

ENGINE CONTROL SYSTEM

SECTION EC

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LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

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NIEC0001

NIEC0001S01

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*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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—NIEC0001S02

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P0131	HO2S1 (B1)	EC-222	CL
P0132	HO2S1 (B1)	EC-228	CL
P0133	HO2S1 (B1)	EC-235	MT
P0134	HO2S1 (B1)	EC-246	MT
P0135	HO2S1 HTR (B1)	EC-254	AT
P0137	HO2S2 (B1)	EC-260	AT
P0138	HO2S2 (B1)	EC-269	AX
P0139	HO2S2 (B1)	EC-278	AX
P0140	HO2S2 (B1)	EC-287	SU
P0141	HO2S2 HTR (B1)	EC-295	SU
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P0151	HO2S1 (B2)	EC-222	BR
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P0159	HO2S2 (B2)	EC-278	HA
P0160	HO2S2 (B2)	EC-287	HA
P0161	HO2S2 HTR (B2)	EC-295	SC
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P0460	FUEL LV SE (SLOSH)	EC-438
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P0731	A/T 1ST GR FNCTN	AT-130
P0732	A/T 2ND GR FNCTN	AT-137
P0733	A/T 3RD GR FNCTN	AT-143
P0734	A/T 4TH GR FNCTN	AT-149
P0740	TCC SOLENOID/CIRC	AT-158
P0744	A/T TCC S/V FNCTN	AT-162
P0745	L/PRESS SOL/CIRC	AT-173
P0750	SFT SOL A/CIRC*3	AT-178

TROUBLE DIAGNOSIS — INDEX QG18DE (EXC CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page	
P0755	SFT SOL B/CIRC*3	AT-182	GI
P1110	INT/V TIM CONT-B1	EC-474	MA
P1111	INT/V TIM V/CIR-B1	EC-480	EM
P1126	THERMOSTAT FNCTN	EC-485	EM
P1130	SWIRL CONT S/V	EC-487	
P1131	SWIRL CONT SOL/V	EC-510	LC
P1140	INTK TIM S/CIRC-B1	EC-516	
P1148	CLOSED LOOP-B1	EC-521	EC
P1165	SWIRL CON VC SW/CIRC	EC-523	
P1168	CLOSED LOOP-B2	EC-521	FE
P1217*2	ENG OVER TEMP	EC-530	
P1320	IGN SIGNAL-PRIMARY	EC-547	CL
P1336	CKP SEN (COG)	EC-558	
P1401	EGR TEMP SEN/CIRC	EC-563	MT
P1402	EGR SYSTEM	EC-570	AT
P1440	EVAP SMALL LEAK	EC-577	
P1441	EVAP VERY SML LEAK	EC-579	AX
P1444	PURG VOLUME CONT/V	EC-595	
P1446	VENT CONTROL VALVE	EC-607	SU
P1447	EVAP PURG FLOW/MON	EC-615	
P1448	VENT CONTROL VALVE	EC-627	BR
P1464	FUEL LEVEL SEN/CIRC	EC-636	
P1490	VC/V BYPASS/V	EC-639	ST
P1491	VC CUT/V BYPASS/V	EC-645	
P1605	A/T DIAG COMM LINE	EC-655	RS
P1610 - P1615*2	NATS MALFUNCTION	EL-301	
P1705	TP SEN/CIRC A/T*3	AT-186	BT
P1706	P-N POS SW/CIRCUIT	EC-658	
P1760	O/R CLTCH SOL/CIRC	AT-194	HA

*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NIEC0002

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL B15 is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance should be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses covered with yellow insulation tape either just before the harness connectors or for the complete harness are related to the SRS.

Precautions for On Board Diagnostic (OBD) System of Engine and A/T

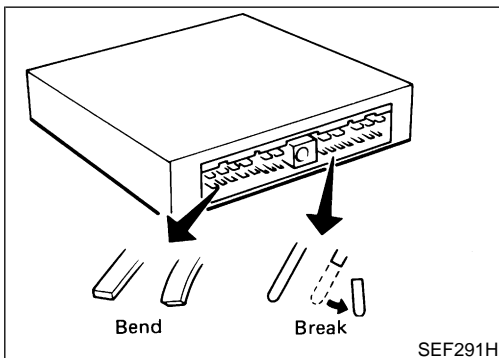
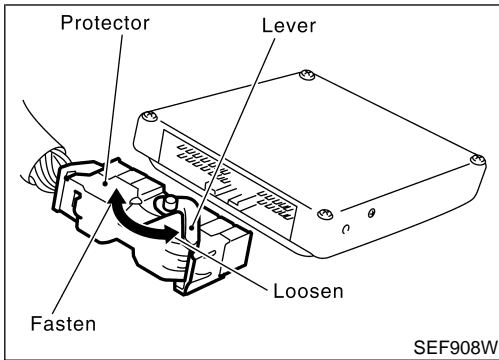
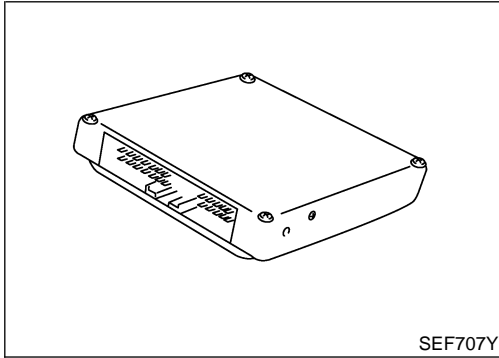
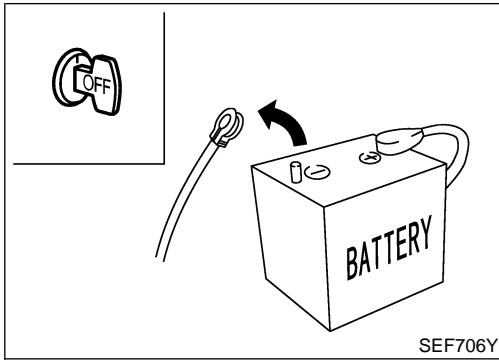
NIEC0003

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- Be sure to turn the ignition switch "OFF" and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.
For description and how to disconnect, refer to EL section, "Description", "HARNES CONNECTOR".
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission control module) before returning the vehicle to the customer.

NIEC0005

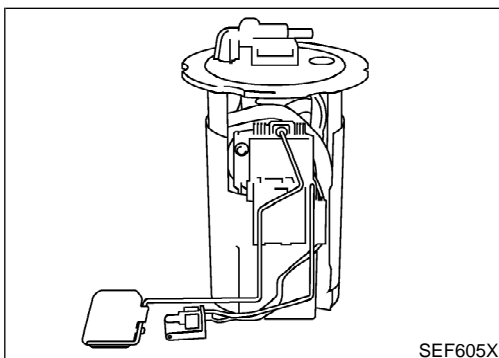
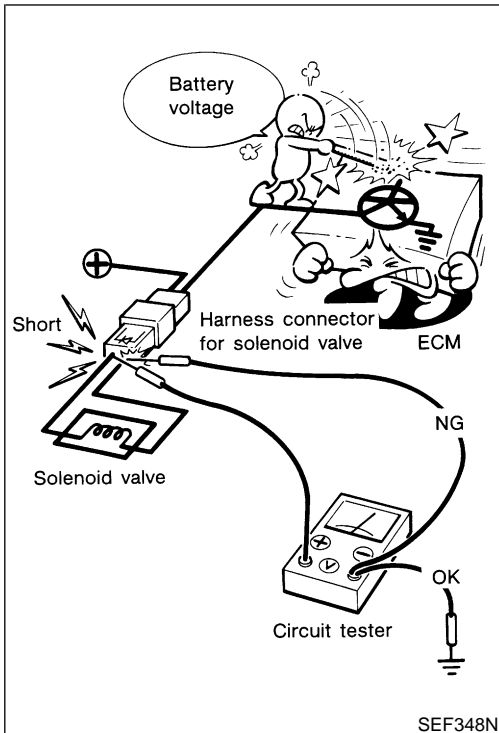
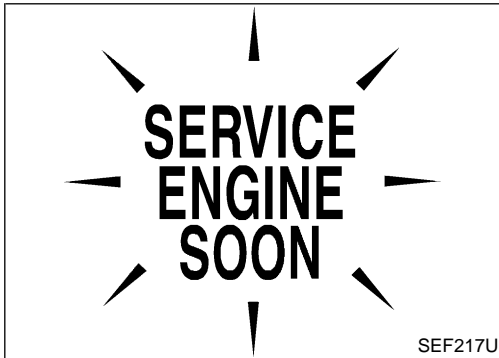
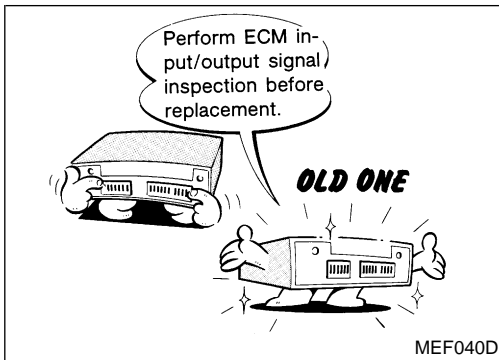


Precautions

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value. The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go, as shown at left.
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break). Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Securely connect ECM harness connectors. A Poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent a ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.

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Precautions (Cont'd)

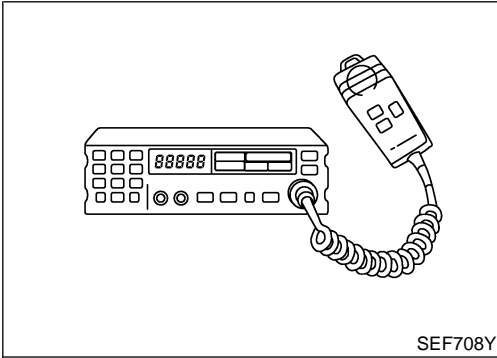
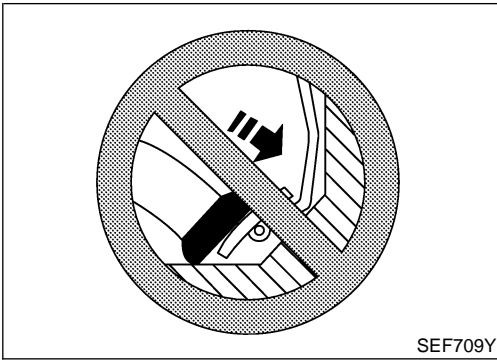


- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to "ECM Terminals and Reference Value", EC-154.
- After performing each TROUBLE DIAGNOSIS, perform "Overall Function Check" or "DTC Confirmation Procedure". The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed. The "Overall Function Check" should be a good result if the repair is completed.
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble IAC valve-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor (PHASE).
- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

PRECAUTIONS

QG18DE (EXC CALIF CA)

Precautions (Cont'd)



- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

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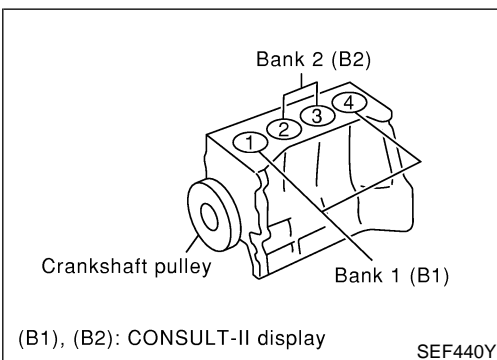
- When installing C.B., ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - a) Keep the antenna as far as possible from the electronic control units.
 - b) Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - c) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - d) Be sure to ground the radio to vehicle body.

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- Regarding model B15, “-B1” indicates cylinders number 1 and 4 and “-B2” indicates cylinders number 2 and 3.

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Wiring Diagrams and Trouble Diagnosis

When you read Wiring diagrams, refer to the following:

- **GI-11**, “HOW TO READ WIRING DIAGRAMS”
- **EL-9**, “POWER SUPPLY ROUTING” for power distribution circuit

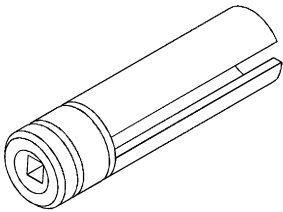
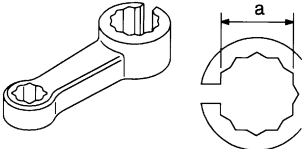
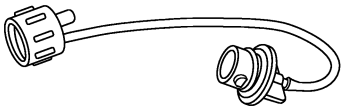
When you perform trouble diagnosis, refer to the following:

- **GI-35**, “How to Follow Test Groups in Trouble Diagnoses”
- **GI-24**, “HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT”

Special Service Tools

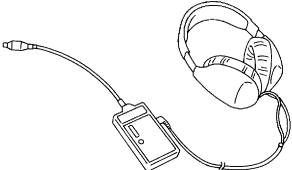
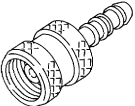
NIEC0007

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
KV10117100 (J36471-A) Heated oxygen sensor wrench	 <p>Loosening or tightening front heated oxygen sensor with 22 mm (0.87 in) hexagon nut</p> <p>NT379</p>
KV10114400 (J-38365) Heated oxygen sensor wrench	 <p>Loosening or tightening rear heated oxygen sensor a: 22 mm (0.87 in)</p> <p>NT636</p>
Fuel filler cap adapter (J-45356)	 <p>Checking fuel tank vacuum relief valve opening pressure</p> <p>NT815</p>

Commercial Service Tools

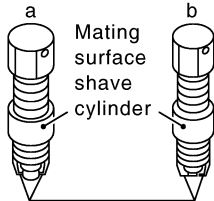
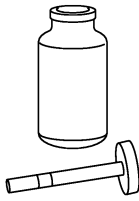
NIEC0008

Tool name	Description
Leak detector (J41416)	 <p>Locating the EVAP leak</p> <p>NT703</p>
EVAP service port adapter (J41413-OBD)	 <p>Applying positive pressure through EVAP service port</p> <p>NT704</p>

PREPARATION

QG18DE (EXC CALIF CA)

Commercial Service Tools (Cont'd)

Tool name	Description
Oxygen sensor thread cleaner (J-43897-18) (J-43897-12)	 <p>Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below.</p> <p>a: J-43897-18 18 mm with 1.5 mm pitch dia., for Zirconia Oxygen Sensor</p> <p>b: J-43897-12 12 mm with 1.25 mm pitch dia., for Titania Oxygen Sensor</p> <p>NT778</p>
Anti-seize lubricant (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	 <p>Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.</p> <p>NT779</p>

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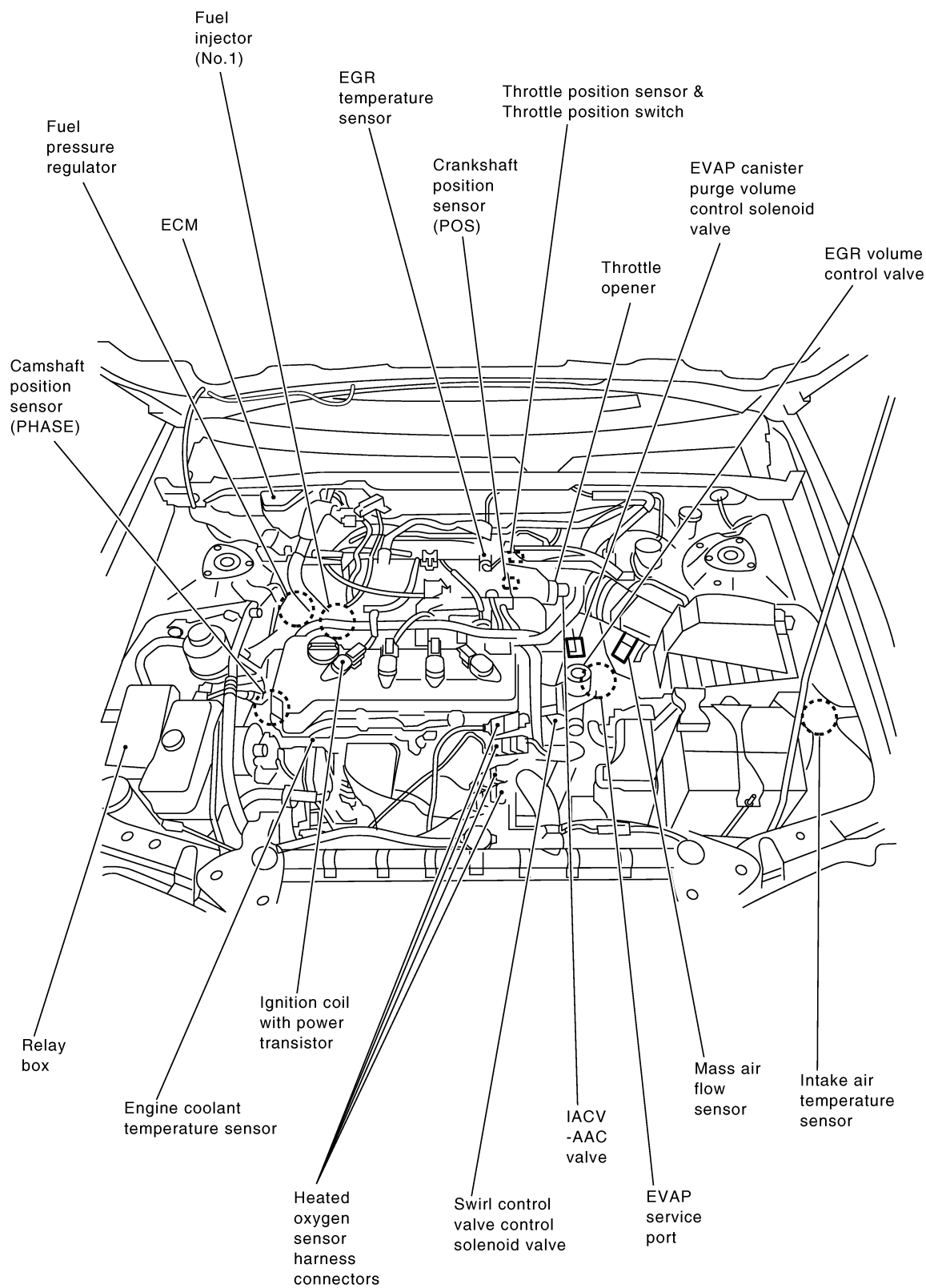
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

Engine Control Component Parts Location

Engine Control Component Parts Location

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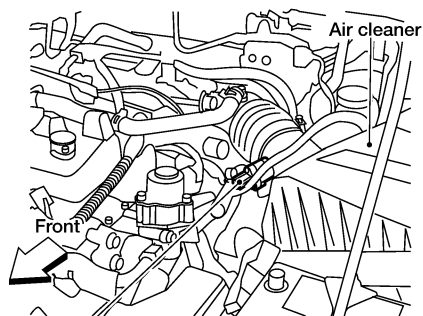


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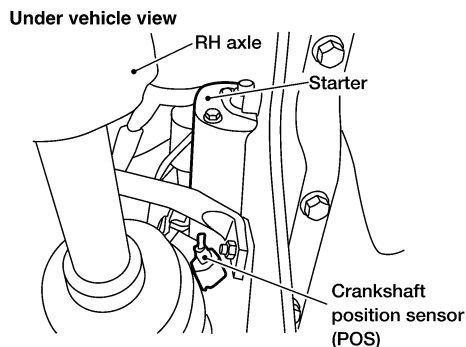
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

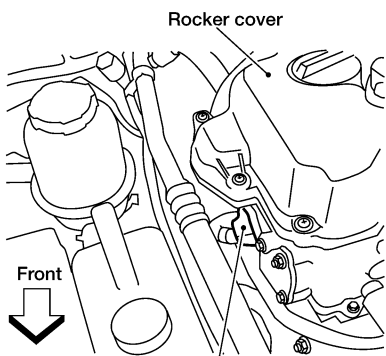
Engine Control Component Parts Location (Cont'd)



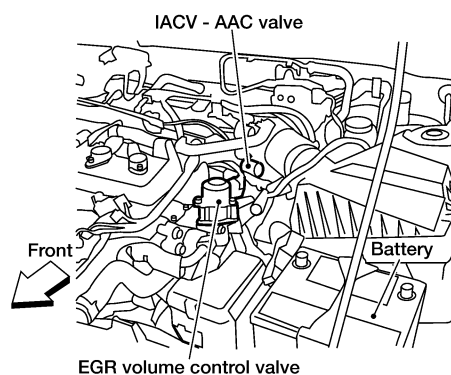
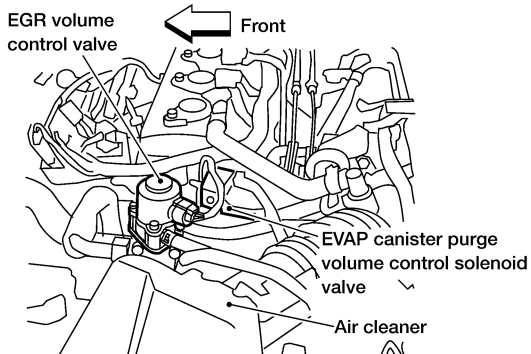
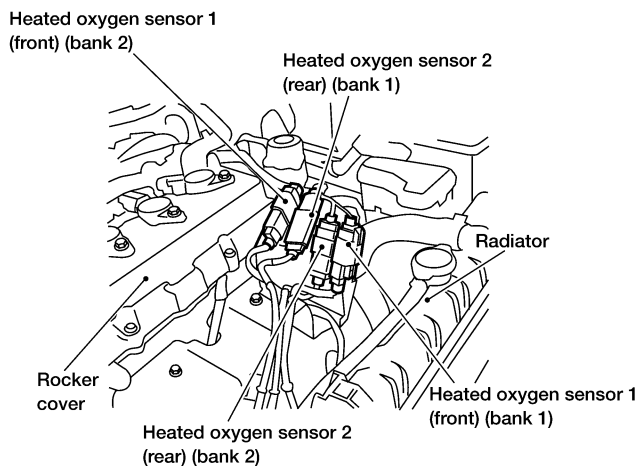
Mass air flow sensor



Crankshaft position sensor (POS)



Camshaft position sensor (PHASE)

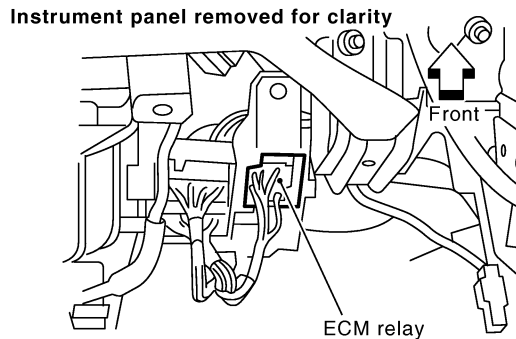
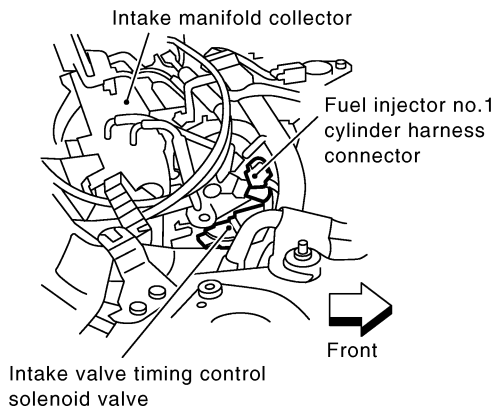
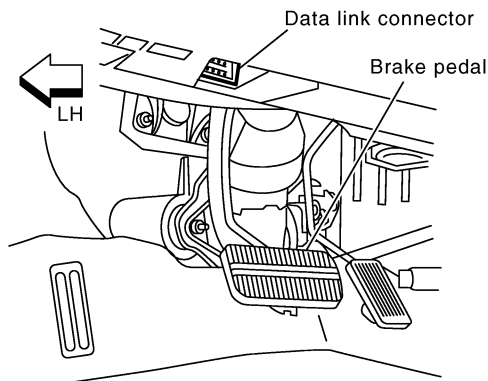
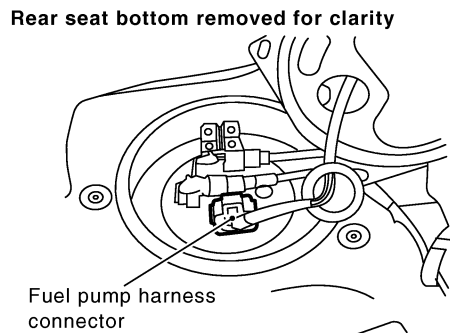
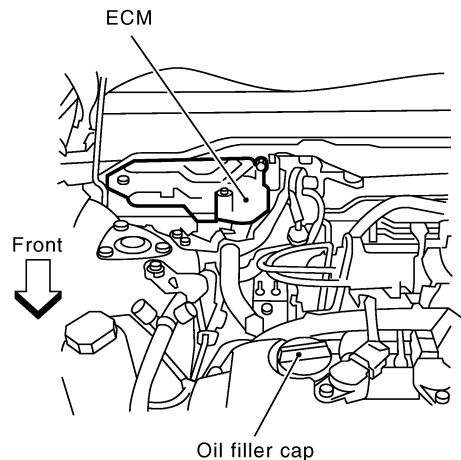
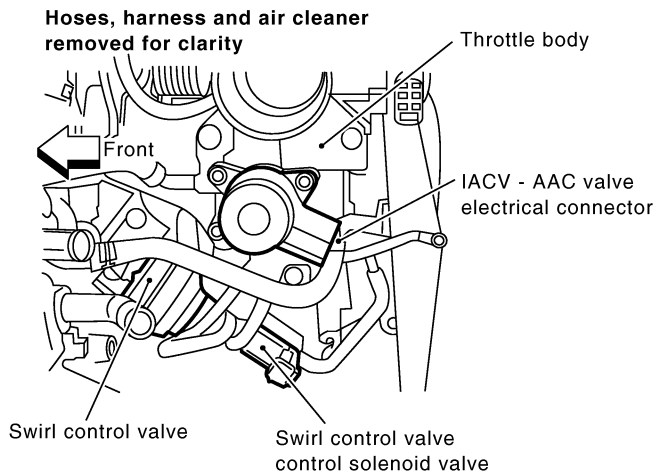


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

Engine Control Component Parts Location (Cont'd)

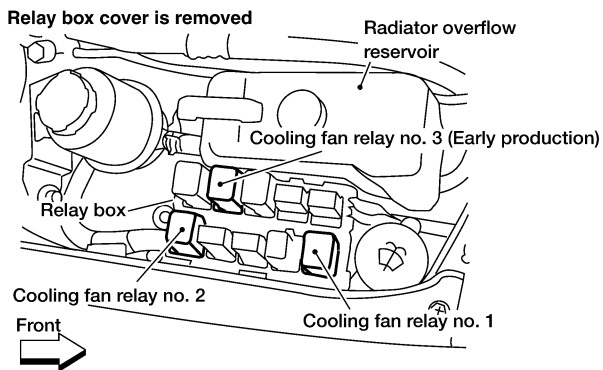
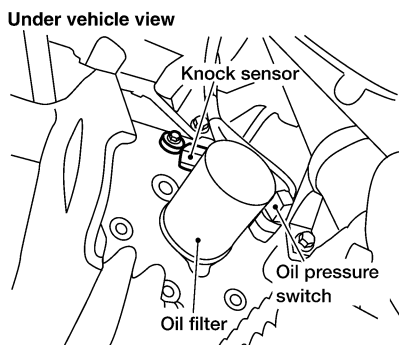
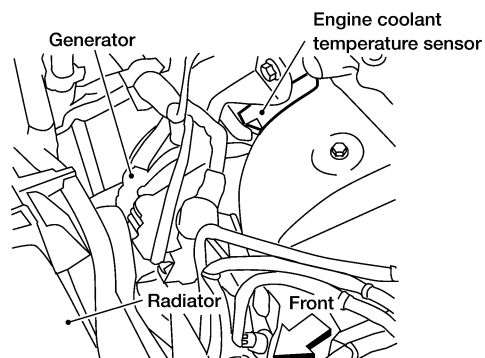
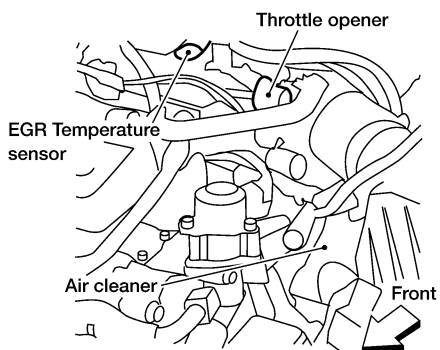
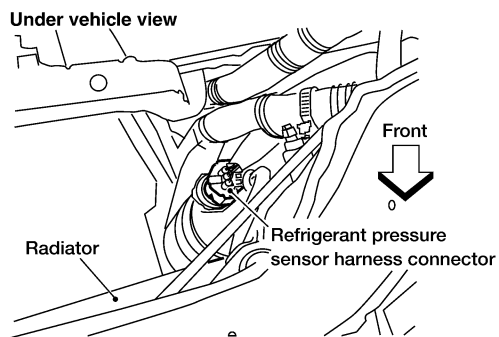
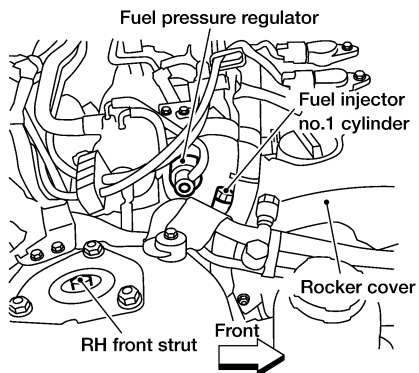


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

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Engine Control Component Parts Location (Cont'd)



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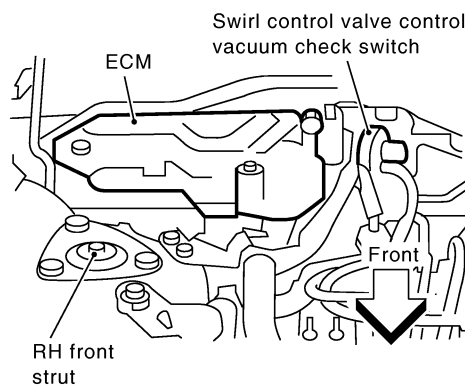
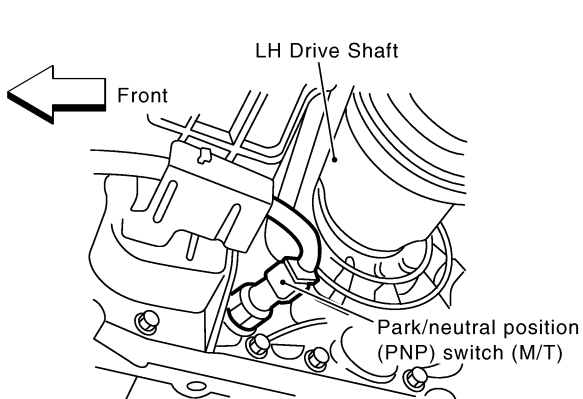
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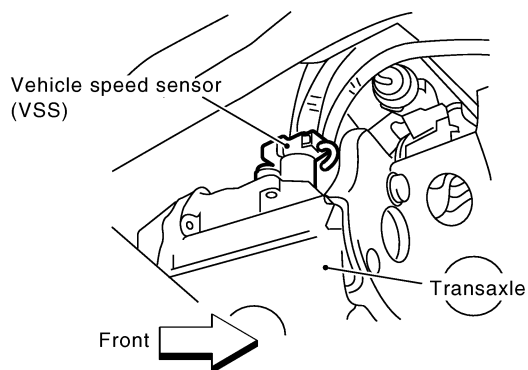
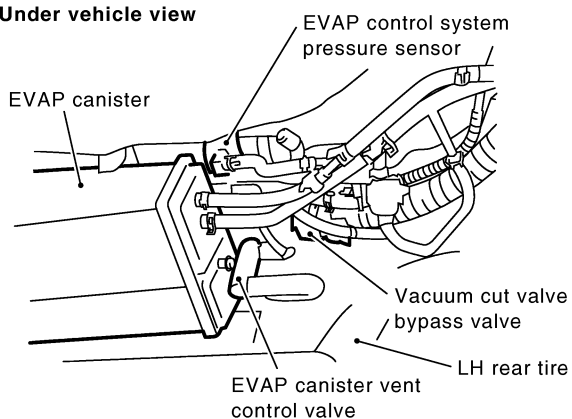
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

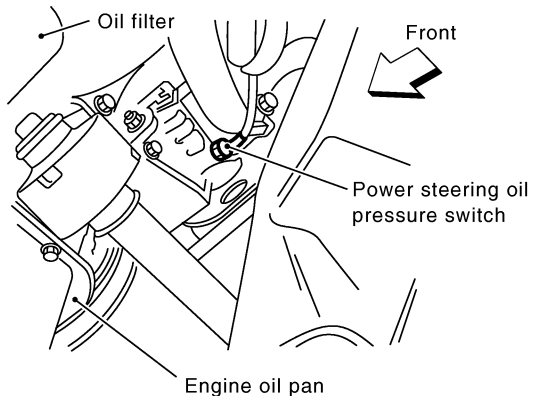
Engine Control Component Parts Location (Cont'd)



Under vehicle view



Under vehicle view



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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

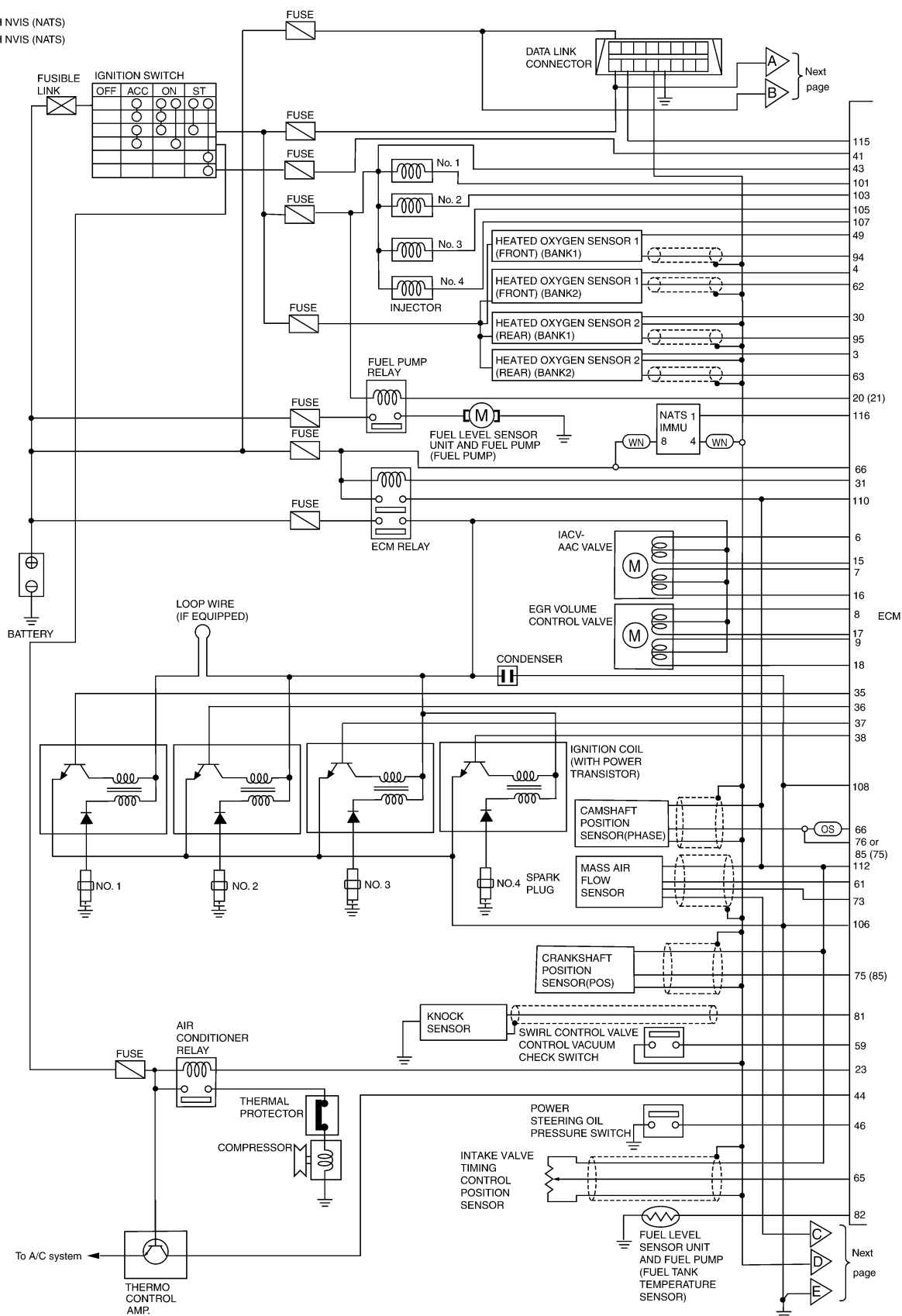
Circuit Diagram

Circuit Diagram

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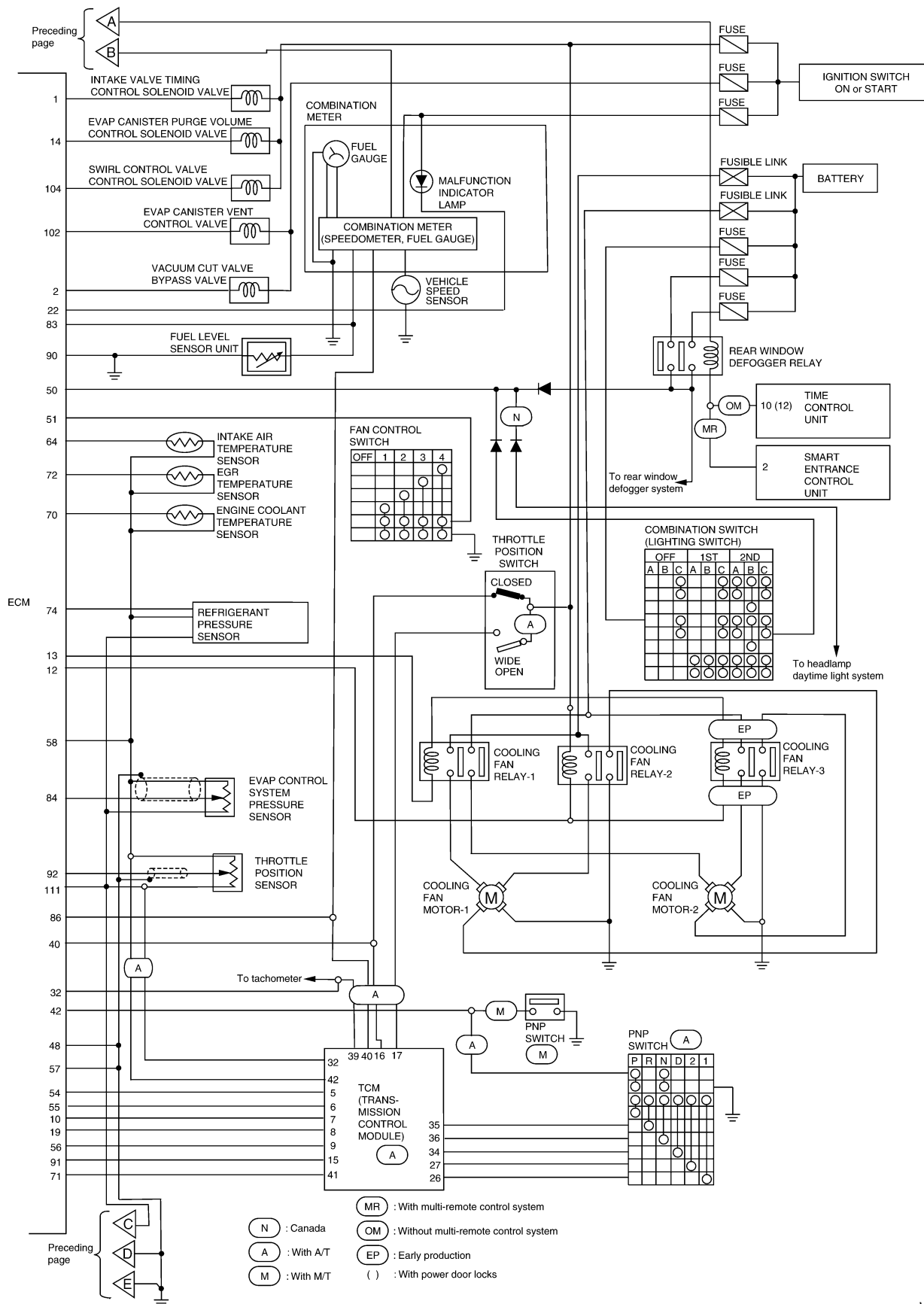


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

Circuit Diagram (Cont'd)



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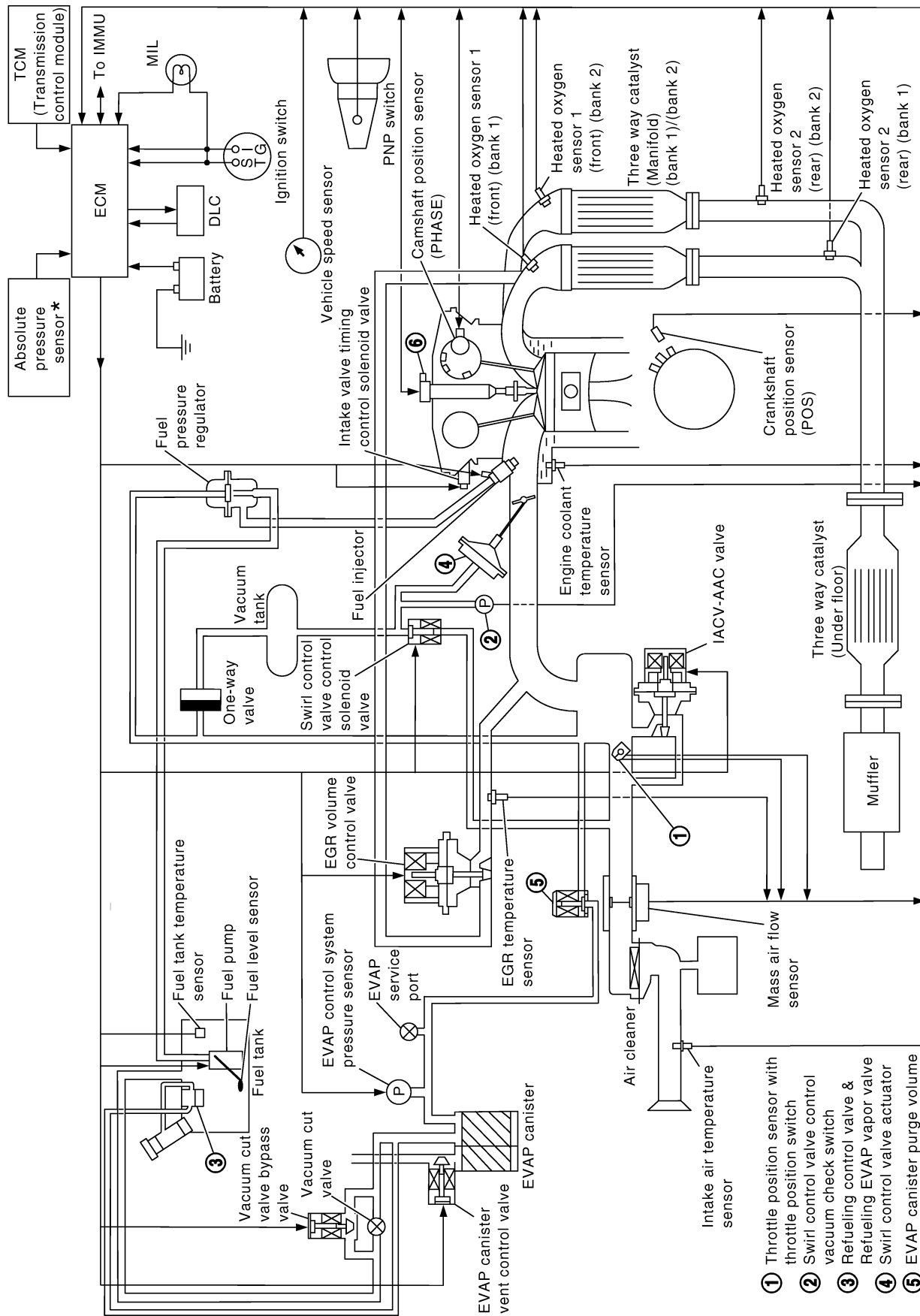
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

System Diagram

System Diagram

NIEC0011



* : Absolute pressure sensor is built into the ECM.

- ① Throttle position sensor with throttle position switch
- ② Swirl control valve control vacuum check switch
- ③ Refueling control valve & Refueling EVAP vapor valve
- ④ Swirl control valve actuator
- ⑤ EVAP canister purge volume control valve
- ⑥ Ignition coil & power transistor

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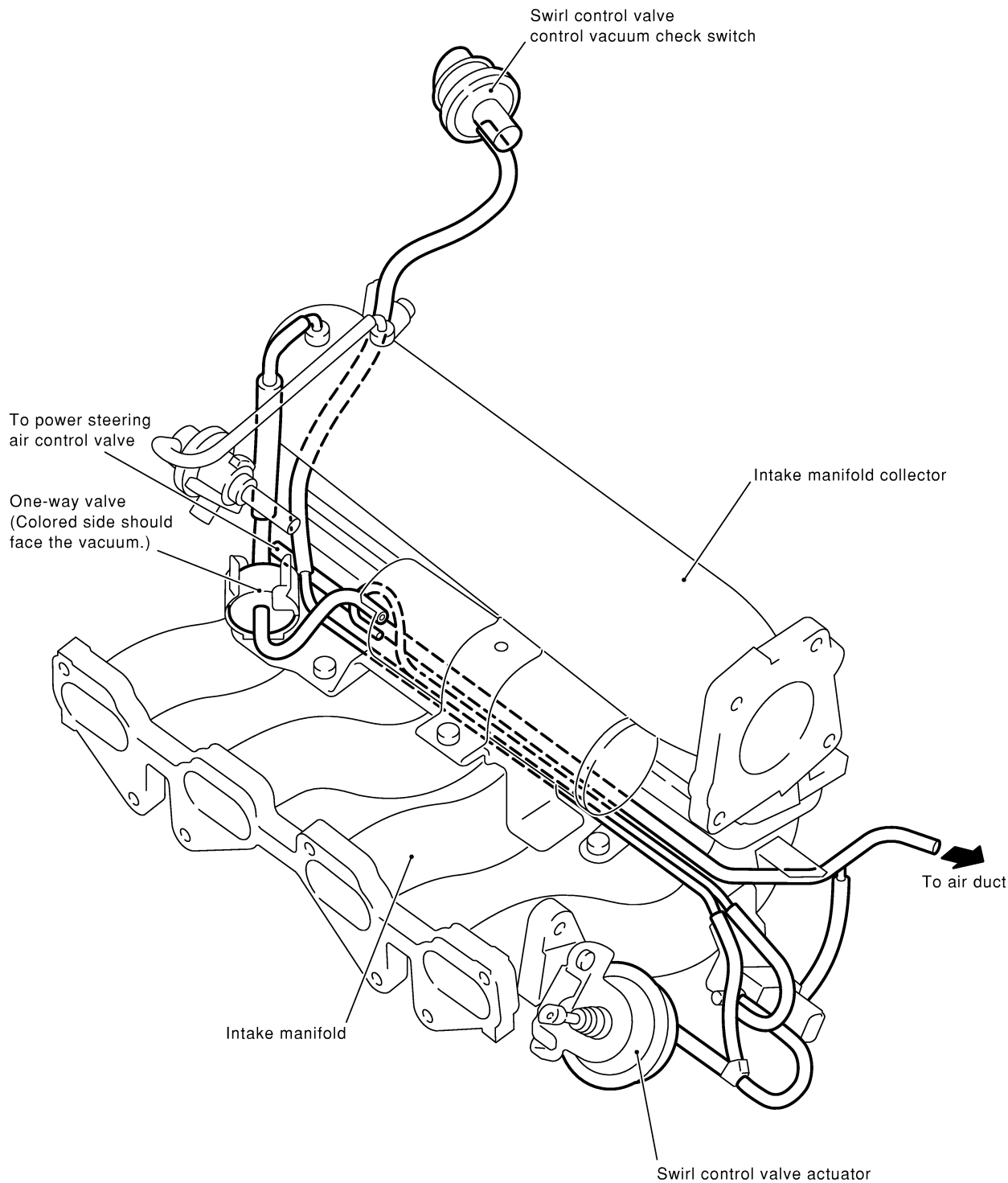
QG18DE (EXC CALIF CA)

Vacuum Hose Drawing

Vacuum Hose Drawing

NIEC0012

Refer to "System Diagram" on EC-41 for vacuum control system.



NOTE: Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

SEF443Y

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (EXC CALIF CA)

System Chart

System Chart

NIEC0013

Input (Sensor)	ECM Function	Output (Actuator)	
<ul style="list-style-type: none"> ● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Mass air flow sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 (front) ● Ignition switch ● Throttle position sensor ● PNP switch ● Air conditioner switch ● Knock sensor ● EGR temperature sensor*1 ● EVAP control system pressure sensor*1 ● Fuel tank temperature sensor*1 ● Battery voltage ● Power steering oil pressure switch ● Vehicle speed sensor ● Intake air temperature sensor ● Absolute pressure sensor ● Heated oxygen sensor 2 (rear)*3 ● TCM (Transmission control module)*2 ● Closed throttle position switch*4 ● Electrical load ● Intake valve timing control position sensor*1 ● Swirl control vacuum check switch*1 ● Fuel level sensor*1 ● Refrigerant pressure sensor 	Fuel injection & mixture ratio control	Injectors	GI
	Distributor ignition system	Power transistor	MA
	Idle air control system	IACV-AAC valve	EM
	Intake valve timing control	Intake valve timing control solenoid valve	EM
	Fuel pump control	Fuel pump relay	LC
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)	EC
	EGR control	EGR volume control valve	FE
	Swirl control valve control	Swirl control valve control solenoid valve	FE
	Heated oxygen sensor 1 and 2 heater control	Heated oxygen sensor heater	CL
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve	MT
	Cooling fan control	Cooling fan relays	AT
	Air conditioning cut control	Air conditioner relay	AT
	ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve 	AX

*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

*2: The DTC related to A/T will be sent to ECM.

*3: Under normal conditions, this sensor is not for engine control operation.

*4: This switch will operate in place of the throttle position sensor to control EVAP parts if the sensor malfunctions.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Multiport Fuel Injection (MFI) System

Multiport Fuel Injection (MFI) System

DESCRIPTION

Input/Output Signal Chart

NIEC0014

NIEC0014S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and piston number	Fuel injection & mixture ratio control	Injector
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position Throttle valve idle position		
PNP switch	Gear position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Electrical load	Electrical load signal		
Battery	Battery voltage		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 (rear)*	Density of oxygen in exhaust gas		
Absolute pressure sensor	Ambient air barometric pressure		

* Under normal conditions, this sensor is not for engine control operation.

Basic Multiport Fuel Injection System

NIEC0014S02

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

Various Fuel Injection Increase/Decrease Compensation

NIEC0014S03

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models only)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation
- During high vehicle speed operation
- Extremely high engine coolant temperature

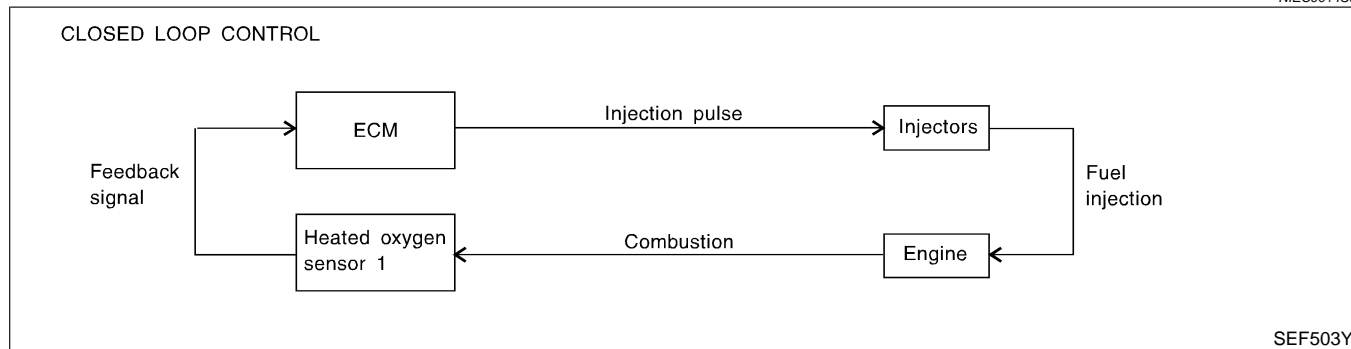
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Multiport Fuel Injection (MFI) System (Cont'd)

Mixture Ratio Feedback Control (Closed loop control)

NIEC0014S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 (front) in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1 (front), refer to "DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2)/(BANK 2) (CIRCUIT)", EC-213. This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 (rear) is located downstream of the three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 (front) shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2 (rear).

Open Loop Control

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 (front) or its circuit
- Insufficient activation of heated oxygen sensor 1 (front) at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

Mixture Ratio Self-learning Control

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor 1 (front). This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from the heated oxygen sensor 1 (front) indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

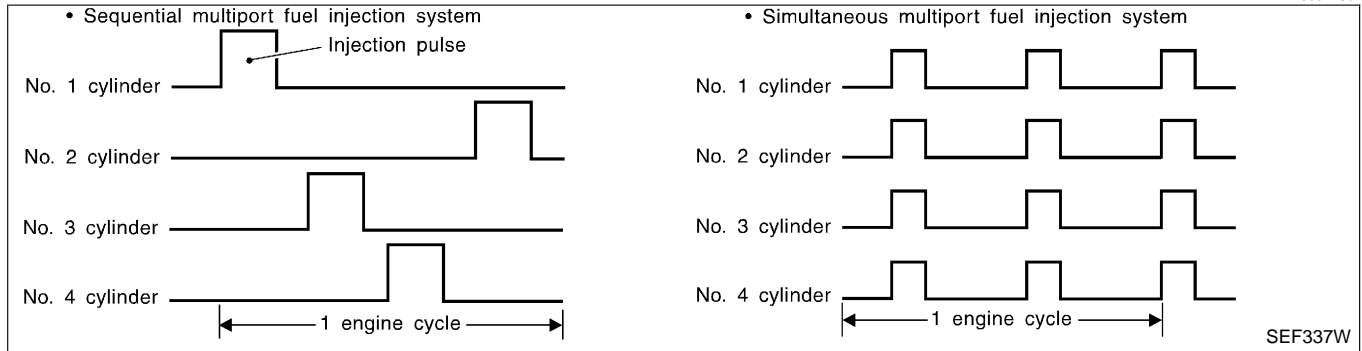
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Multiport Fuel Injection (MFI) System (Cont'd)

Fuel Injection Timing

NIEC0014S07



Two types of systems are used.

Sequential Multiport Fuel Injection System

NIEC0014S0701

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

NIEC0014S0702

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

Fuel Shut-off

NIEC0014S08

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Distributor Ignition (DI) System

DESCRIPTION

NIEC0015

Input/Output Signal Chart

NIEC0015S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and piston number	Ignition timing control	Power transistor
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position Throttle valve idle position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage		

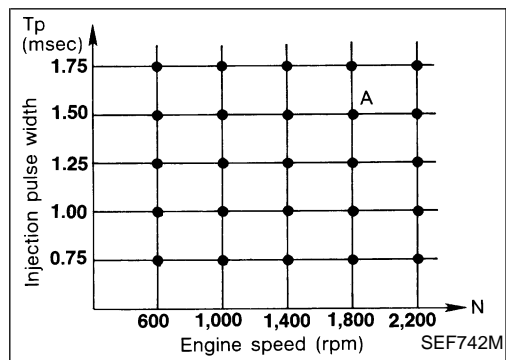
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Distributor Ignition (DI) System (Cont'd)

System Description

NIEC0015S02



The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

The ECM receives information such as the injection pulse width and camshaft position sensor (PHASE) signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec

A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control

DESCRIPTION

Input/Output Signal Chart

NIEC0016

NIEC0016S01

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
PNP switch	Neutral position		
Throttle position sensor	Throttle valve opening angle		
Camshaft position sensor (PHASE)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

System Description

NIEC0016S02

This system improves engine operation when the air conditioner is used.

Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Fuel Cut Control (at no load & high engine speed)

- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When the refrigerant pressure is excessively high or low.

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NIEC0017

NIEC0017S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS)	Engine speed		
Camshaft position sensor (PHASE)	Engine speed and piston number		

If the engine speed is above 2,500 rpm with no load, (for example, in Neutral and engine speed over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

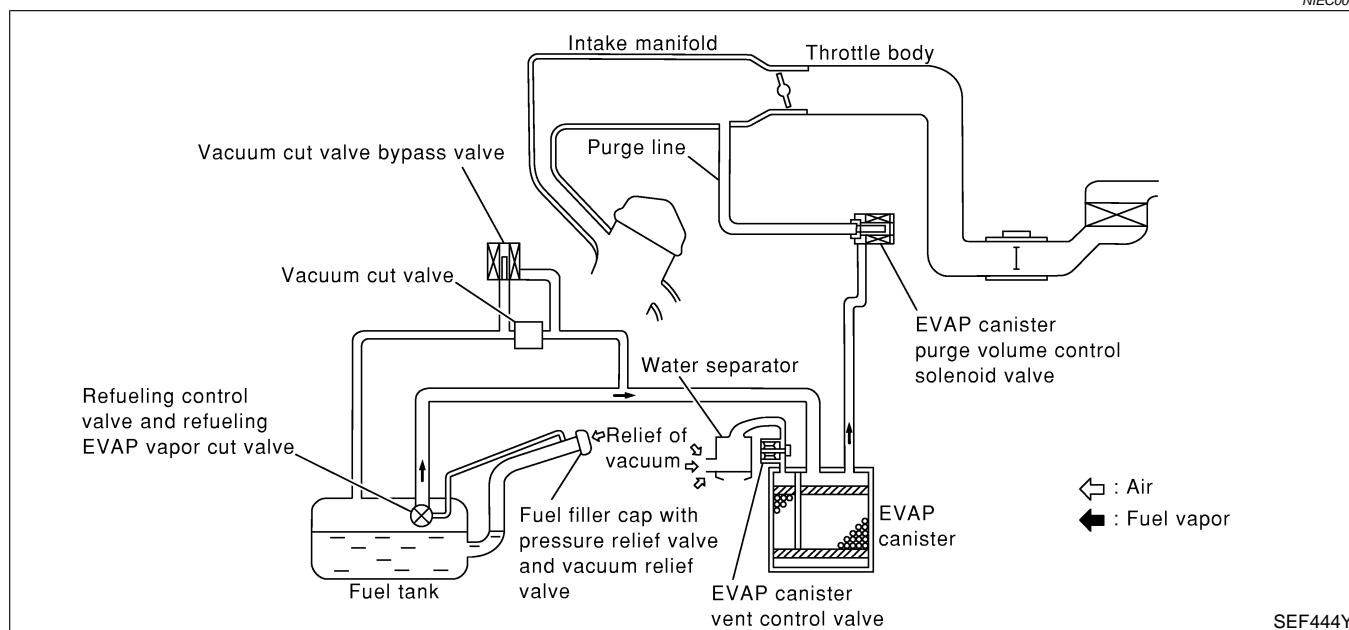
NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, EC-44.

Evaporative Emission System

DESCRIPTION

NIEC0018



SEF444Y

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating. EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

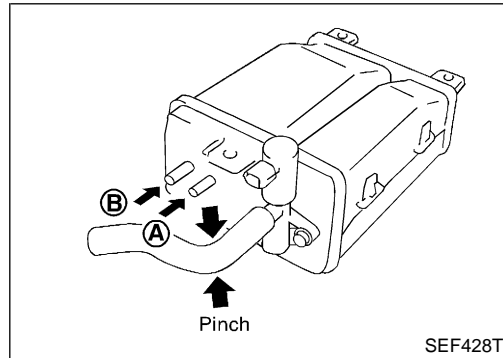
EVAP canister purge control solenoid valve also shuts off the vapor purge line during decelerating and idling.

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INSPECTION

EVAP Canister

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that air flows freely through port **B**.

NIEC0019

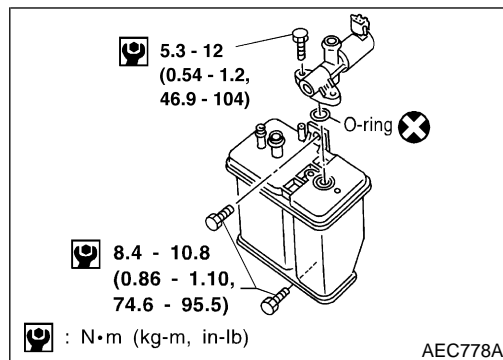
NIEC0019S01

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Tightening Torque

Tighten EVAP canister as shown in the figure.

Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.

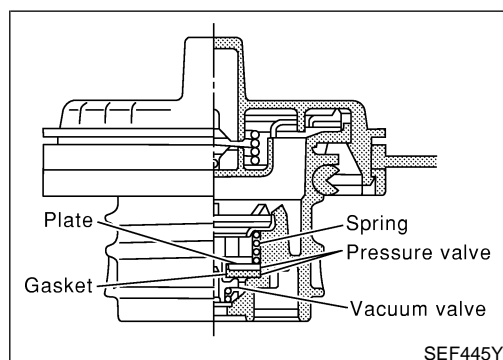
NIEC0019S02

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Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NOTE:

Refer to fuel filler cap adapter instruction manual before performing following inspection.

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

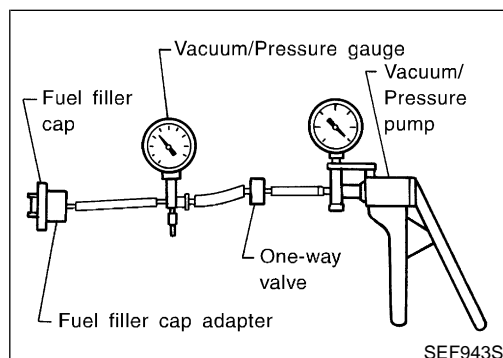
NIEC0019S03

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3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NIEC0019S05

Refer to EC-645.

Evaporative Emission (EVAP) Canister Purge Volume Control Solenoid Valve

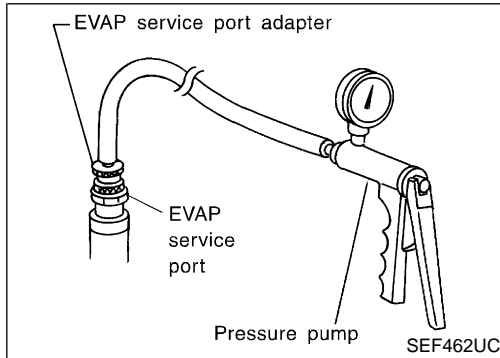
NIEC0019S06

Refer to EC-400.

Fuel Tank Temperature Sensor

NIEC0019S08

Refer to EC-319.



EVAP Service Port

NIEC0019S09

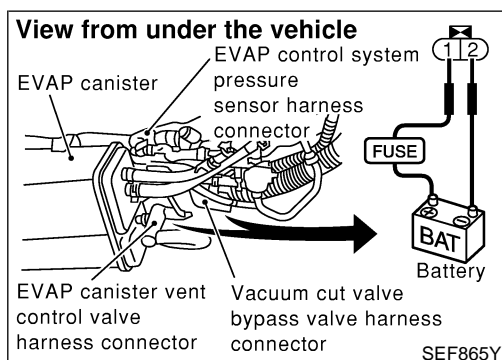
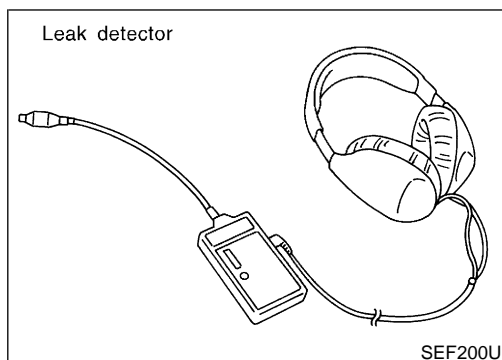
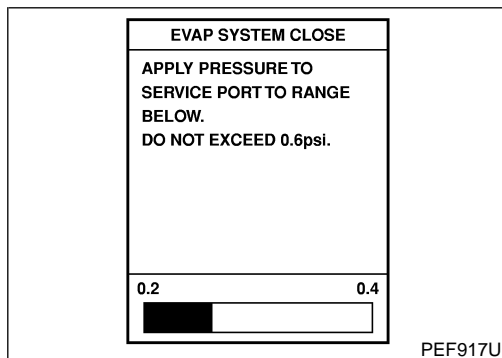
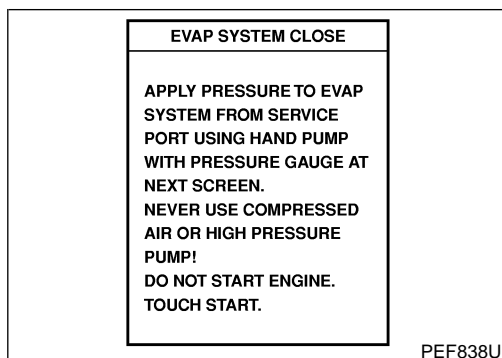
Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

NIEC0019S10



How to Detect Fuel Vapor Leakage

CAUTION:

- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

Improper installation of adapter to the service port may cause a leak.

④ With CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port.
- 2) Also attach the pressure pump and hose.
- 3) Turn ignition switch "ON".
- 4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
- 5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- 7) Remove the EVAP service port adapter and hose with pressure pump.
- 8) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.
- 9) If the check result is NG, repair or replace the malfunctioning parts.
If OK, touch "BACK" on CONSULT-II screen.
- 10) Start engine and warm it up to normal operating temperature.
- 11) Turn ignition switch "OFF" and wait at least 10 seconds.
- 12) Restart engine and let it idle for 90 seconds.
- 13) Keep engine speed at 2,000 rpm for 30 seconds.
- 14) Turn ignition switch "OFF".

⊗ Without CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
- 2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
- 3) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
- 4) Remove the EVAP service port adapter and hose with pressure pump.
- 5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.
- 6) If the check result is NG, repair or replace the malfunctioning parts.
If OK, stop applying battery voltage to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 7) Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 8) Start engine and warm it up to normal operating temperature.
- 9) Turn ignition switch "OFF" and wait at least 10 seconds.
- 10) Restart engine and let it idle for 90 seconds.

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**ENGINE AND EMISSION BASIC CONTROL
SYSTEM DESCRIPTION**

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

- 11) Keep engine speed at 2,000 rpm for 30 seconds.
- 12) Turn ignition switch "OFF".

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

EVAPORATIVE EMISSION LINE DRAWING

NIEC0020

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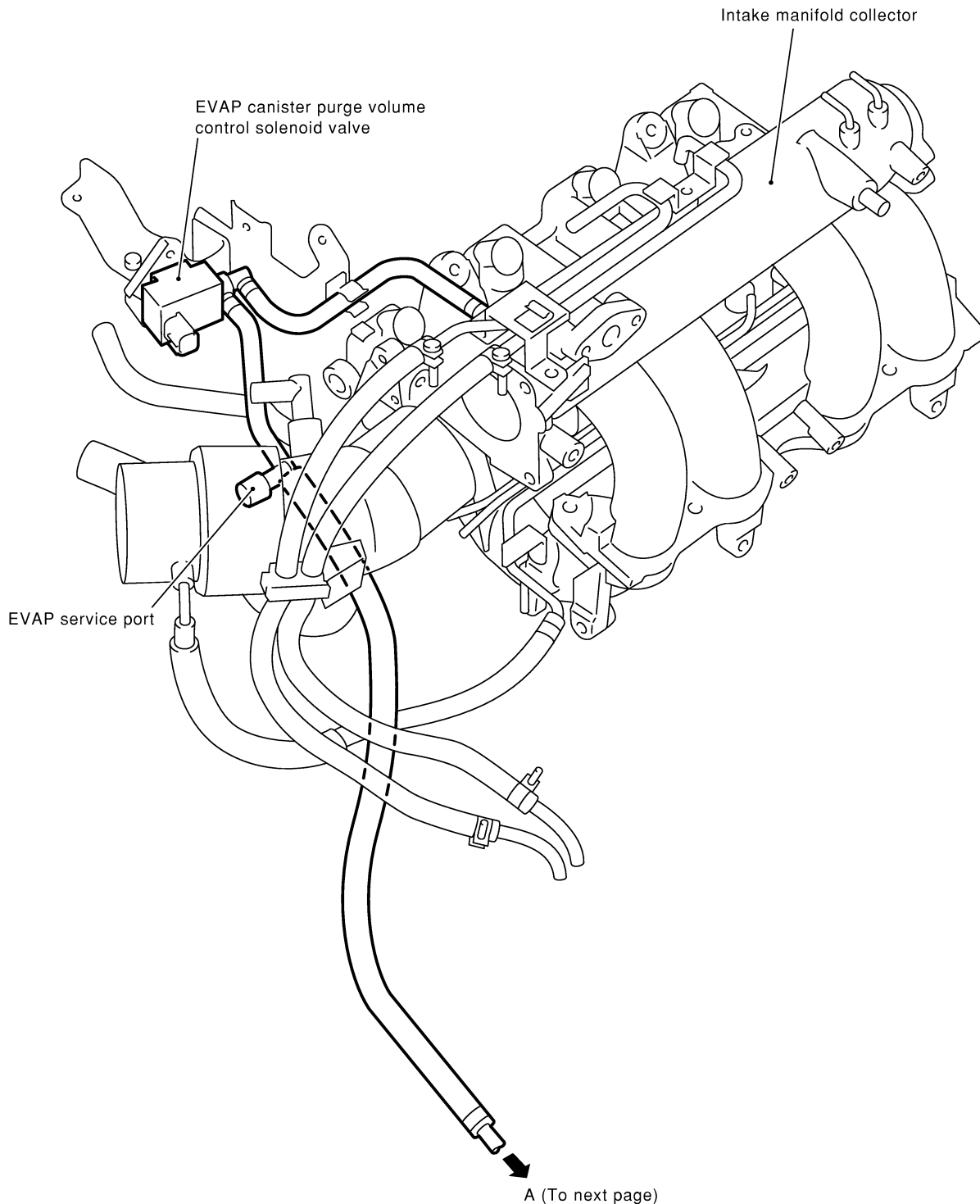
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NOTE : Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

SEF446Y

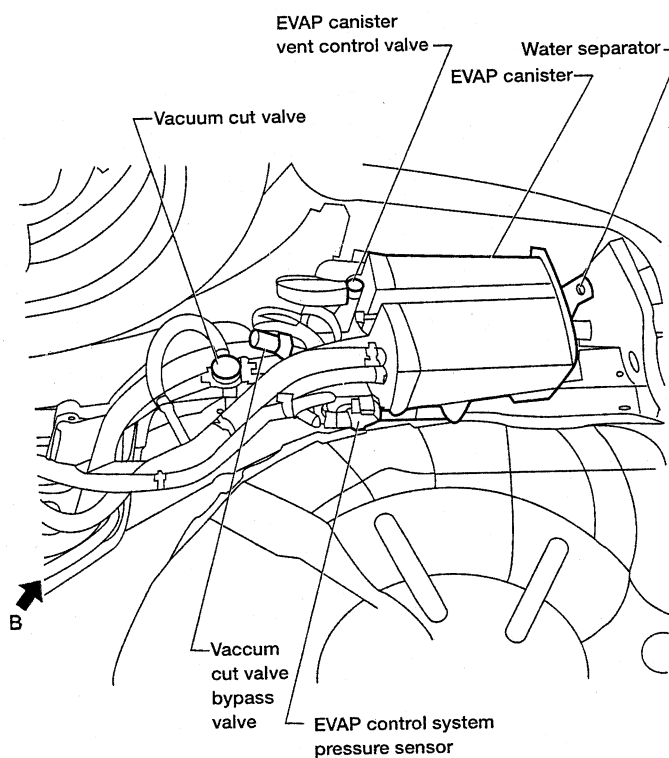
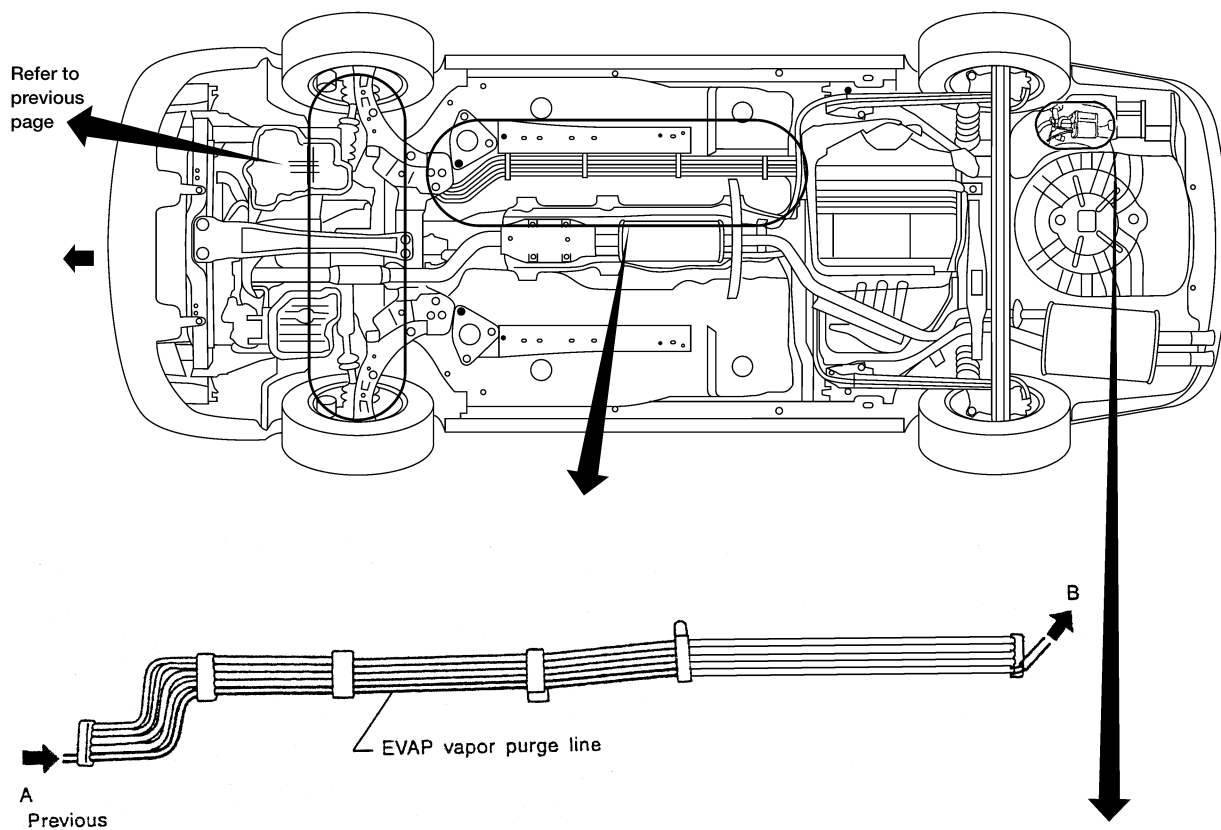
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Evaporative Emission System (Cont'd)

NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.



WEC362

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

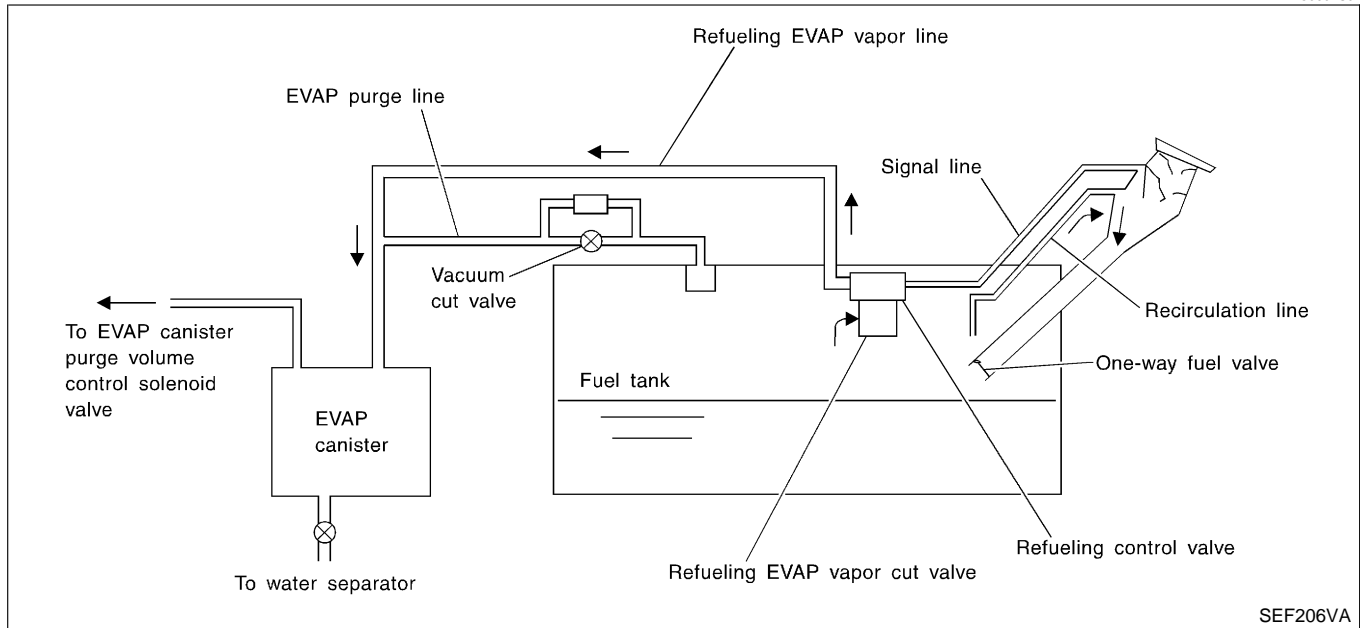
On Board Refueling Vapor Recovery (ORVR)

On Board Refueling Vapor Recovery (ORVR)

NIEC0502

SYSTEM DESCRIPTION

NIEC0502S01



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: INFLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - a) Put drained fuel in an explosion-proof container and put lid on securely.
 - b) Release fuel pressure from fuel line. Refer to "Fuel Pressure Release", EC-67.
 - c) Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

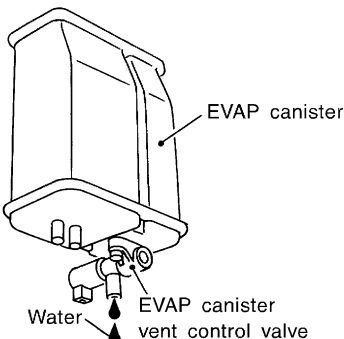
DIAGNOSTIC PROCEDURE

NIEC0502S02

Symptom: Fuel Odor from EVAP Canister Is Strong.

NIEC0502S0201

1	CHECK EVAP CANISTER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

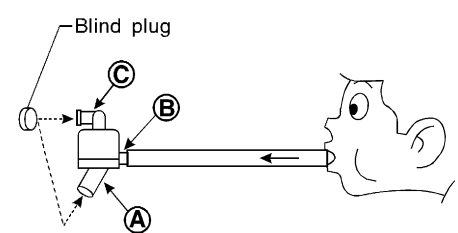
2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 3.
No (With CONSULT-II)	▶	GO TO 6.
No (Without CONSULT-II)	▶	GO TO 7.

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	▶	GO TO 4.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR	<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: ● Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT	
	OK	▶	GO TO 5.	
	NG	▶	Replace water separator.	

5	DETECT MALFUNCTIONING PART	<p>Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.</p> <p style="text-align: center;">▶</p> <p style="text-align: center;">Repair or replace EVAP hose.</p>	AT AX SU BR ST RS BT HA SC EL IDX
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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

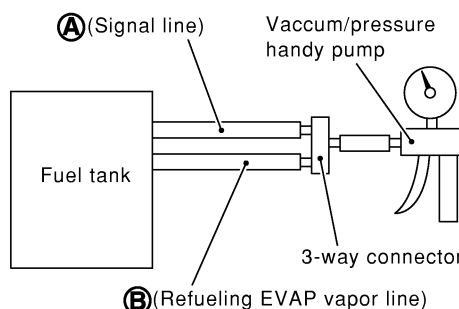
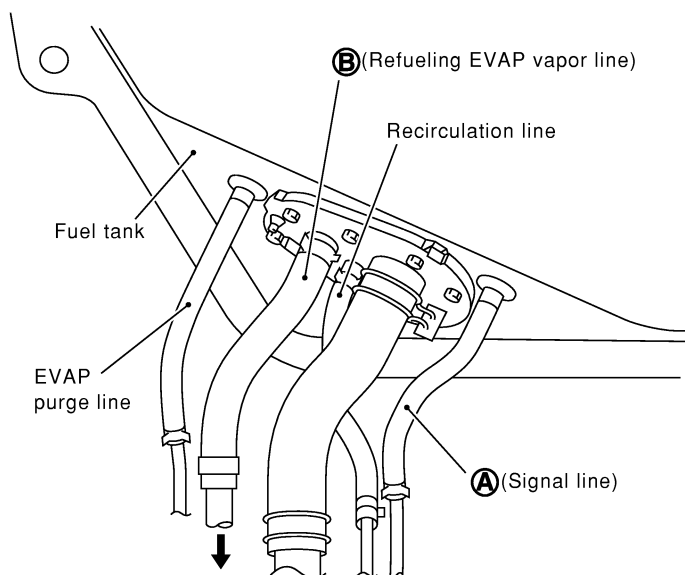
6 CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to **FE-6**, "FUEL SYSTEM."
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel level sensor unit.

Always replace O-ring with new one.

 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF246Y

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

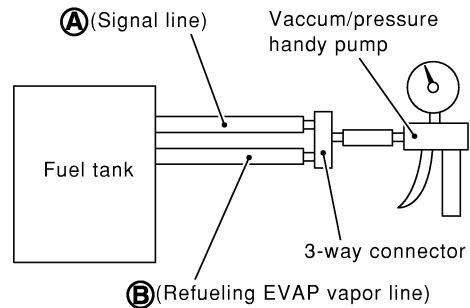
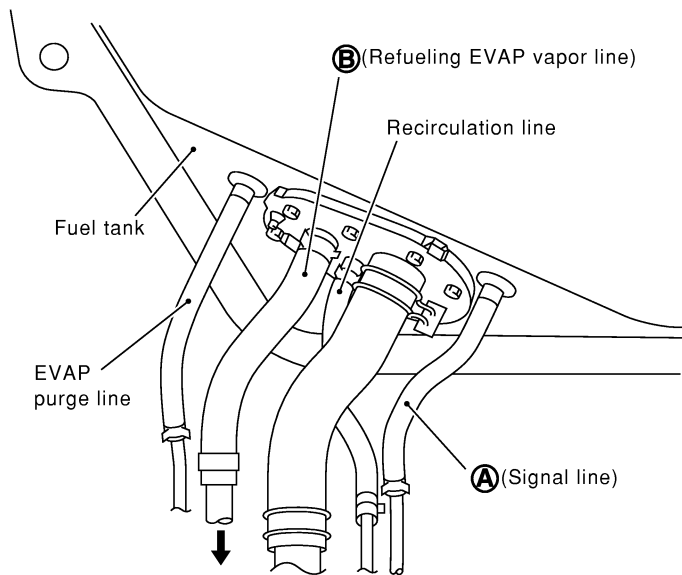
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

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7 CHECK REFUELING EVAP VAPOR CUT VALVE

⊗ Without CONSULT-II

1. Remove fuel tank. Refer to **FE-6**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel level sensor unit retainer.
 - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
 Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit retainer with fuel level sensor unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF246Y

OK or NG

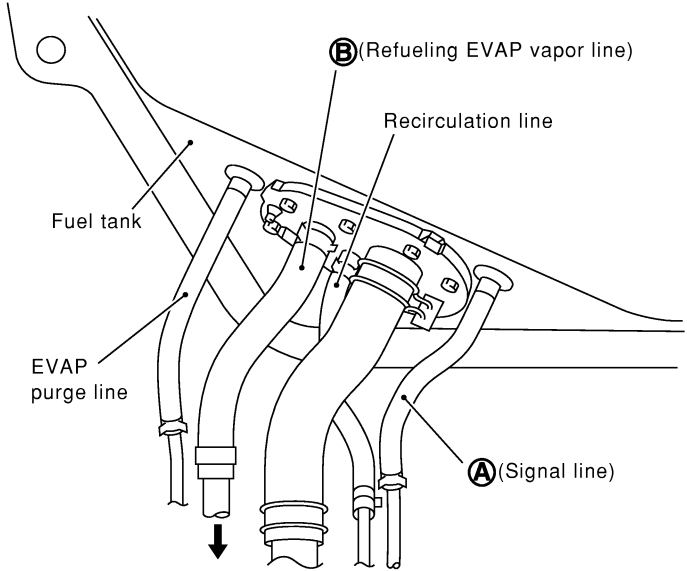
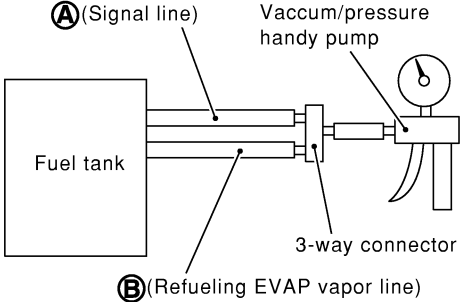
OK ► GO TO 8.

NG ► Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

8	CHECK REFUELING CONTROL VALVE	<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.
		
		
		SEF246Y
OK or NG		
OK	▶	INSPECTION END
NG	▶	Replace refueling control valve with fuel tank.

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

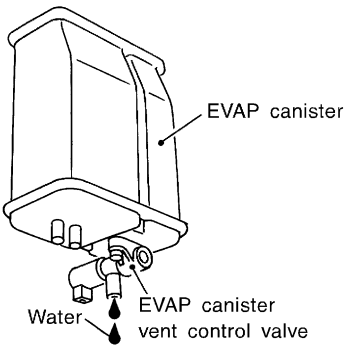
NIEC0502S0202

1	CHECK EVAP CANISTER	<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

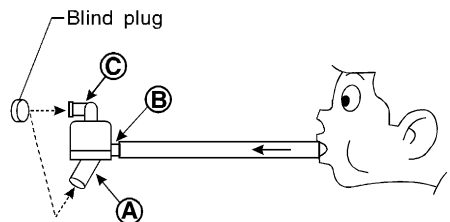
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

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3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
▶ GO TO 4.		

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4	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
● Do not disassemble water separator.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace water separator.

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5	DETECT MALFUNCTIONING PART	
Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.		
▶ Repair or replace EVAP hose.		

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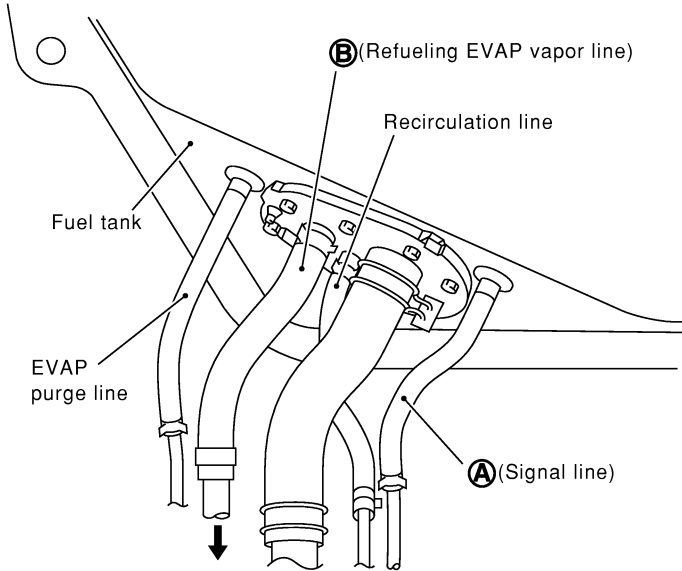
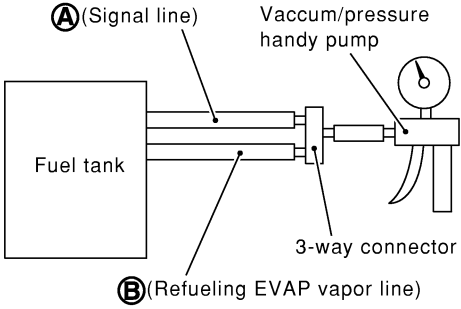
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

6	CHECK VENT HOSES AND VENT TUBES	
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE	
Check signal line and recirculation line for clogging, dents and cracks.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace filler neck tube.

8	CHECK REFUELING CONTROL VALVE	
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 		
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	Replace refueling control valve with fuel tank.

SEF246Y

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

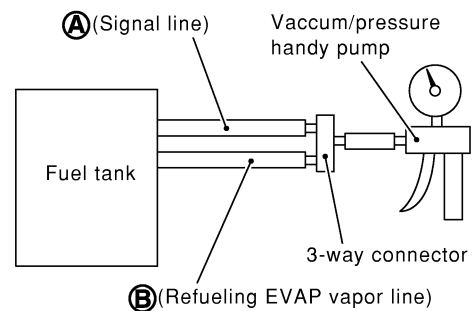
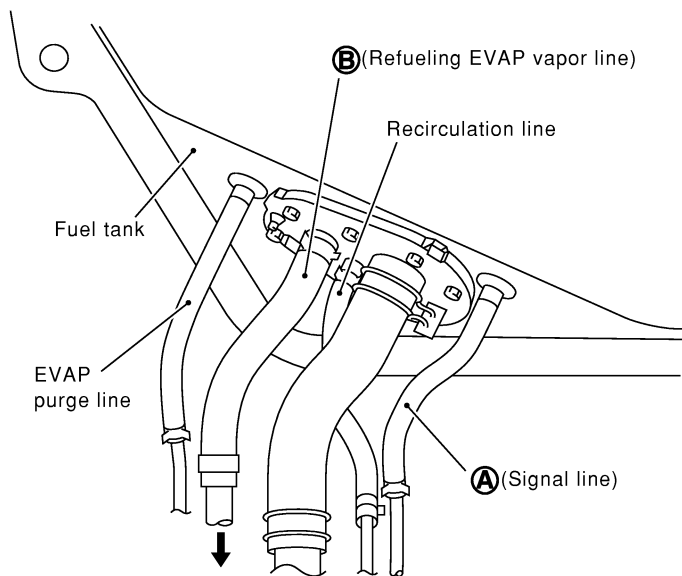
QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

9 CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to **FE-6**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit retainer with fuel level sensor unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF246Y

OK or NG

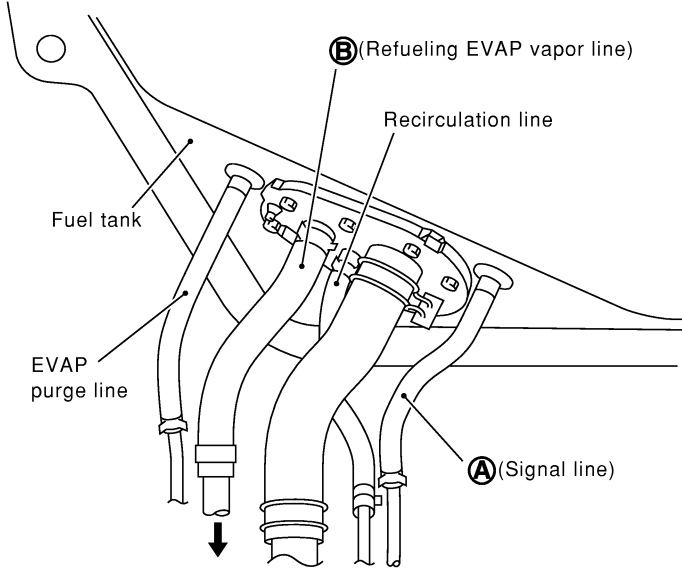
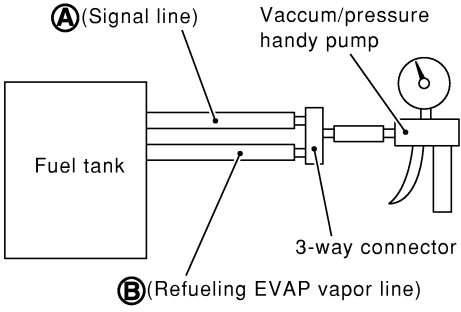
OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

10	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-6, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel level sensor unit retainer. b. Drain fuel from the tank using a hand pump into a fuel container. 3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel level sensor unit retainer with fuel level sensor unit. Always replace O-ring with new one. c. Put fuel tank upside down. d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable. 	
<div style="display: flex; justify-content: space-around; align-items: flex-start;">   </div>	
SEF246Y	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace refueling EVAP vapor cut valve with fuel tank.

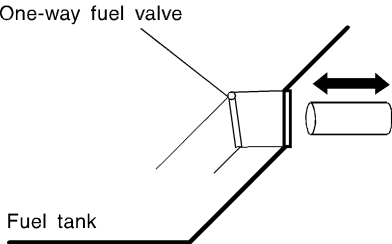
11	CHECK FUEL FILLER TUBE
Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I
Check one-way valve for clogging.	
OK or NG	
OK	▶ GO TO 13.
NG	▶ Repair or replace one-way fuel valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

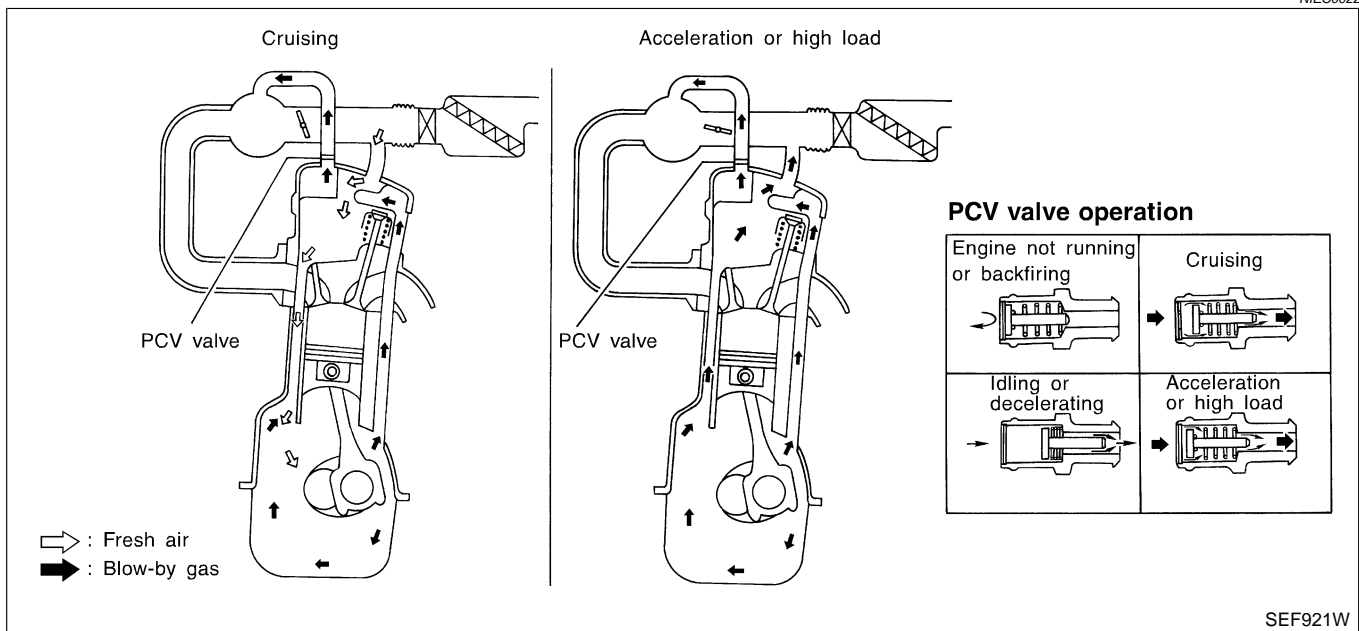
QG18DE (EXC CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

13	CHECK ONE-WAY FUEL VALVE-II
<p>1. Make sure that fuel is drained from the tank. 2. Remove fuel filler tube and hose. 3. Check one-way fuel valve for operation as follows. When a stick is inserted, the valve should open, when removing stick it should close.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF665U</p> <p>Do not drop any material into the tank.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ INSPECTION END
NG	▶ Replace fuel filler tube or replace one-way fuel valve with fuel tank.

Positive Crankcase Ventilation

DESCRIPTION



This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

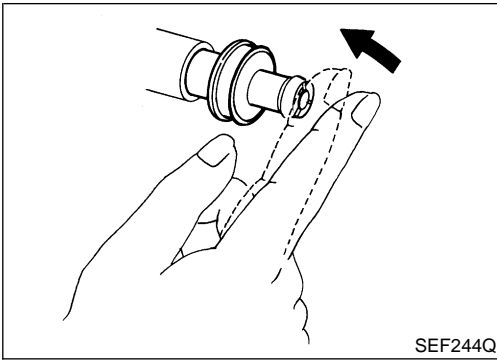
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.

Positive Crankcase Ventilation (Cont'd)



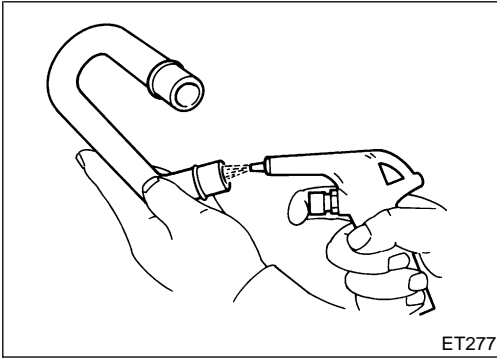
INSPECTION

PCV (Positive Crankcase Ventilation) Valve

NIEC0023

NIEC0023S01

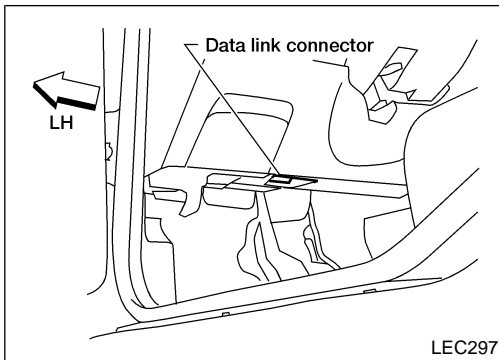
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.



Ventilation Hose

NIEC0023S02

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



Fuel Pressure Release

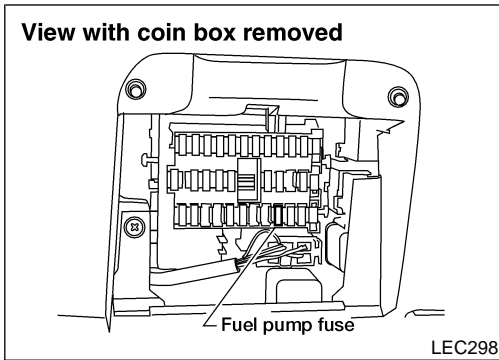
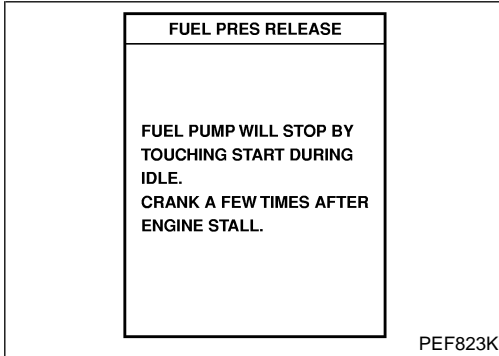
Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

NIEC0024

Ⓜ WITH CONSULT-II

NIEC0024S01

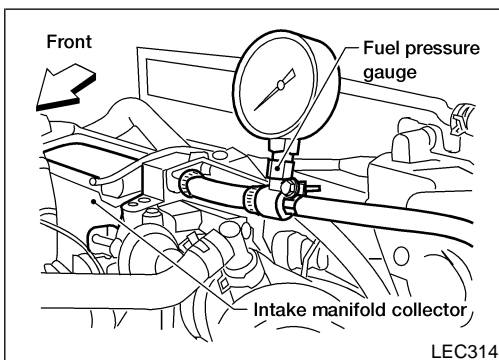
1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.



⊗ WITHOUT CONSULT-II

NIEC0024S02

1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF and reconnect fuel pump fuse.



Fuel Pressure Check

NIEC0025

- When reconnecting fuel line, always use new clamps.
- Make sure that clamp screw does not contact adjacent parts.
- Use a torque driver to tighten clamps.
- Use Pressure Gauge to check fuel pressure.
- Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose from fuel feed tube (engine side).
3. Install pressure gauge between fuel hose and fuel feed tube.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idle speed:

With vacuum hose connected

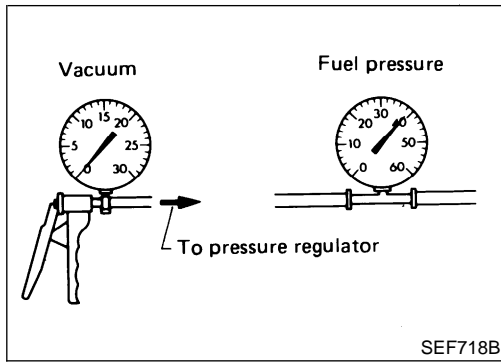
Approximately 235 kPa (2.4 kg/cm², 34 psi)

With vacuum hose disconnected

Approximately 294 kPa (3.0 kg/cm², 43 psi)

If results are unsatisfactory, perform Fuel Pressure Regulator Check, EC-68.

Fuel Pressure Regulator Check



Fuel Pressure Regulator Check

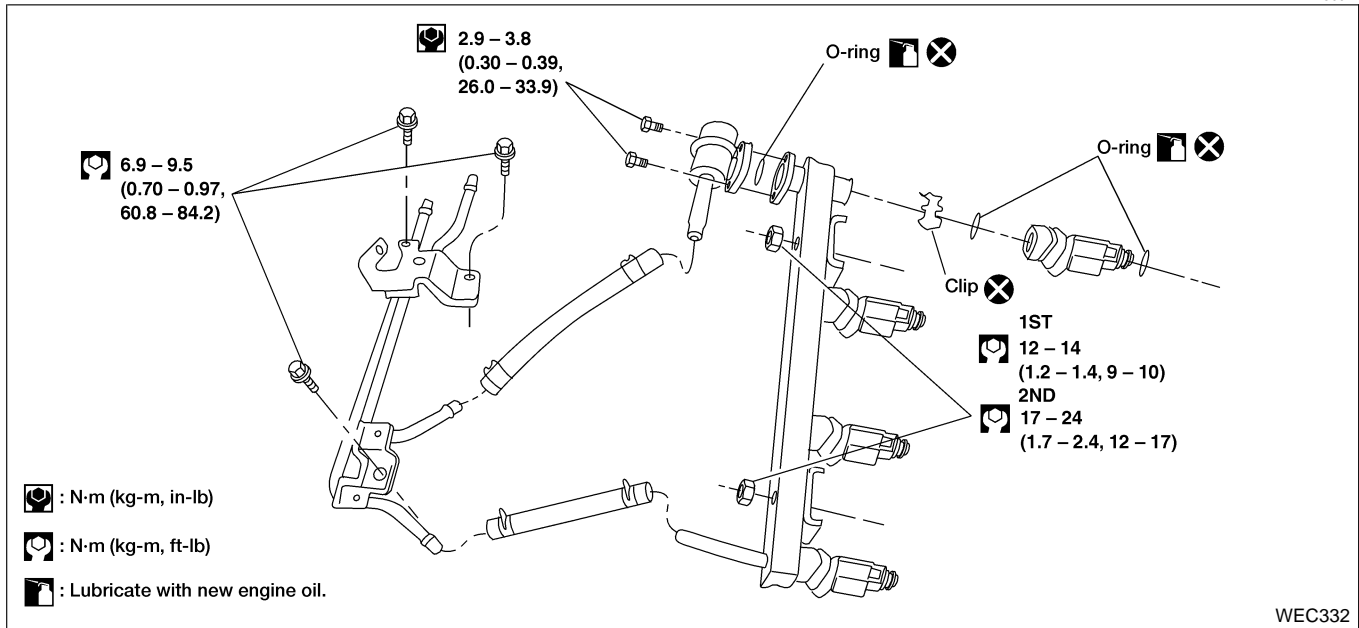
NIEC0026

1. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold collector.
2. Plug intake manifold collector with a rubber cap.
3. Connect variable vacuum source to fuel pressure regulator.
4. Start engine and read indication of fuel pressure gauge as vacuum is changed.

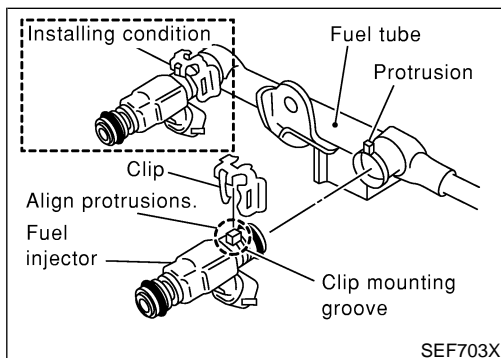
Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.

Injector REMOVAL AND INSTALLATION

NIEC0027



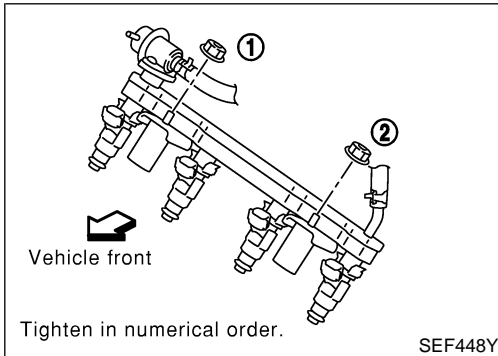
1. Release fuel pressure to zero. Refer to "Fuel Pressure Release", EC-67.
2. Remove accelerator cables.
3. Remove intake manifold bracket.
4. Remove PCV hose with bracket.
5. Disconnect injector harness connectors.
6. Disconnect fuel pressure regulator vacuum hose from intake manifold collector.
7. Disconnect fuel hoses from fuel tube assembly.
8. Remove injectors with fuel tube assembly.



9. Expand and remove clips securing fuel injectors.
10. Extract fuel injectors straight from fuel tubes.
 - **Be careful not to damage injector nozzles during removal.**
 - **Do not bump or drop fuel injectors.**
11. Carefully install O-rings, including the one used with the pressure regulator.
 - **Lubricate O-rings by smearing engine oil.**
 - **Be careful not to damage O-rings with service tools finger nails or clips. Do not expand or twist O-rings.**
 - **Discard old clips; replace with new ones.**

12. Position clips in grooves on fuel injectors.
 - **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**
13. Align protrusions of fuel tubes with those of fuel injectors.
14. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.

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15. Tighten fuel tube assembly mounting nuts in two stages.

: Tightening torque N·m (kg·m, ft·lb)

1st stage:

12 - 13 (1.2 - 1.4, 9 - 10)

2nd stage:

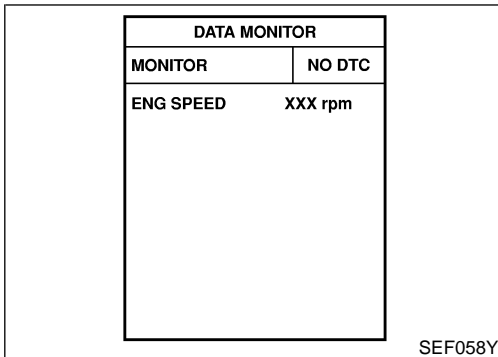
17 - 23 (1.7 - 2.4, 13 - 17)

16. Install all removed parts in the reverse order of removal.

CAUTION:

After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

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How to Check Idle Speed and Ignition Timing

NIEC0666

IDLE SPEED

NIEC0666S01

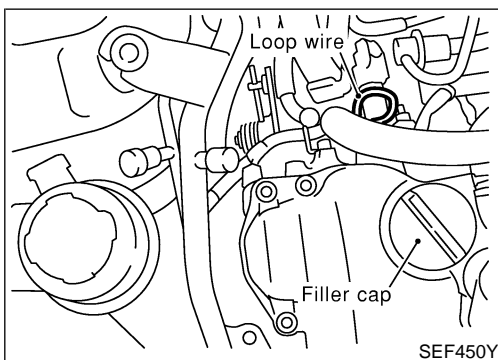
- **With CONSULT-II**

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

- **With GST**

Check idle speed in "MODE 1" with GST.

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IGNITION TIMING

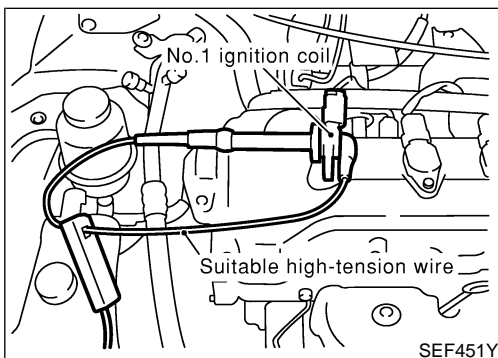
NIEC0666S02

Any of following two methods may be used.

Method A

- 1) Attach timing light to loop wire (if equipped) at the location shown in the figure.
- 2) Check ignition timing.

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Method B

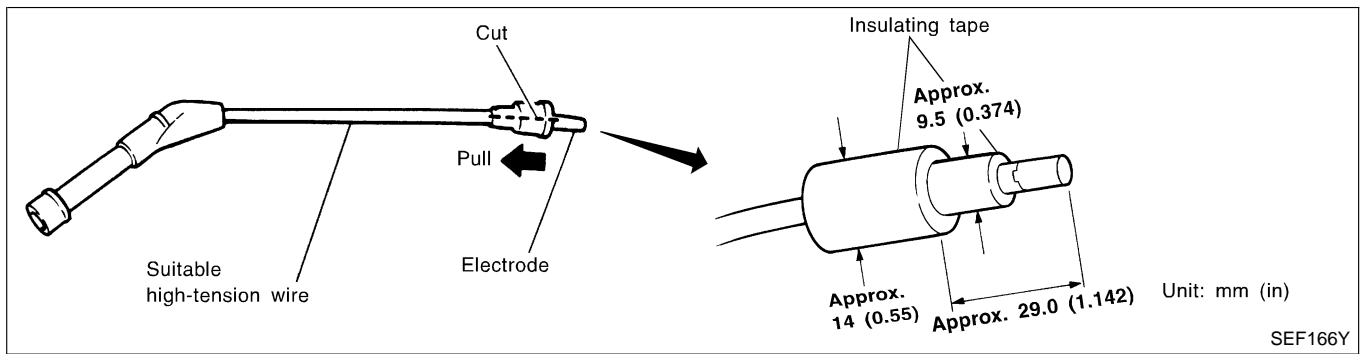
- 1) Remove No. 1 ignition coil.
- 2) Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.
- 3) Check ignition timing.

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BASIC SERVICE PROCEDURE

QG18DE (EXC CALIF CA)

How to Check Idle Speed and Ignition Timing (Cont'd)



Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

=NIEC0028

NIEC0028S01

PREPARATION

- 1) Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system
(Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - EGR valve operation
 - Throttle valve
 - EVAP system
- 2) On models equipped with air conditioner, checks should be carried out while the air conditioner is "OFF".
- 3) On models equipped with automatic transaxle, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "P" or "N" position.
- 4) When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- 5) Turn off headlamps, heater blower, rear window defogger.
- 6) Keep front wheels pointed straight ahead.
- 7) Make the check after the cooling fan has stopped.

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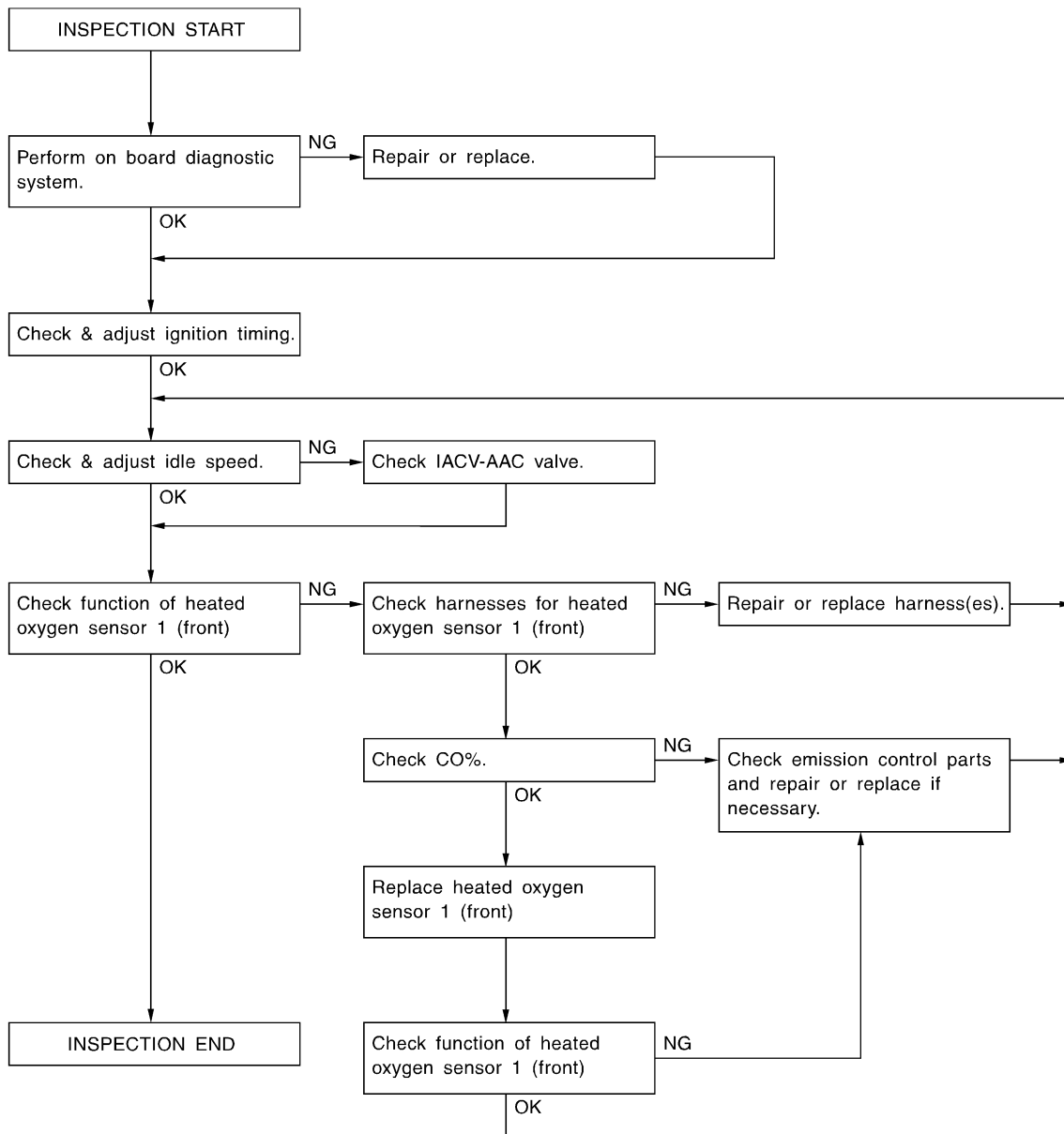
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Overall Inspection Sequence

NIEC0028S0101

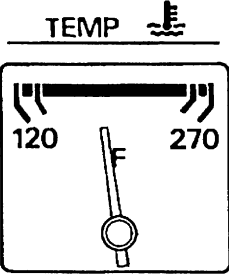
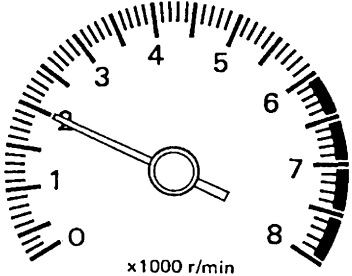


SEF554Y

NOTE:

If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

INSPECTION PROCEDURE

1	INSPECTION START		
		<p>1. Visually check the following:</p> <ul style="list-style-type: none"> ● Air cleaner clogging ● Hoses and ducts for leaks ● EGR valve operation ● Electrical connectors ● Gasket ● Throttle position and throttle position sensor operation <p>2. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.</p> <div style="text-align: center;">  <p>TEMP </p> </div> <p>3. Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.</p> <div style="text-align: center;">  <p>x 1000 r/min</p> </div> <p>4. Make sure that no DTC is displayed with CONSULT-II or GST.</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center;">EC</p> <p>FE</p> <p>CL</p> <p>SEF976U</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>SEF977U</p> <p>BR</p>
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

2	REPAIR OR REPLACE		
		Repair or replace components as necessary according to corresponding "Diagnostic Procedure".	
		▶	GO TO 3.

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3	CHECK TARGET IDLE SPEED						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes with no-load. 2. Rev engine (2,000 to 3,000 rpm) two or three times with no-load, then run engine at idle speed for approximately 1 minute. 3. Read idle speed in "DATA MONITOR" mode with CONSULT-II. 4. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th style="width: 50%;">MONITOR</th> <th style="width: 50%;">NO DTC</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> </table>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
<p>M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>							
SEF058Y							
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes with no-load. 2. Rev engine (2,000 to 3,000 rpm) two or three times with no-load, then run engine at idle speed for approximately 1 minute. 3. Check idle speed. <p>M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>							
OK	▶ GO TO 6.						
NG	▶ GO TO 4.						

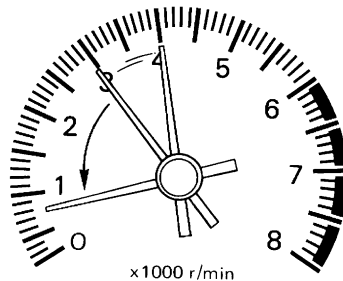
4	CHECK TARGET IDLE SPEED AGAIN
Perform test No. 3 again.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check IACV-AAC valve and replace if necessary. Refer to EC-452. ● Check IACV-AAC valve harness and repair if necessary. Refer to EC-456. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
▶	GO TO 6.

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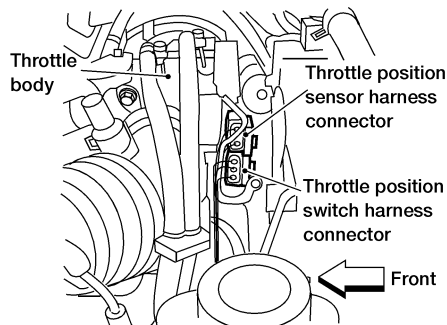
6 CHECK IGNITION TIMING

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



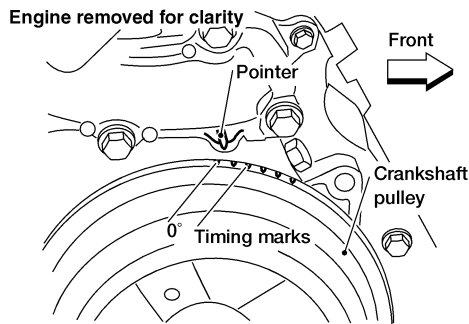
SEF978U

3. Turn off engine and disconnect throttle position sensor harness connector.



WEC244

4. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
5. Check ignition timing with a timing light.



LEC245

M/T: 9°±5° BTDC
A/T: 9°±5° BTDC (in "P" or "N" position)

OK or NG

OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	GO TO 7.

7 DETECT MALFUNCTIONING PART

Check the following.

- Check camshaft position sensor (PHASE) and circuit, repair or replace if necessary. Refer to EC-359.
- Check crankshaft position sensor (POS) and circuit, repair or replace if necessary. Refer to EC-354, EC-558.
- Check ECM function by substituting another known-good ECM.
(ECM may be the cause of a problem, but this is rarely the case.)

▶ GO TO 6.

8	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1) SIGNAL											
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. See "HO2S1 MNTR B1" in "DATA MONITOR" mode. 3. Running engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>RICH</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	RICH
DATA MONITOR												
MONITOR	NO DTC											
ENG SPEED	XXX rpm											
HO2S1 MNTR (B1)	LEAN											
HO2S1 MNTR (B2)	RICH											
SEF449Y												
<p>1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>												
OK	▶	GO TO 12.										
NG (Monitor does not fluctuate.)	▶	GO TO 17.										
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 10.										

9	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1) SIGNAL	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. Set voltmeter probe between ECM terminal 62 and ground. 3. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG (Voltage does not fluctuate.)	▶	GO TO 17.
NG (Voltage fluctuates less than 5 times.)	▶	GO TO 10.

10	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1) SIGNAL	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> Stop engine. Replace heated oxygen sensor 1 (front) (bank 1). Start engine and warm it up to normal operating temperature. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. See "HO2S MNTR (B1)" in "DATA MONITOR" mode. Running engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH 		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> Stop engine. Replace heated oxygen sensor 1 (front) (bank 1). Start engine and warm it up to normal operating temperature. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. Set voltmeter probe between ECM terminal 94 and ground. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V <p style="text-align: center;">OK or NG</p>		
	OK (With CONSULT-II) ▶	GO TO 12.
	OK (Without CONSULT-II) ▶	GO TO 13.
	NG ▶	GO TO 11.

11	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ol style="list-style-type: none"> Check fuel pressure regulator. Refer to EC-68. Check mass air flow sensor and its circuit. Refer to EC-174. Check injector and its circuit. Refer to EC-664. Clean or replace if necessary. Check engine coolant temperature sensor and its circuit. Refer to EC-191. Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 		
	▶	GO TO 3.

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12	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2) SIGNAL											
<p> With CONSULT-II</p> <p>1. See "HO2S1 MNTR (B2)" in "DATA MONITOR" mode.</p> <p>2. Running engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.</p>												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center;">MONITOR</th> <th style="text-align: center;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">RICH</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	RICH
DATA MONITOR												
MONITOR	NO DTC											
ENG SPEED	XXX rpm											
HO2S1 MNTR (B1)	LEAN											
HO2S1 MNTR (B2)	RICH											
SEF449Y												
<p>1 time: RICH → LEAN → RICH</p> <p>2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>												
OK	▶	INSPECTION END										
NG (Monitor does not fluctuate.)	▶	GO TO 16.										
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 14.										

13	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2) SIGNAL	
<p> Without CONSULT-II</p> <p>1. Set voltmeter probe between ECM terminal 62 and ground.</p> <p>2. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm.</p> <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> <p>2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	INSPECTION END
NG (Voltage does not fluctuate.)	▶	GO TO 16.
NG (Voltage fluctuates less than 5 times.)	▶	GO TO 14.

14	CHECK FRONT OXYGEN SENSOR 1 (FRONT) (BANK 2) SIGNAL
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front) (bank 2). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 MNTR (B2)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH 	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front) (bank 2). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 62 and ground. 6. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V <p style="text-align: center;">OK or NG</p>	
OK	▶ INSPECTION END
NG	▶ GO TO 15.

15	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check fuel pressure regulator. Refer to EC-68. ● Check mass air flow sensor and its circuit. Refer to EC-174. ● Check injector and injector circuit. Refer to EC-664. Clean or replace if necessary. ● Check engine coolant temperature sensor and circuit. Refer to EC-191. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
	▶ GO TO 3.

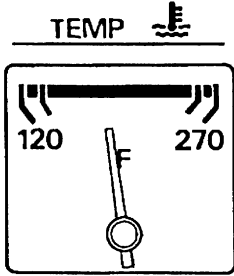
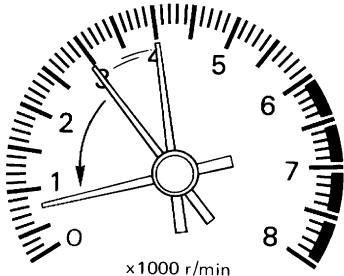
16	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2) HARNESS
<ol style="list-style-type: none"> 1. Turn off engine and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (front) (bank 2) harness connector. 4. Check harness continuity between ECM terminal 62 and heated oxygen sensor 1 (front) (bank 2) harness connector terminal 1. Refer to Wiring Diagram, EC-216. Continuity should exist. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 19.
NG	▶ GO TO 18.

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17	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1) HARNESS	
<ol style="list-style-type: none"> 1. Turn off engine and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (front) (bank 1) harness connector. 4. Check harness continuity between ECM terminal 62 and heated oxygen sensor 1 (front) (bank 1) harness connector terminal 1. Refer to Wiring Diagram, EC-216. Continuity should exist. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 19.
NG	▶	GO TO 18.

18	REPAIR OR REPLACE	
Repair or replace harness between ECM and heated oxygen sensor.		
▶		GO TO 3.

19	PREPARATION FOR "CO" % CHECK																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect ECM harness connector and battery ground cable. 2. Turn ignition switch "ON". 3. Select "COOLANT TEMP" in "ACTIVE TEST" mode. 4. Set "COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd". 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>COOLANT TEMP</td> <td>5°C</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG-SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>INJ PULSE-B1</td> <td>XXX msec</td> </tr> <tr> <td>INJ PULSE-B2</td> <td>XXX msec</td> </tr> <tr> <td>IGN TIMING</td> <td>XXX BTDC</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		COOLANT TEMP	5°C	MONITOR		ENG-SPEED	XXX rpm	INJ PULSE-B1	XXX msec	INJ PULSE-B2	XXX msec	IGN TIMING	XXX BTDC						
ACTIVE TEST																						
COOLANT TEMP	5°C																					
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INJ PULSE-B1	XXX msec																					
INJ PULSE-B2	XXX msec																					
IGN TIMING	XXX BTDC																					
SEF712Y																						
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Disconnect engine coolant temperature sensor harness connector. 3. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector. 																						
<p style="text-align: center;">4.4kΩ resistor</p>																						
SEF982UA																						
▶		GO TO 20.																				

20	CHECK "CO" %
<p>1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.</p> <div style="text-align: center;">  </div>	
<p>2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.</p> <div style="text-align: center;">  </div>	
<p>3. Check "CO" %. Idle CO: 0 - 8%</p> <p>4. <input checked="" type="checkbox"/> Without CONSULT-II After checking CO%,</p> <p>a. Disconnect the resistor from terminals of engine coolant temperature sensor. b. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 21.
NG	▶ GO TO 22.

21	CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1/BANK 2) SIGNAL
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front) (bank 1/bank 2). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 (B1)" and "HO2S1 (B2)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature.), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH 	
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front) (bank 1/bank 2). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 94 or 62 and ground. 6. Make sure that voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 22.

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22	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● Connect front heated oxygen sensor harness connectors to front heated oxygen sensors.● Check fuel pressure regulator. Refer to EC-68.● Check mass air flow sensor and circuit. Refer to EC-174.● Check injector and injector circuit. Refer to EC-664. Clean or replace if necessary.● Check engine coolant temperature sensor and circuit. Refer to EC-191.● Check ECM function by substituting another known good ECM. (ECM may be the cause of a problem, but this is rarely the case.)	
▶	GO TO 3.

SELECT WORK ITEM
TP SW/TP SEN IDLE POSI ADJ
FUEL PRESSURE RELEASE
IDLE AIR VOL LEARN
SELF-LEARNING CONT
EVAP SYSTEM CLOSE
TARGET ING TIM ADJ

SEF452Y

WORK SUPPORT	
IDLE AIR VOL LEARN	
MONITOR	
ENG SPEED	XXX rpm
START	

SEF454Y

WORK SUPPORT	
IDLE AIR VOL LEARN	CMPLT
MONITOR	
ENG SPEED	XXX rpm
Result appears.	
CMPLT: successful	
INCMP: unsuccessful	
START	

SEF455Y

Idle Air Volume Learning

=NIEC0503

DESCRIPTION

NIEC0503S01

"Idle Air Volume Learning" is an operation to learn the idle air volume that keeps each engine within the specific range. It must be performed under any of the following conditions:

- Each time IACV-AAC valve, throttle body or ECM is replaced.
- Idle speed or ignition timing is out of specification.

PRE-CONDITIONING

NIEC0503S02

Before performing "Idle Air Volume Learning", make sure that all of the following conditions are satisfied.

Learning will be cancelled if any of the following conditions are missed for even a moment.

- Battery voltage: More than 12.9V (At idle)
- Engine coolant temperature: 70 - 95°C (158 - 203°F)
- PNP switch: ON
- Electric load switch: OFF
(Air conditioner, headlamp, rear window defogger)

On vehicles equipped with daytime light systems, if the parking brake is applied before the engine is started the headlamp will not be illuminated.

- Cooling fan motor: Not operating
- Steering wheel: Neutral (Straight-ahead position)
- Vehicle speed: Stopped
- Transmission: Warmed-up
For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V.
For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes.

OPERATION PROCEDURE

NIEC0503S03

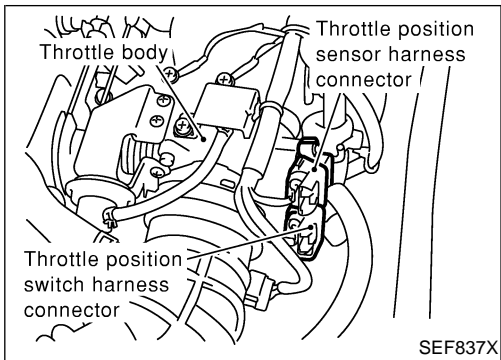
Ⓜ With CONSULT-II

NIEC0503S0301

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 30 seconds.
7. Select "IDLE AIR VOL LEARN" in "WORK SUPPORT" mode.
8. Touch "START" and wait 20 seconds.
9. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "INCMP" is displayed, "Idle Air Volume Learning" will not be carried out successfully. In this case, find the cause of the problem by referring to the NOTE on next page.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 9°±5° BTDC A/T: 9°±5° BTDC (in "P" or "N" position)

Idle Air Volume Learning (Cont'd)



SEF837X

⊗ Without CONSULT-II

NIEC0503S0302

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING", EC-83, are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 30 seconds.
7. Disconnect throttle position sensor harness connector (brown), then reconnect it within 5 seconds.
8. Wait 20 seconds.
9. Make sure that idle speed is within specifications. If not, the result will be incomplete. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 9°±5° BTDC A/T: 9°±5° BTDC (in "P" or "N" position)

NOTE:

If idle air volume learning cannot be performed successfully, proceed as follows:

- 1) **Check that throttle valve is fully closed.**
- 2) **Check PCV valve operation.**
- 3) **Check that downstream of throttle valve is free from air leakage.**
- 4) **Adjust closed throttle position switch and reset memory. (Refer to Basic Inspection, EC-127.)**
- 5) **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the problem. It is useful to perform "TROUBLE DIAGNOSIS SPECIFICATION VALUE", EC-163.**
- 6) **If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:**
 - Engine stalls.
 - Erroneous idle.
 - Blown fuses related to the IACV-AAC valve system.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Introduction

Introduction

NIEC0029

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X

*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-144.)

Two Trip Detection Logic

NIEC0030

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Coolant overtemperature enrichment protection — DTC: P0217	—	X	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	X	—	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 has been detected	—	—	X	—	—	X	—	—
Closed loop control — DTC: P1148	—	X	—	—	X	—	X	—
Fail-safe items (Refer to EC-144.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except “ECM”

Emission-related Diagnostic Information

NIEC0031

DTC AND 1ST TRIP DTC

NIEC0031S01

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-96. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a problem. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to EC-125. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NIEC0031S0101

DTC and 1st trip DTC can be read by the following methods.

☐ With CONSULT-II

Ⓢ With GST

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1320, P0705, P0750, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

DTC display	SELF DIAG RESULTS		SELF DIAG RESULTS	
	DTC RESULTS	TIME	DTC RESULTS	TIME
	IACV-AAC VALVE [P0505]	0	IACV-AAC VALVE [P0505]	1t
		1st trip DTC display		

SEF698X

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NIEC0031S02

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed and absolute pressure at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-112.

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.

SYSTEM READINESS TEST (SRT) CODE

NIEC0031S03

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

If MIL is "ON" during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

GI
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

SRT Item

=NIEC0031S0307

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	3	Three way catalyst function	P0420, P0430
EVAP SYSTEM	2	EVAP control system (small leak) (negative pressure)	P0440
	3	EVAP control system (very small leak) (negative pressure/positive pressure)	P1441
		EVAP control system purge flow monitoring	P1447
O2 SENSOR	3	Heated oxygen sensor 1 (front) (bank 1)/(bank 2) (circuit)	P0130, P0150
		Heated oxygen sensor 1 (front) (bank 1)/(bank 2) (lean shift monitoring)	P0131, P0151
		Heated oxygen sensor 1 (front) (bank 1)/(bank 2) (rich shift monitoring)	P0132, P0152
		Heated oxygen sensor 1 (front) (bank 1)/(bank 2) (response monitoring)	P0133, P0153
		Heated oxygen sensor 1 (front) (bank 1)/(bank 2) (high voltage)	P0134, P0154
		Heated oxygen sensor 2 (rear) (bank 1)/(bank 2) (min. voltage monitoring)	P0137, P0157
		Heated oxygen sensor 2 (rear) (bank 1)/(bank 2) (max. voltage monitoring)	P0138, P0158
		Heated oxygen sensor 2 (rear) (bank 1)/(bank 2) (response monitoring)	P0139, P0159
		Heated oxygen sensor 2 (rear) (bank 1)/(bank 2) (high voltage)	P0140, P0160
O2 SEN HEATER	3	Heated oxygen sensor 1 (front) heater (bank 1)/(bank 2)	P0135, P0155
		Heated oxygen sensor 2 (rear) heater (bank 1)/(bank 2)	P0141, P0161
EGR SYSTEM	3	EGR function (close)	P0400
	1	EGR function (open)	P1402

*: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

—NIEC0031S0308

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example						
		Diagnosis	Ignition cycle					
			← ON →	OFF	← ON →	OFF	← ON →	OFF
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)		
		P0402	OK (1)	— (1)	— (1)	OK (2)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”		
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)		
		P0402	— (0)	— (0)	OK (1)	— (1)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”		
NG exists	Case 3	P0400	OK	OK	—	—		
		P0402	—	—	—	—		
		P1402	NG	—	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL “ON”)		
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”		

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

NOTE:

SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

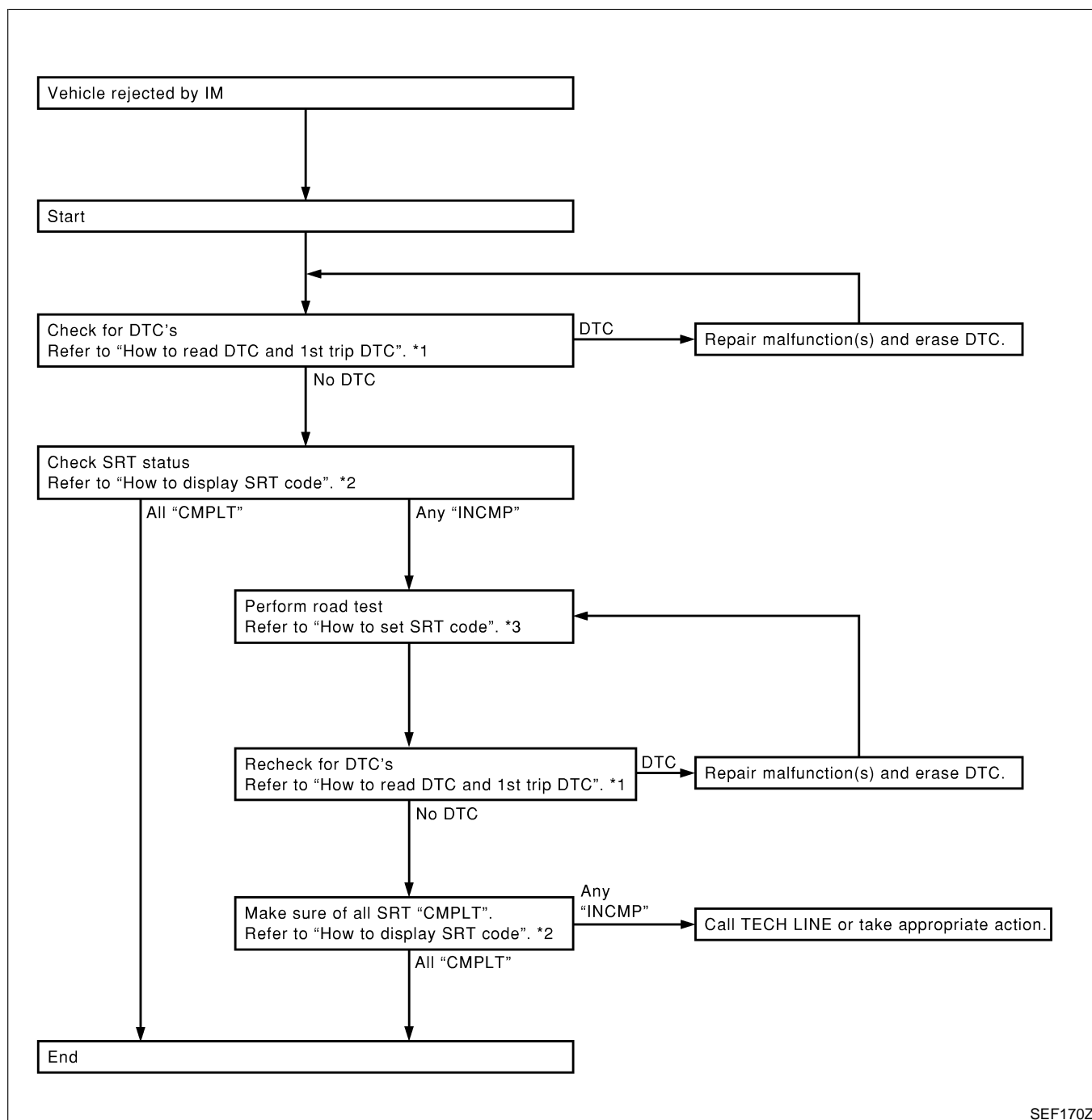
SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)



SEF170Z

*1 EC-86

*2 EC-90

*3 EC-91

How to Display SRT Code

With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

With GST

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

NIEC0031S0301

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

SRT STATUS	
CATALYST	CMLPT
EVAP SYSTEM	INCMP
HO2S HTR	CMLPT
HO2S	CMLPT
EGR SYSTEM	INCMP

SEF713Y

GI

MA

EM

LC

EC

How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions. N/EC0031S0302

With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-88.

Without CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

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SC

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IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

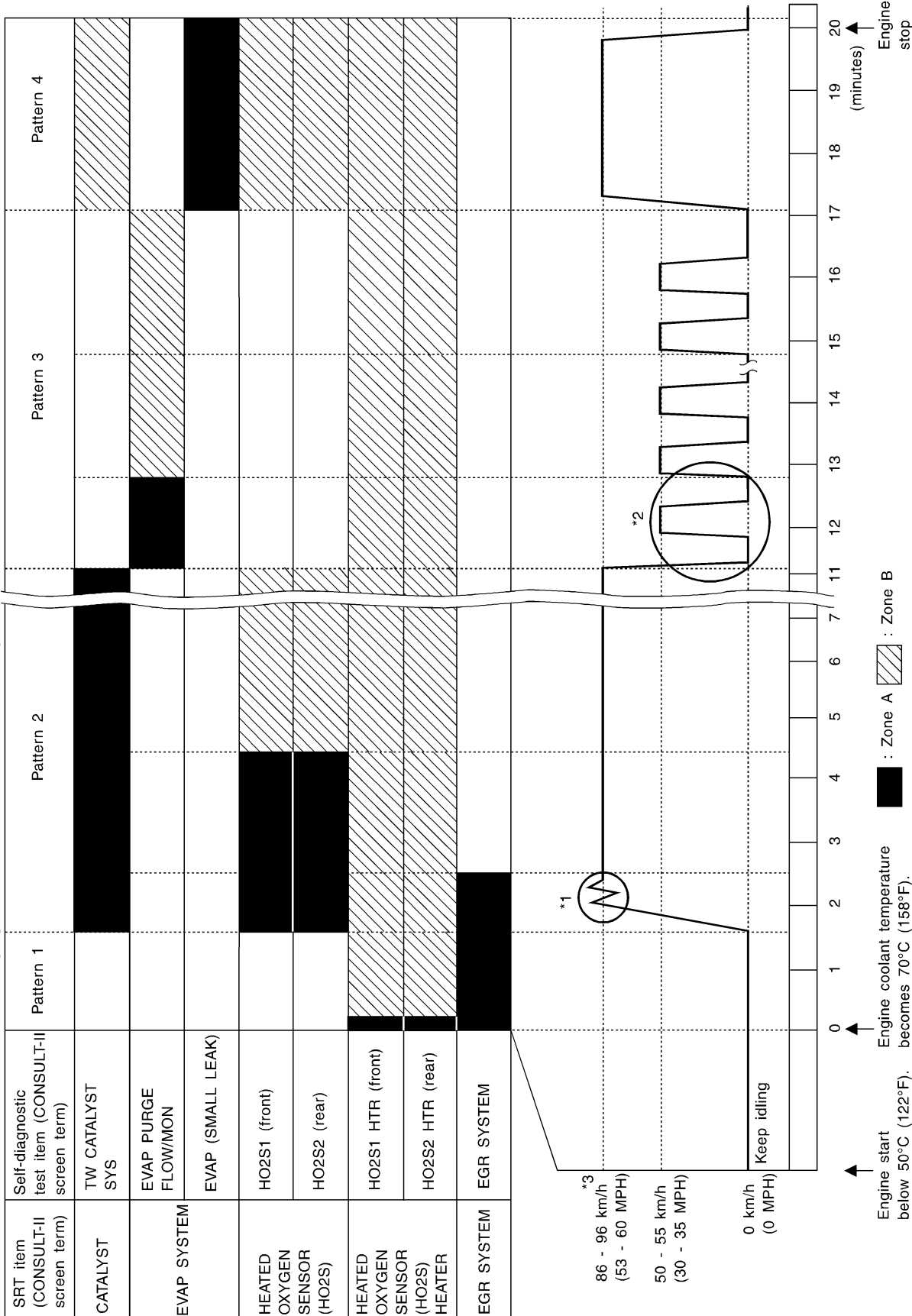
QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Driving Pattern

NIEC0031S0303

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.



SEF676Y

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
Zone A refers to the range where the time required, for the diagnosis under normal conditions*, is the shortest.
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminals 70 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminals 70 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 82 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in *2 must be repeated at least 3 times.

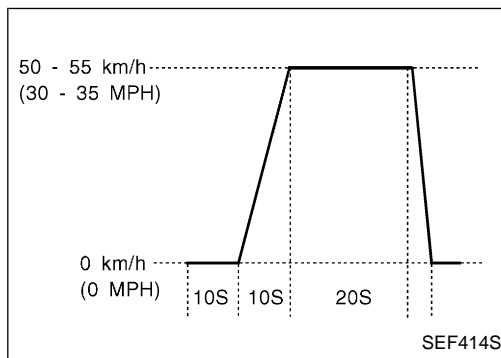
Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

*2: Operate the vehicle in the following driving pattern.

- 1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- 2) Repeat driving pattern shown below at least 10 times.
- **During acceleration, hold the accelerator pedal as steady as possible.**
- 3) Repeat steps 1 and 2 until the EGR system SRT is set.



*3: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

GI

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

Gear change	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
	ACCEL shift point km/h (MPH)	km/h (MPH)
1st to 2nd	24 (15)	25 (15)
2nd to 3rd	40 (25)	40 (25)
3rd to 4th	65 (40)	65 (40)
4th to 5th	75 (45)	75 (45)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate. Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	48 (30)
2nd	84 (52)
3rd	128 (80)
4th	—
5th	—

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

NIEC0031S04

The following is the information specified in Mode 6 of SAE J1979. The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (9 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function (bank 1)	02H	81H	Min.	X
	Three way catalyst function (bank 2)	02H	81H	Min.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application	
		TID	CID			
O2 SENSOR	Heated oxygen sensor 1 (front) (bank 1)	09H	04H	Max.	X	GI
		0AH	84H	Min.	X	MA
		0BH	04H	Max.	X	EM
		0CH	04H	Max.	X	LC
		0DH	04H	Max.	X	EC
	Heated oxygen sensor 1 (front) (bank 2)	11H	05H	Max.	X	FE
		12H	85H	Min.	X	CL
		13H	05H	Max.	X	MT
		14H	05H	Max.	X	AT
		15H	05H	Max.	X	AX
	Heated oxygen sensor 2 (rear) (bank 1)	19H	86H	Min.	X	SU
		1AH	86H	Min.	X	BR
		1BH	06H	Max.	X	ST
		1CH	06H	Max.	X	RS
	Heated oxygen sensor 2 (rear) (bank 2)	21H	87H	Min.	X	BT
		22H	87H	Min.	X	HA
23H		07H	Max.	X	SC	
24H		07H	Max.	X	EL	
O2 SENSOR HEATER	Heated oxygen sensor 1 heater (front) (bank 1)	29H	08H	Max.	X	BT
		2AH	88H	Min.	X	HA
	Heated oxygen sensor 1 heater (front) (bank 2)	2BH	09H	Max.	X	SC
		2CH	89H	Min.	X	EL
	Heated oxygen sensor 2 heater (rear) (bank 1)	2DH	0AH	Max.	X	BT
		2EH	8AH	Min.	X	HA
Heated oxygen sensor 2 heater (rear) (bank 2)	2FH	0BH	Max.	X	SC	
	30H	8BH	Min.	X	EL	
EGR SYSTEM	EGR function	31H	8CH	Min.	X	BT
		32H	8CH	Min.	X	HA
		33H	8CH	Min.	X	SC
		34H	8CH	Min.	X	EL
		35H	0CH	Max.	X	IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

NIEC0031S05
X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	—	—	—
MAF SEN/CIRCUIT	P0100	—	—	X	EC-174
ABSL PRES SEN/CIRC	P0105	—	—	X	EC-183
AIR TEMP SEN/CIRC	P0110	—	—	X	EC-185
COOLANT T SEN/CIRC	P0115	—	—	X	EC-191
THRTL POS SEN/CIRC	P0120	—	—	X	EC-196
*COOLAN T SEN/CIRC	P0125	—	—	X	EC-208
HO2S1 (B1)	P0130	X	X	X*2	EC-213
HO2S1 (B1)	P0131	X	X	X*2	EC-222
HO2S1 (B1)	P0132	X	X	X*2	EC-228
HO2S1 (B1)	P0133	X	X	X*2	EC-235
HO2S1 (B1)	P0134	X	X	X*2	EC-246
HO2S1 HTR (B1)	P0135	X	X	X*2	EC-254
HO2S2 (B1)	P0137	X	X	X*2	EC-260
HO2S2 (B1)	P0138	X	X	X*2	EC-269
HO2S2 (B1)	P0139	X	X	X*2	EC-278
HO2S2 (B1)	P0140	X	X	X*2	EC-287
HO2S2 HTR (B1)	P0141	X	X	X*2	EC-295
HO2S1 (B2)	P0150	X	X	X*2	EC-213
HO2S1 (B2)	P0151	X	X	X*2	EC-222
HO2S1 (B2)	P0152	X	X	X*2	EC-228
HO2S1 (B2)	P0153	X	X	X*2	EC-235
HO2S1 (B2)	P0154	X	X	X*2	EC-246
HO2S1 HTR (B2)	P0155	X	X	X*2	EC-254
HO2S2 (B2)	P0157	X	X	X*2	EC-260
HO2S2 (B2)	P0158	X	X	X*2	EC-269
HO2S2 (B2)	P0159	X	X	X*2	EC-278
HO2S2 (B2)	P0160	X	X	X*2	EC-287
HO2S2 HTR (B2)	P0161	X	X	X*2	EC-295
FUEL SYS-LEAN/BK1	P0171	—	—	X	EC-301
FUEL SYS-RICH/BK1	P0172	—	—	X	EC-310
FUEL SYS-LEAN/BK2	P0174	—	—	X	EC-301
FUEL SYS-RICH/BK2	P0175	—	—	X	EC-310
FUEL TEMP SEN/CIRC	P0180	—	—	X	EC-319

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page	
ENG OVER TEMP	P0217	—	—	X	EC-324	GI
MULTI CYL MISFIRE	P0300	—	—	X	EC-343	MA
CYL 1 MISFIRE	P0301	—	—	X	EC-343	EM
CYL 2 MISFIRE	P0302	—	—	X	EC-343	EM
CYL 3 MISFIRE	P0303	—	—	X	EC-343	LC
CYL 4 MISFIRE	P0304	—	—	X	EC-343	LC
KNOCK SEN/CIRC-B1	P0325	—	—	—	EC-350	EC
CKP SEN/CIRCUIT	P0335	—	—	X	EC-354	EC
CMP SEN/CIRCUIT	P0340	—	—	X	EC-359	FE
EGR SYSTEM	P0400	X	X	X*2	EC-365	FE
EGR VOL CONT/V CIR	P0403	—	—	X	EC-374	CL
TW CATALYST SYS-B1	P0420	X	X	X*2	EC-381	CL
TW CATALYST SYS-B2	P0430	X	X	X*2	EC-381	MT
EVAP SMALL LEAK	P0440	X	X	X*2	EC-385	MT
PURG VOLUME CONT/V	P0443	—	—	X	EC-400	AT
VENT CONTROL VALVE	P0446	—	—	X	EC-406	AT
EVAPO SYS PRES SEN	P0450	—	—	X	EC-413	AX
EVAP GROSS LEAK	P0455	—	X	X*2	EC-425	AX
FUEL LV SE (SLOSH)	P0460	—	—	X	EC-438	SU
FUEL LEVEL SENSOR	P0461	—	—	X	EC-442	SU
FUEL LEVEL SEN/CIRC	P0464	—	—	X	EC-444	BR
VEH SPEED SEN/CIRC	P0500	—	—	X	EC-448	BR
IACV/AAC VLV/CIRC	P0505	—	—	X	EC-452	ST
CLOSED TP SW/CIRC	P0510	—	—	X	EC-461	ST
A/T COMM LINE	P0600	—	—	—	EC-469	RS
ECM	P0605	—	—	X	EC-472	RS
PNP SW/CIRC	P0705	—	—	X	AT-110	BT
ATF TEMP SEN/CIRC	P0710	—	—	X	AT-115	BT
VEH SPD SEN/CIR AT	P0720	—	—	X	AT-121	HA
ENGINE SPEED SIG	P0725	—	—	X	AT-126	HA
A/T 1ST GR FNCTN	P0731	—	—	X	AT-130	SC
A/T 2ND GR FNCTN	P0732	—	—	X	AT-137	SC
A/T 3RD GR FNCTN	P0733	—	—	X	AT-143	EL
A/T 4TH GR FNCTN	P0734	—	—	X	AT-149	EL
TCC SOLENOID/CIRC	P0740	—	—	X	AT-158	IDX
A/T TCC S/V FNCTN	P0744	—	—	X	AT-162	IDX
L/PRESS SOL/CIRC	P0745	—	—	X	AT-173	IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
SFT SOL A/CIRC	P0750	—	—	X	AT-178
SFT SOL B/CIRC	P0755	—	—	X	AT-182
INT/V TIMING CONT	P1110	—	—	X	EC-474
INT TIM S/CIR-B1	P1140	—	—	X	EC-516
THERMOSTAT FNCTN	P1126	—	—	X	EC-485
SWIRL CONT SOL/V	P1130	—	—	X	EC-487
CLOSED LOOP-B1	P1148	—	—	X	EC-521
SWL CON VC SW/CIRC	P1165	—	—	X	EC-523
CLOSED LOOP-B2	P1168	—	—	X	EC-521
ENG OVER TEMP	P1217	—	—	X	EC-530
IGN SIGNAL-PRIMARY	P1320	—	—	X	EC-547
CKP SEN COG	P1336	—	—	X	EC-558
EGR TEMP SEN/CIRC	P1401	—	—	X	EC-563
EGR SYSTEM	P1402	X	X	X*2	EC-570
EVAP SMALL LEAK	P1440	X	X	X*2	EC-577
EVAP VERY SML LEAK	P1441	X*3	X	X*2	EC-579
PURG VOLUME CONT/V	P1444	—	—	X	EC-595
VENT CONTROL VALVE	P1446	—	—	X	EC-607
EVAP PURG FLOW/MON	P1447	X	X	X*2	EC-615
VENT CONTROL VALVE	P1448	—	—	X	EC-627
FUEL LEVEL SEN/CIRC	P1464	—	—	X	EC-636
VC/V BYPASS/V	P1490	—	—	X	EC-639
VC CUT/V BYPASS/V	P1491	—	—	X	EC-645
A/T DIAG COMM LINE	P1605	—	—	X	EC-655
TP SEN/CIRC A/T	P1705	—	—	X	AT-186
P-N POS SW/CIRCUIT	P1706	—	—	X	EC-658
O/R CLTCH SOL/CIRC	P1760	—	—	X	AT-194

*1: 1st trip DTC No. is the same as DTC No.

*2: These are not displayed with GST.

*3: SRT will not be set, if the self-diag results are NG.

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC (📄 With CONSULT-II)

NOTE:

If the DTC is not for A/T related items (see EC-22), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Turn CONSULT-II "ON" and touch "A/T".
3. Touch "SELF-DIAG RESULTS".
4. Touch "ERASE". [The DTC in the TCM (Transmission control module) will be erased.] Then touch "BACK" twice.

NIEC0031S06

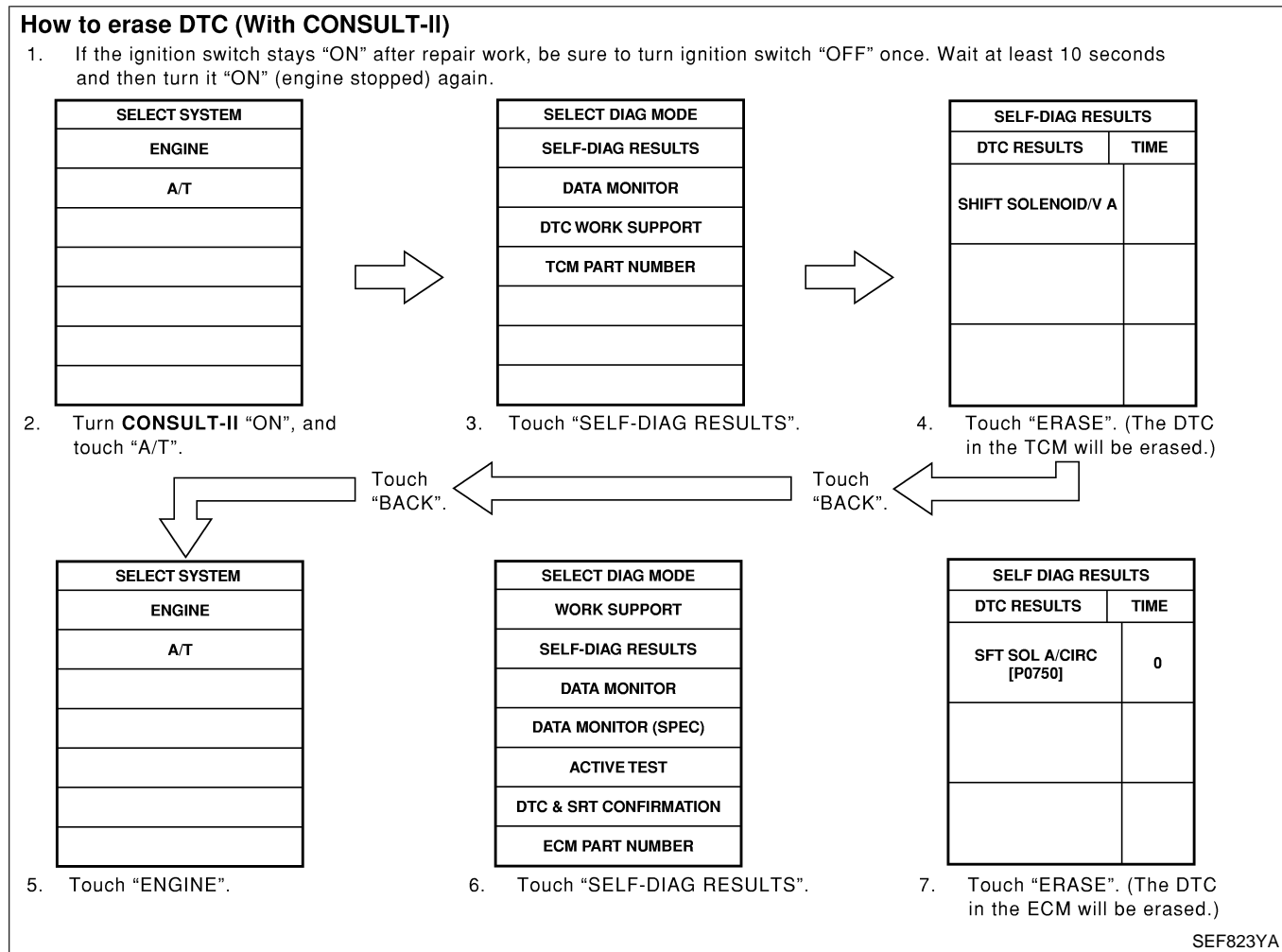
NIEC0031S0601

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

5. Touch "ENGINE".
 6. Touch "SELF-DIAG RESULTS".
 7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).



The emission related diagnostic information in the ECM can be erased by selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT-II.

How to Erase DTC (GST) With GST

NIEC0031S0602

NOTE:

If the DTC is not for A/T related items (see EC-22), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

- **If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.**
- **The following data are cleared when the ECM memory is erased.**
 - 1) Diagnostic trouble codes
 - 2) 1st trip diagnostic trouble codes
 - 3) Freeze frame data
 - 4) 1st trip freeze frame data

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Emission-related Diagnostic Information (Cont'd)

- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)

NIEC0031S07

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

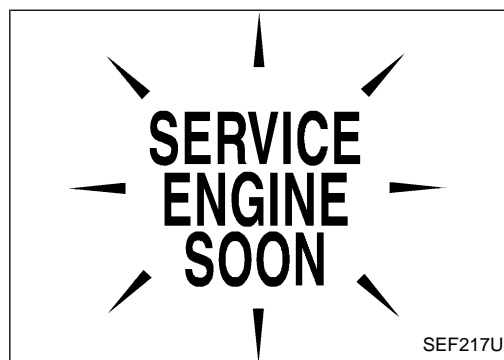
SEF543X

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to *EL-302*, “NVIS (NISSAN Vehicle Immobilizer System — NATS)”.
- Confirm no self-diagnostic results of NVIS (NATS) are displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II OPERATION MANUAL IVIS/NVIS.

Malfunction Indicator Lamp (MIL)

DESCRIPTION

NIEC0032



The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
 - If the MIL does not light up, refer to *EL-103*, “WARNING LAMPS” or see EC-697.
2. When the engine is started, the MIL should go off.
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION




QG18DE (EXC CALIF CA)

Malfunction Indicator Lamp (MIL) (Cont'd)

On Board Diagnostic System Function

-NIEC0032S01

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> ● Coolant overtemperature enrichment protection ● "Misfire (Possible three way catalyst damage)" ● "Closed loop control" ● Fail-safe mode

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to ^{NIEC0032S0102}**EL-103**, "WARNING LAMPS" or see EC-697.

Diagnostic Test Mode I — Malfunction Warning

NIEC0032S0103

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

OBD System Operation Chart

OBD System Operation Chart

=NIEC0033

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

NIEC0033S01

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to “Two Trip Detection Logic” on EC-85.
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven.
- The 1st trip DTC is not displayed when the self-diagnosis results in “OK” for the 2nd trip.

SUMMARY CHART

NIEC0033S02

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns “B” and “C” under “Fuel Injection System” and “Misfire”, see EC-104.

For details about patterns “A” and “B” under “Other”, see EC-106.

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

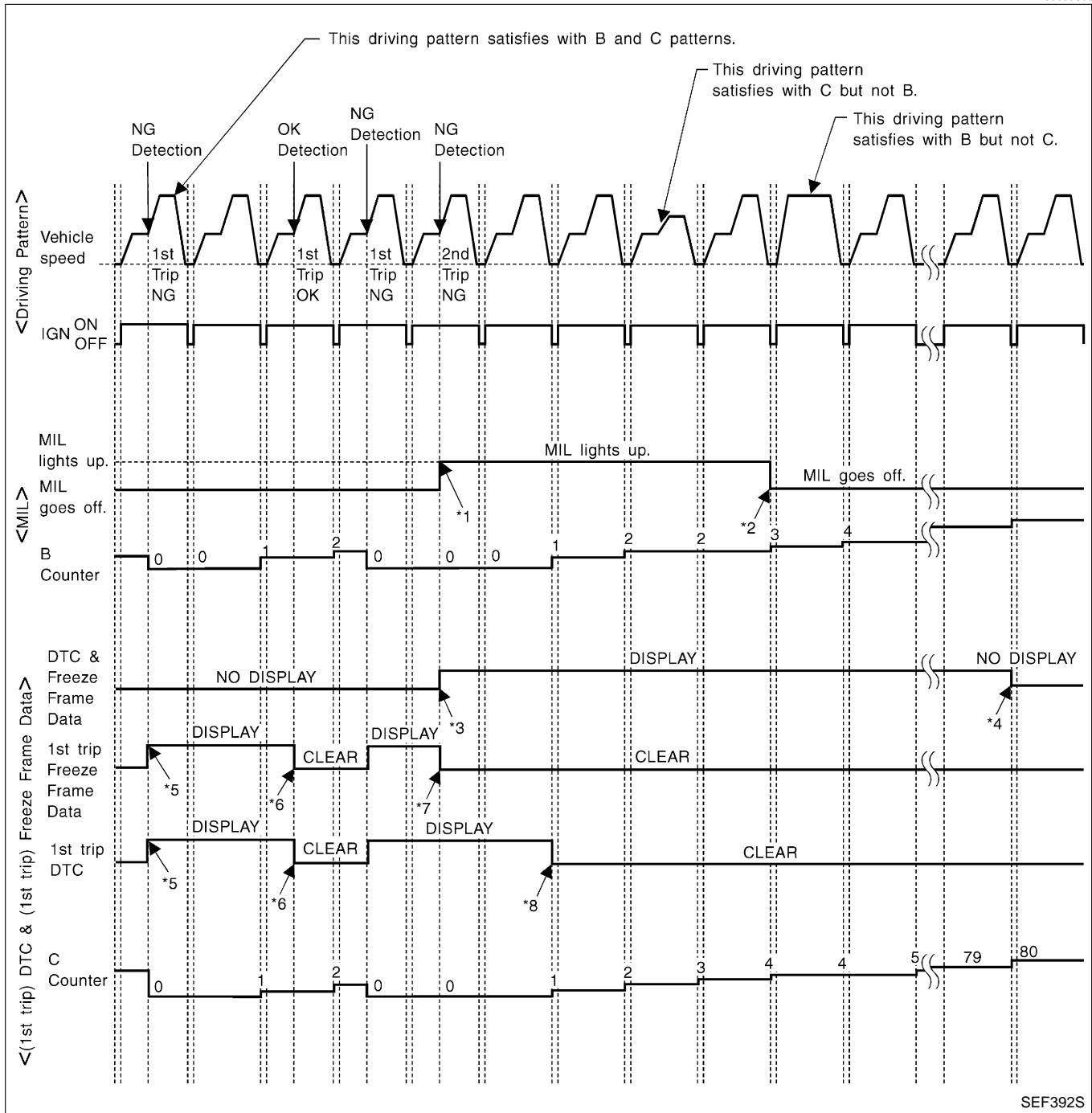
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

OBD System Operation Chart (Cont'd)

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"

=NIEC0033S03



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- *4: The DTC and the freeze frame

- data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- *6: The 1st trip DTC and the 1st trip

- freeze frame data will be cleared at the moment OK is detected.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.
- *8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

OBD System Operation Chart (Cont'd)

EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

=NIEC0033S04

Driving Pattern B

NIEC0033S0401

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

Driving Pattern C

NIEC0033S0402

Driving pattern C means the vehicle operation as follows:

1) The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the freeze frame data) $\times (1 \pm 0.1)$ [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), "T" should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), "T" should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of (1).
- The C counter will be counted up when (1) is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

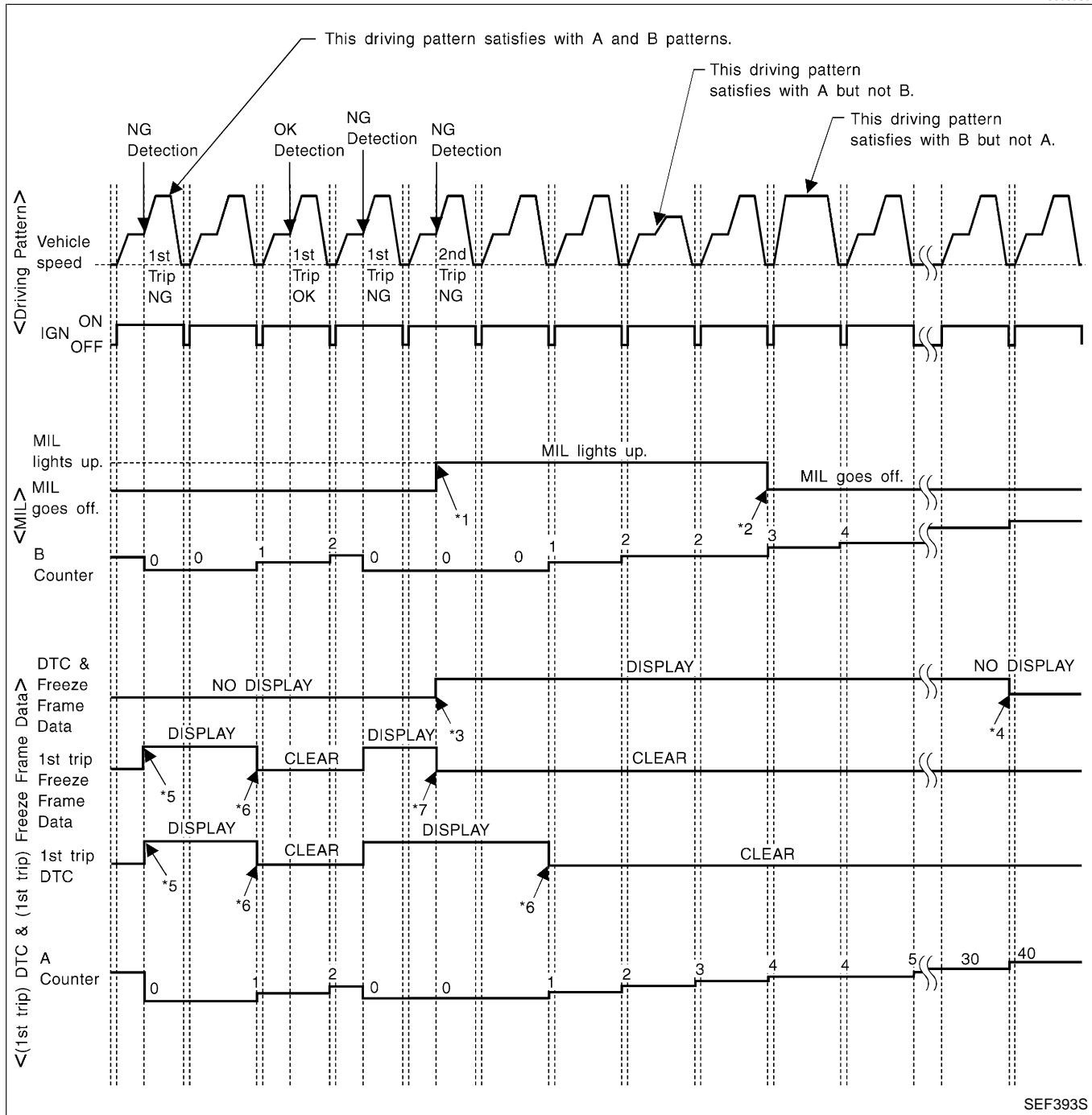
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

OBD System Operation Chart (Cont'd)

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NIEC0033S05



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

- *4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC

- and the 1st trip freeze frame data will be stored in ECM.
- *6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

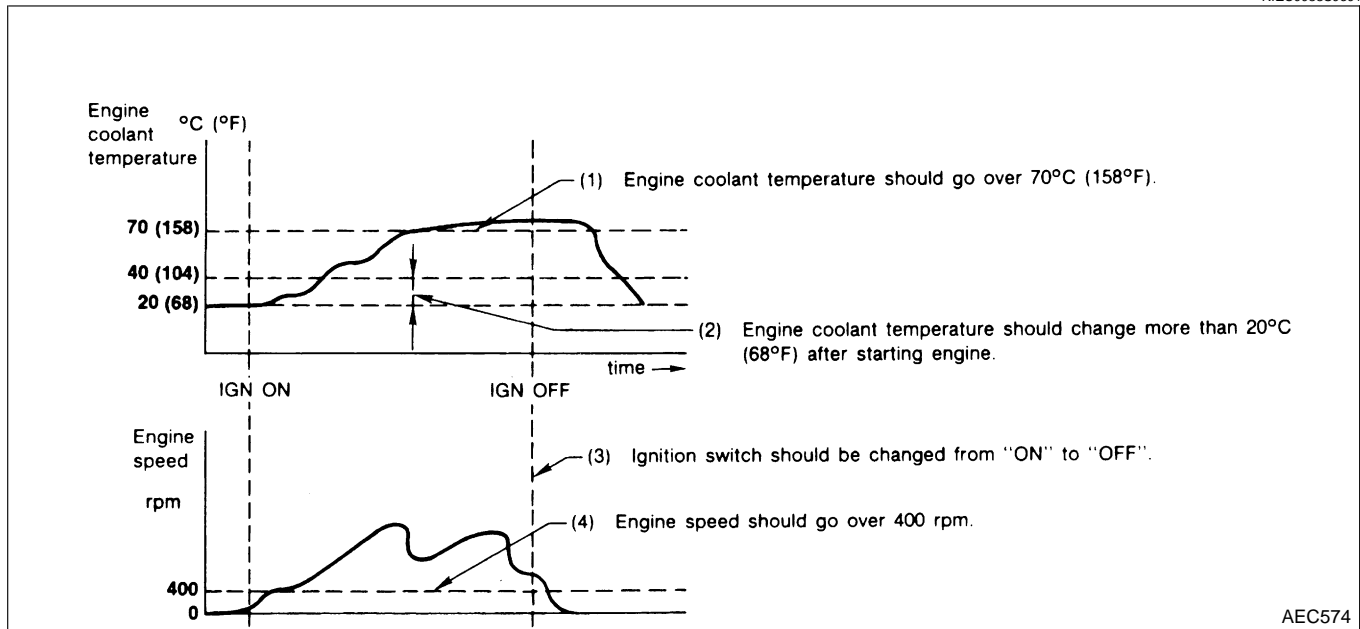
OBD System Operation Chart (Cont'd)

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NIEC0033S06

Driving Pattern A

NIEC0033S0601



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

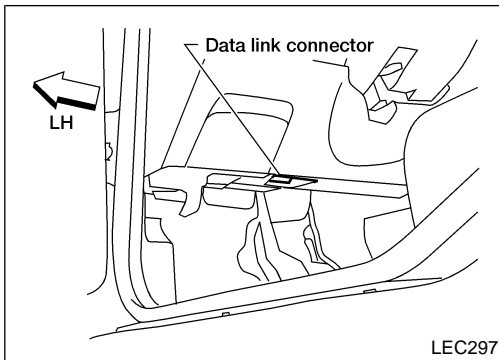
Driving Pattern B

NIEC0033S0602

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in "OBD SYSTEM OPERATION CHART").



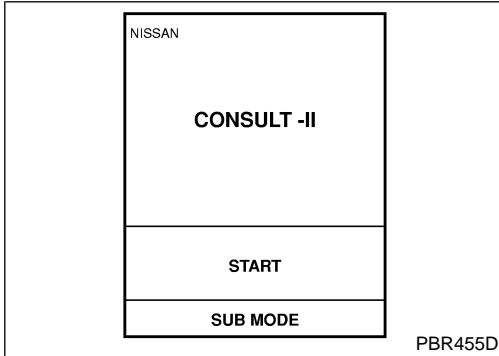
CONSULT-II

=NIEC0504

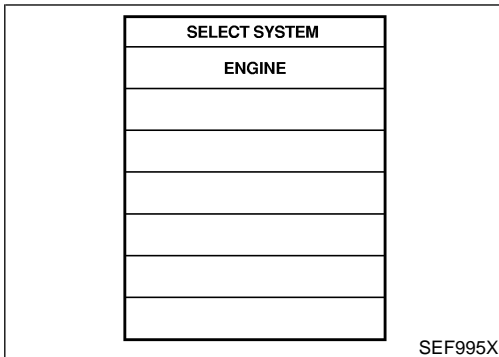
CONSULT-II INSPECTION PROCEDURE

NIEC0504S01

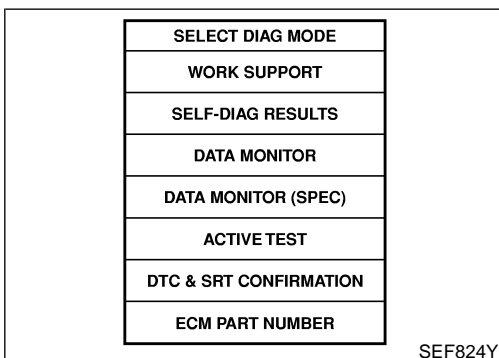
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" to data link connector, which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NIEC0504S02

Item		DIAGNOSTIC TEST MODE							
		WORK SUP- PORT	SELF-DIAGNOS- TIC RESULTS		DATA MONI- TOR	DATA MONI- TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP- PORT
ENGINE CONTROL COMPONENT PARTS INPUT	Camshaft position sensor (PHASE)		X	X					
	Crankshaft position sensor (POS)		X			X			
	Mass air flow sensor		X		X	X			
	Engine coolant temperature sensor		X	X	X	X	X		
	Heated oxygen sensor 1 (front)		X		X	X		X	X
	Heated oxygen sensor 2 (rear)		X		X	X		X	X
	Vehicle speed sensor		X	X	X	X			
	Throttle position sensor		X		X	X			
	Fuel tank temperature sensor		X		X	X	X		
	EVAP control system pressure sensor		X		X	X			
	Absolute pressure sensor		X		X	X			
	EGR temperature sensor		X		X	X			
	Intake air temperature sensor		X	X	X	X			
	Knock sensor		X						
	Ignition switch (start signal)				X	X			
	Closed throttle position switch		X		X	X			
	Closed throttle position switch (throttle position sensor signal)				X	X			
	Air conditioner switch				X	X			
	Park/neutral position (PNP) switch		X		X	X			
	Power steering oil pressure switch				X	X			
Battery voltage				X	X				
Load signal				X	X				
Swirl control valve control vacuum check switch		X		X	X				
Fuel level sensor		X		X	X				

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

Item		DIAGNOSTIC TEST MODE							GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA SC EL IDX	
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION		
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS		DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				X	X	X			
	Power transistor (Ignition timing)	X	X (Ignition signal)		X	X	X			
	IACV-AAC valve		X		X	X	X			
	EVAP canister purge volume control solenoid valve		X		X	X	X		X	
	Air conditioner relay				X	X				
	Fuel pump relay	X			X	X	X			
	Cooling fan		X		X	X	X			
	EGR volume control valve		X		X	X	X			
	Heated oxygen sensor 1 heater		X		X	X		X		
	Heated oxygen sensor 2 heater		X		X	X		X		
	EVAP canister vent control valve		X		X	X	X			
	Vacuum cut valve bypass valve		X		X	X	X		X	
	Swirl control valve control solenoid valve		X		X	X	X			
	Intake valve timing control solenoid valve		X		X	X	X			
Calculated load value			X	X	X					

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-86.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

FUNCTION	
Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM part number	ECM part number can be read.

=NIEC0504S03

*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

WORK SUPPORT MODE

-NIEC0504S04

WORK ITEM	CONDITION	USAGE	
TP SW/TP SEN IDLE POSI ADJ	<ul style="list-style-type: none"> FOLLOW THE BASIC INSPECTION INSTRUCTION IN THE SERVICE MANUAL. 	When adjusting the idle throttle position	GI
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. 	When releasing fuel pressure from fuel line	MA
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. 	When learning the idle air volume	EM
SELF-LEARNING CONT	<ul style="list-style-type: none"> THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. 	When clear the coefficient of self-learning control value	LC
EVAP SYSTEM CLOSE	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> IGN SW "ON" ENGINE NOT RUNNING AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM TANK FUEL TEMP. IS MORE THAN 0°C (32°F). WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system	EC FE CL MT AT AX SU
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> IDLE CONDITION 	When setting target idle speed	BR
TARGET IGNITION TIMING ADJ*	<ul style="list-style-type: none"> IDLE CONDITION 	<ul style="list-style-type: none"> When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light. If once the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed. 	ST RS BT

*: This function is not necessary in the usual service procedure.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

SELF-DIAGNOSTIC MODE

=NIEC0504S05

DTC and 1st Trip DTC

NIEC0504S0501

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-22.)

Freeze Frame Data and 1st Trip Freeze Frame Data

NIEC0504S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-22.)
FUEL SYS-B1*2	<ul style="list-style-type: none"> "Fuel injection system status" at the moment a malfunction is detected is displayed. One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction
FUEL SYS-B2*2	<ul style="list-style-type: none"> "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1*2 [%]	<ul style="list-style-type: none"> "Short-term fuel trim" at the moment a malfunction is detected is displayed. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
S-FUEL TRIM-B2*2 [%]	
L-FUEL TRIM-B1*2 [%]	<ul style="list-style-type: none"> "Long-term fuel trim" at the moment a malfunction is detected is displayed. The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
L-FUEL TRIM-B2*2 [%]	
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.

*1: The items are the same as those of 1st trip freeze frame data.

*2: Regarding B15 model, "-B1" indicates cylinders No. 1 and 4, "-B2" indicates cylinders No. 2 and 3.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

DATA MONITOR MODE

-NIEC0504S06

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor (PHASE). 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. This data also includes the data for the air-fuel ratio learning control.
A/F ALPHA-B2 [%]				
COOLAN TEMP/S [°C] or [°F]	○	○	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2S1 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 1 (front) is displayed. 	
HO2S1 (B2) [V]	○	○		
HO2S2 (B1) [V]	○		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 (rear) is displayed. 	
HO2S2 (B2) [V]	○	○		
HO2S1 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 1 (front) signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture. 	<ul style="list-style-type: none"> After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S1 MNTR (B2) [RICH/LEAN]	○			
HO2S2 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 2 (rear) signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
HO2S2 MNTR (B2) [RICH/LEAN]	○			
VHCL SPEED SE [km/h] or [mph]	○	○	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed sensor signal is displayed. 	
BATTERY VOLT [V]	○		<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
THRTL POS SEN [V]	○	○	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	
FUEL T/TMP SE [°C] or [°F]			<ul style="list-style-type: none"> The fuel temperature judged from the tank fuel temperature sensor signal voltage is displayed. 	

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
INT/A TEMP SE [°C] or [°F]	○		<ul style="list-style-type: none"> The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated. 	
EGR TEMP SEN [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the EGR temperature sensor is displayed. 	
EVAP SYS PRES [V]			<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 	
ABSOL PRES/SE [V]			<ul style="list-style-type: none"> The signal voltage of the absolute pressure sensor is displayed. 	
FUEL LEVEL SE [V]			<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 	
START SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the starter signal. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal.
CLSD THL POS [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the throttle position sensor signal. 	
CLSD THL/P SW [ON/OFF]			<ul style="list-style-type: none"> Indicates mechanical contact [ON/OFF] condition of the closed throttle position switch. 	
AIR COND SIG [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 	
P/N POSI SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. 	
PW/ST SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering oil pressure switch determined by the power steering oil pressure signal is indicated. 	
LOAD SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on. 	
IGNITION SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 	
SWL CON VC SW			<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the swirl control valve control vacuum check switch. ON ... Swirl control valve is not operational. OFF ... Swirl control valve is operational. 	
INJ PULSE-B1 [msec]		○	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated.
INJ PULSE-B2 [msec]				
IGN TIMING [BTDC]		○	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
CAL/LD VALUE [%]			<ul style="list-style-type: none"> “Calculated load value” indicates the value of the current airflow divided by peak airflow. 		GI MA
ABSOL TH-P/S [degree]			<ul style="list-style-type: none"> “Absolute throttle position sensor” indicates the throttle valve opening angle computed by ECM according to the signal voltage of the throttle position sensor. 		EM LC
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor. 		EC
IACV-AAC/V [step]		○	<ul style="list-style-type: none"> Indicates the IACV-AAC valve control value computed by ECM according to the input signals. 		FE
PURG VOL C/V [%]		○	<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 		CL MT
EGR VOL CON/V [step]		○	<ul style="list-style-type: none"> Indicates the EGR volume control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 		AT AX
SWRL CONT S/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the swirl control valve control solenoid valve (determined by ECM according to the input signals) is indicated. ON ... Swirl control valve is closed. OFF ... Swirl control valve is opened. 		SU BR
AIR COND RLY [ON/OFF]		○	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signal) is indicated. 		ST
FUEL PUMP RLY [ON/OFF]		○	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 		RS
INT/V SOL-B1			<ul style="list-style-type: none"> The control condition of the intake valve timing control solenoid valve is indicated. ON ... Intake valve timing control solenoid is operating. OFF ... Intake valve timing control solenoid is not operating. 		BT HA SC
VC/V BYPASS/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. ON ... Open OFF ... Closed 		EL IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. ON ... Closed OFF ... Open 	
COOLING FAN [ON/OFF]		○	<ul style="list-style-type: none"> Indicates the control condition of the cooling fan (determined by ECM according to the input signal). HIGH ... High speed operation LOW ... Low speed operation OFF ... Stop 	
HO2S1 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 1 heater determined by ECM according to the input signals. 	
HO2S1 HTR (B2) [ON/OFF]				
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
HO2S2 HTR (B2) [ON/OFF]				
IDL A/V LEAN			<ul style="list-style-type: none"> Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully. INCMP ... Idle air volume learning has not been performed successfully. 	
TRVL AFTER MIL [km] or [Mile]			<ul style="list-style-type: none"> Distance traveled while MIL is activated 	
Voltage [V]			<ul style="list-style-type: none"> Voltage measured by the voltage probe. 	
Frequency [msec] or [Hz] or [%]			<ul style="list-style-type: none"> Pulse width, frequency or duty cycle measured by the pulse probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

DATA MONITOR (SPEC) MODE

-NIEC0504S11

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor (PHASE). 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated.
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated.
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated. This data also includes the data for the air-fuel ratio learning control.
A/F ALPHA-B2 [%]				

ACTIVE TEST MODE

NIEC0504S07

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Fuel injectors Heated oxygen sensor 1 (front)
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Adjust initial ignition timing
IACV-AAC/V OPENING	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. Change the IACV-AAC valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> Harness and connector IACV-AAC valve
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch "OFF" Shift lever "N" Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connector Compression Injectors Power transistor Spark plugs Ignition coils
COOLING FAN	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "ON" and "OFF" using CONSULT-II. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connector Cooling fan motor Cooling fan relay
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Engine coolant temperature sensor Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connector Fuel pump relay

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
EGR VOL CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Change EGR volume control valve opening step using CONSULT-II. 	EGR volume control valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● EGR volume control valve
VALVE TIMING SOL	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
SWIRL CONT SOL VALVE	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
PURG VOL CONT/V	<ul style="list-style-type: none"> ● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

NIEC0504S08

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-87.

NIEC0504S0801

SRT Work Support Mode

NIEC0504S0802

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

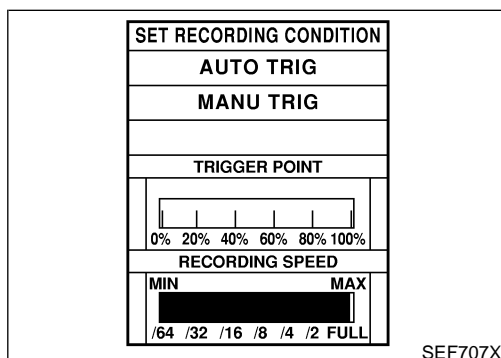
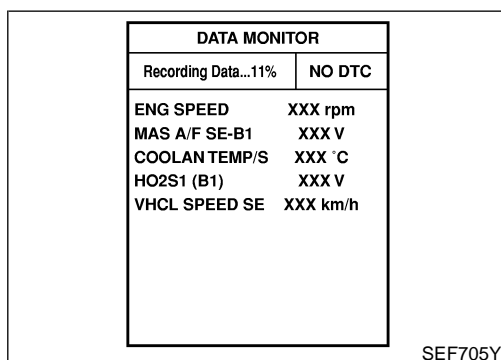
QG18DE (EXC CALIF CA)

CONSULT-II (Cont'd)

DTC Work Support Mode

NIEC0504S0803

Test mode	Test item	Condition	Reference page	
EVAPORATIVE SYSTEM	EVAP SML LEAK P0440/P1441	Refer to corresponding trouble diagnosis for DTC.	EC-385, 579	GI
	PURG VOL CN/V P1444		EC-595	MA
	PURGE FLOW P1447		EC-615	EM
	VC CUT/V BP/V P1491		EC-645	EM
HEATED OXYGEN SENSOR 1 (FRONT)	HO2S1 (B1) P0130		EC-213	LC
	HO2S1 (B1) P0131		EC-222	LC
	HO2S1 (B1) P0132		EC-228	EC
	HO2S1 (B1) P0133		EC-235	FE
	HO2S2 (B1) P0150		EC-213	FE
	HO2S2 (B1) P0151		EC-222	CL
	HO2S2 (B1) P0152		EC-228	CL
	HO2S2 (B1) P0153		EC-235	MT
HEATED OXYGEN SENSOR 2 (REAR)	HO2S2 (B1) P0137		EC-260	MT
	HO2S2 (B1) P0138		EC-269	AT
	HO2S2 (B1) P0139		EC-278	AT
	HO2S2 (B2) P0157	EC-260	AX	
	HO2S2 (B2) P0158	EC-269	AX	
	HO2S2 (B2) P0159	EC-278	SU	
EGR SYSTEM	EGR SYSTEM P0400	EC-365	SU	
	EGR SYSTEM P1402	EC-570	BR	



REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

NIEC0504S09

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

- 1) "AUTO TRIG" (Automatic trigger):
 - The malfunction will be identified on the CONSULT-II screen in real time. In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM. At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at left, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed. The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.
- 2) "MANU TRIG" (Manual trigger):
 - DTC/1st trip DTC and malfunction item will not be displayed

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

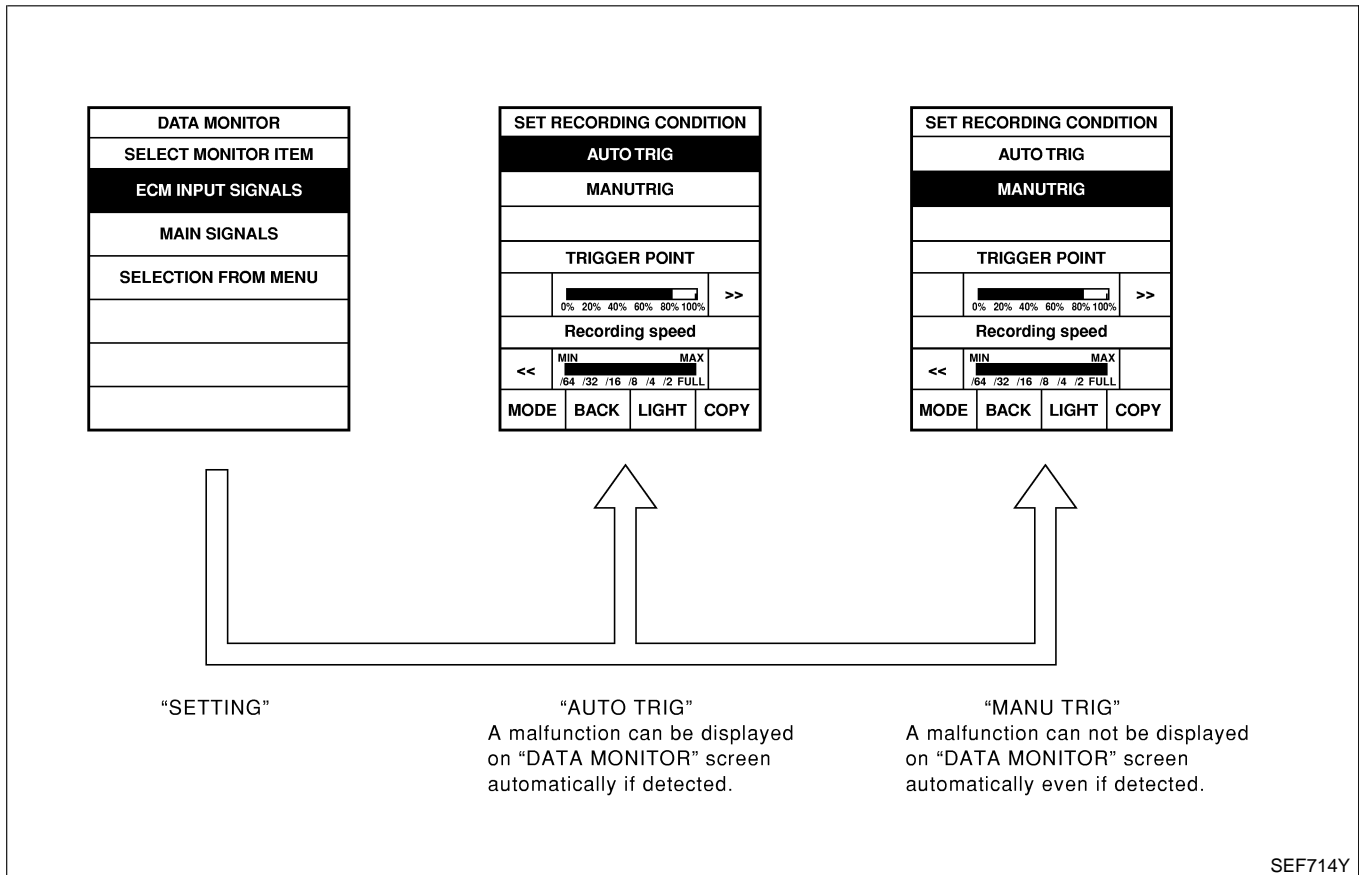
CONSULT-II (Cont'd)

automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.

Use these triggers as follows:

- 1) "AUTO TRIG"
 - While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent. When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to **GI-25**, "Incident Simulation Tests".)
- 2) "MANU TRIG"
 - If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.

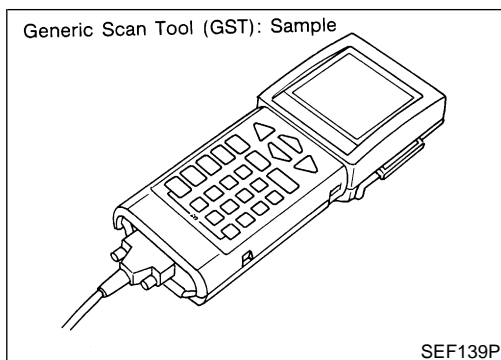


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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Generic Scan Tool (GST)



Generic Scan Tool (GST)

=NIEC0035

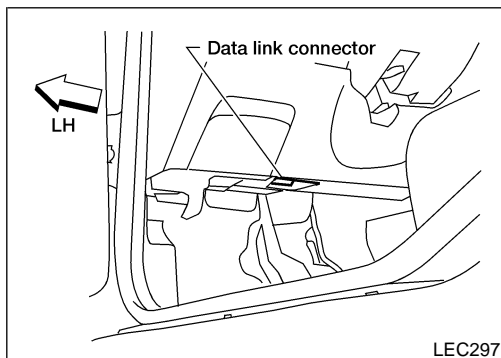
DESCRIPTION

NIEC0035S01

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page.

ISO9141 is used as the protocol.

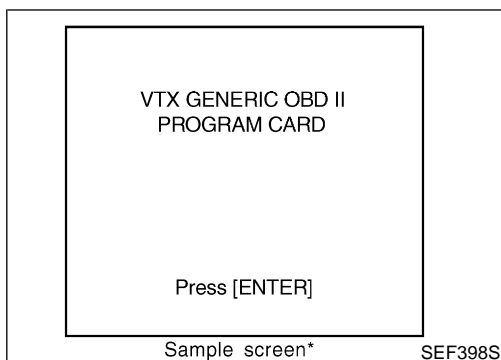
The name "GST" or "Generic Scan Tool" is used in this service manual.



GST INSPECTION PROCEDURE

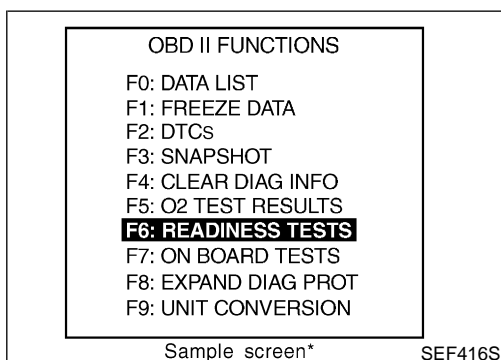
NIEC0035S02

1. Turn ignition switch OFF.
2. Connect "GST" to data link connector. (Data link connector is located under LH dash panel near the fuse box cover.)



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.

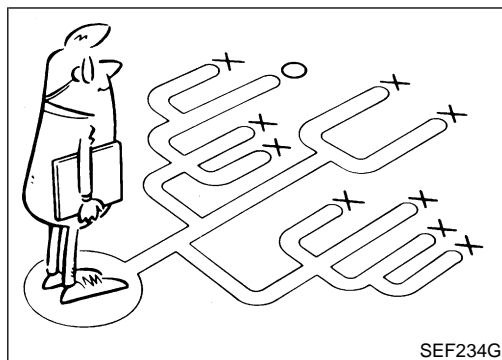
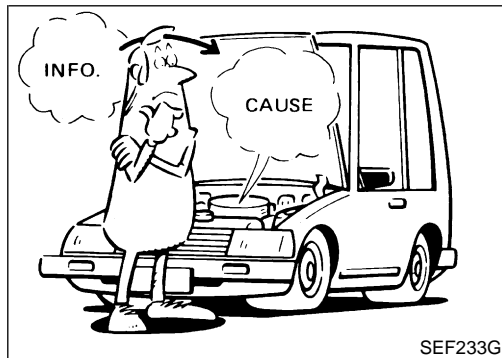
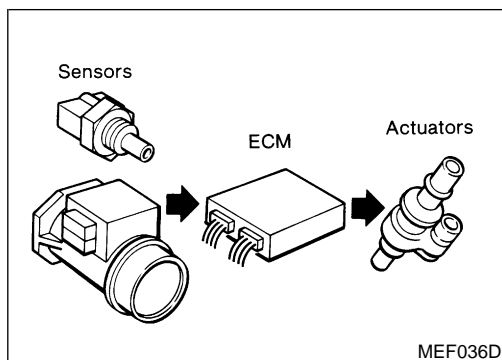
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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (EXC CALIF CA)

Generic Scan Tool (GST) (Cont'd)

FUNCTION		NIEC0035S03
	Diagnostic test mode	Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" (EC-112).]
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. <ul style="list-style-type: none"> ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch "OFF" ● Low fuel temperature ● Too much pressure is applied to EVAP system
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.



KEY POINTS	
WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE Road conditions
HOW Operating conditions, Weather conditions, Symptoms

SEF907L

Introduction

NIEC0036

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on EC-125.

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.

Start your diagnosis by looking for "conventional" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

DIAGNOSTIC WORKSHEET

NIEC0036S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make troubleshooting faster and more accurate.

In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

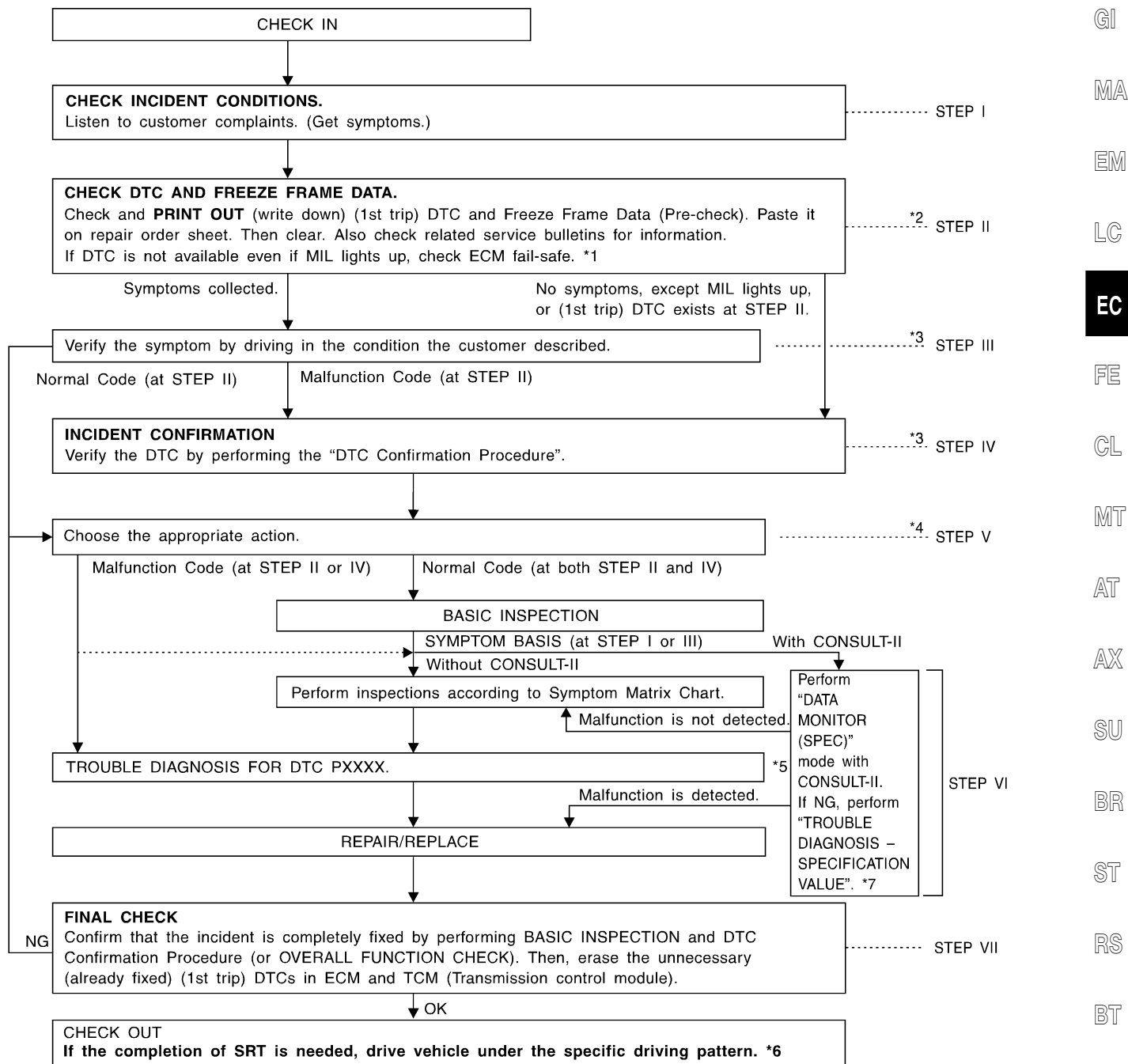
Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere [for the models with EVAP (SMALL LEAK) diagnosis].

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Work Flow

NIEC0037



*1: EC-144

*2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT", EC-167.

*3: If the incident cannot be duplicated, refer to "TROUBLE

DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

*4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-168.

*5: If the malfunctioning part cannot be found, refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

*6: EC-92
*7: EC-163

SEF510ZE

TROUBLE DIAGNOSIS — INTRODUCTION

QG18DE (EXC CALIF CA)

Work Flow (Cont'd)

DESCRIPTION FOR WORK FLOW

NIEC0037S01

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-124.
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to EC-98.) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-145.) Also check related service bulletins for information.
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25 .) If the malfunction code is detected, skip STEP IV and perform STEP V.
STEP IV	Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or Generic Scan Tool. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25 .) In case the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-127.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE" EC-163. (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-145.)
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-154. The "DIAGNOSTIC PROCEDURE" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the DIAGNOSTIC PROCEDURE. For details, refer to GI section ("HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT", "Circuit Inspection"). Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC CONFIRMATION PROCEDURE" and confirm the normal code [DTC No. P0000 or 0505] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-98.)

Basic Inspection

NIEC0038

Precaution:

Perform Basic Inspection without electrical or mechanical loads applied;

- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear window defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.

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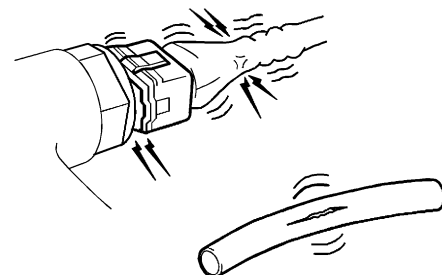
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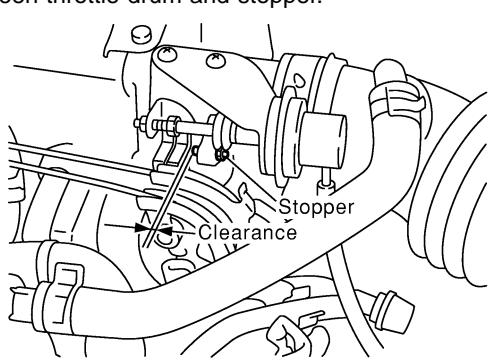
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1	INSPECTION START	<p>1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> ● Harness connectors for improper connections ● Vacuum hoses for splits, kinks and improper connections ● Wiring for improper connections, pinches and cuts ● Air cleaner clogging ● Hoses and ducts for leaks
		
▶		GO TO 2.

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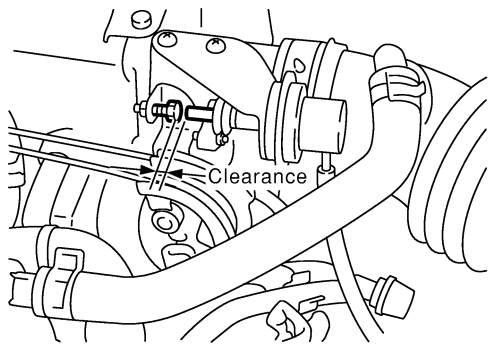
2	CHECK THROTTLE OPENER OPERATION-I	<p>Confirm that there is a clearance between throttle drum and stopper.</p>
		
OK or NG		<small>SEF456Y</small>
OK	▶	GO TO 4.
NG	▶	GO TO 3.

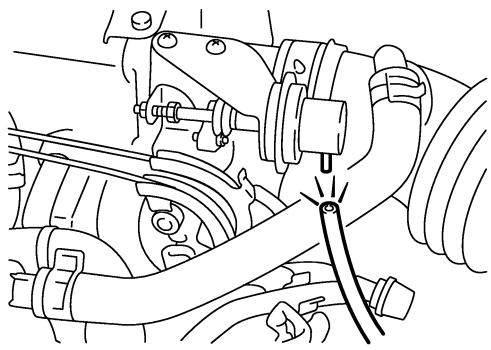
TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

3	CHECK THROTTLE OPENER FIXING BOLTS	
Check throttle opener fixing bolts for loosening.		
OK or NG		
OK	▶	1. Repair or replace throttle body assembly. 2. GO TO 2.
NG	▶	1. Retighten the fixing bolts. 2. GO TO 2.

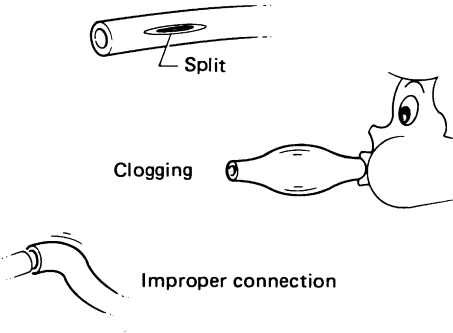
4	CHECK THROTTLE OPENER OPERATION-II	
<ol style="list-style-type: none"> 1. Start engine and let it idle. 2. Confirm that throttle opener rod moves backward and there is a clearance between throttle drum and throttle opener rod. 		
 <p style="text-align: right; margin-right: 50px;">SEF457Y</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

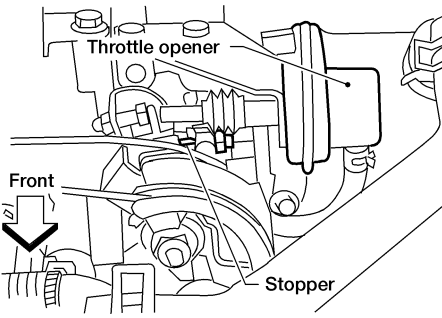
5	CHECK VACUUM SOURCE FOR THROTTLE OPENER	
<ol style="list-style-type: none"> 1. Disconnect vacuum hose connected to throttle opener. 2. Check vacuum existence with engine running. 		
 <p style="text-align: right; margin-right: 50px;">SEF458Y</p>		
OK or NG		
OK	▶	1. Repair or replace throttle body assembly. 2. GO TO 4.
NG	▶	GO TO 6.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

6	CHECK VACUUM HOSE	
<p>1. Stop engine. 2. Remove the vacuum hose. 3. Check the vacuum hose for splits, kinks and clogging.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Split</p> <p style="margin-left: 100px;">Clogging</p> <p style="margin-left: 100px;">Improper connection</p> </div> <p style="text-align: right;">SEF109L</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	1. Clean vacuum port by blowing air. 2. GO TO 4.
NG	▶	1. Replace vacuum hose. 2. GO TO 4.

7	CHECK THROTTLE DRUM OPERATION	
<p>Confirm that throttle drum moves to contact the stopper.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Throttle opener</p> <p style="margin-left: 100px;">Front</p> <p style="margin-left: 100px;">Stopper</p> </div> <p style="text-align: right;">LEC317</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK ACCELERATOR WIRE INSTALLATION	
<p>1. Stop engine. 2. Check accelerator wire for slack.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	1. Adjust accelerator wire. Refer to FE-3 , "Adjusting Accelerator Wire". 2. GO TO 7.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

9	CHECK THROTTLE VALVE OPERATION	
1. Remove intake air ducts. 2. Check throttle valve operation when moving throttle drum by hand.		
OK or NG		
OK	▶	1. Retighten the throttle drum fixing nuts. 2. GO TO 7.
NG	▶	1. Clean the throttle body and throttle valve. 2. GO TO 7.

10	CHECK THROTTLE POSITION SWITCH CLOSED POSITION-I	
<p>NOTE: Always check ignition timing before performing the following.</p> <ol style="list-style-type: none"> 1. Warm up engine to normal operating temperature. 2. Stop engine. 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to vacuum pump as shown below. 		
<p style="text-align: right; font-size: small;">SEF793WA</p>		
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum is free from the throttle opener rod.		
With CONSULT-II	▶	GO TO 11.
Without CONSULT-II	▶	GO TO 17.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

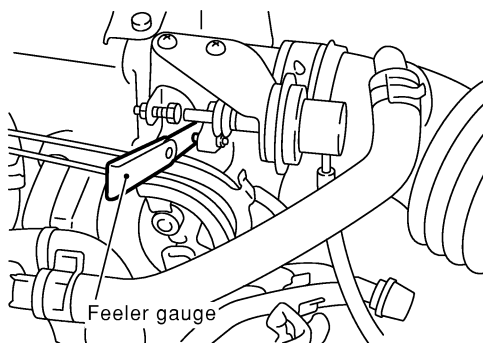
Basic Inspection (Cont'd)

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11 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode or "CLSD THL/P SW" in "DATA MONITOR" mode with CONSULT-II.
3. Read "CLSD THL/P SW" signal under the following conditions.
 - Insert a 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between stopper and throttle drum as shown in the figure and check the signal.



SEF459Y

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

"CLSD THL/P SW" signal should remain "ON" while inserting 0.05 mm (0.0020 in) feeler gauge.
 "CLSD THL/P SW" signal should remain "OFF" while inserting 0.15 mm (0.0059 in) feeler gauge.

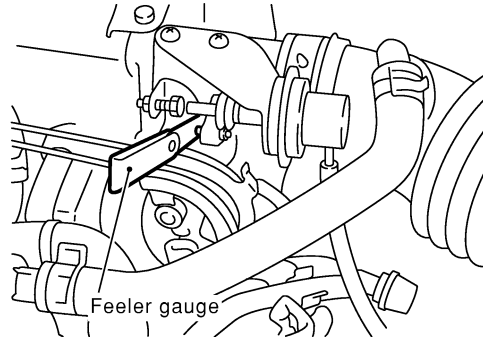
OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 12.

12 | ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

Ⓜ With CONSULT-II

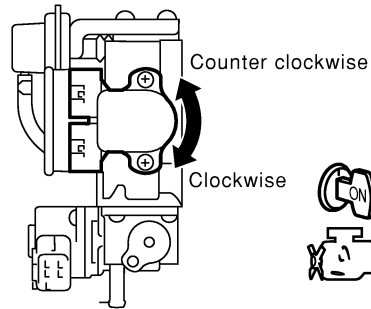
1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.



SEF459Y

4. Turn throttle position sensor body counterclockwise until "CLSD THL/P SW" signal switches to "OFF".

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91°C
CLSD THL POS	ON
CLSD THL/P SW	OFF



SEF717Y

▶ GO TO 13.

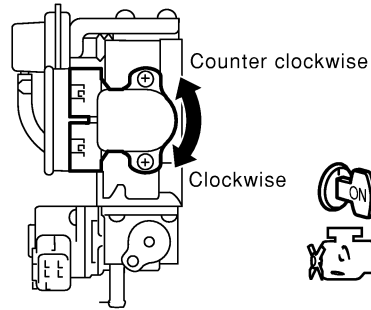
13 ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II

Ⓟ With CONSULT-II

1. Temporarily tighten sensor body fixing bolts as follows.

- Gradually move the sensor body clockwise and stop it when "CLSD THL/P SW" signal switches from "OFF" to "ON", then temporarily tighten sensor body fixing bolts.

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91°C
CLSD THL POS	ON
CLSD THL/P SW	ON



SEF718Y

2. Make sure two or three times that the signal is "ON" when the throttle valve is closed and "OFF" when it is opened.
3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.
4. Make sure two or three times that the signal remains "OFF" when the throttle valve is closed.
5. Tighten throttle position sensor.
6. Check the "CLSD THL/P SW" signal again.

The signal remains "OFF" while closing throttle valve.

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 12.

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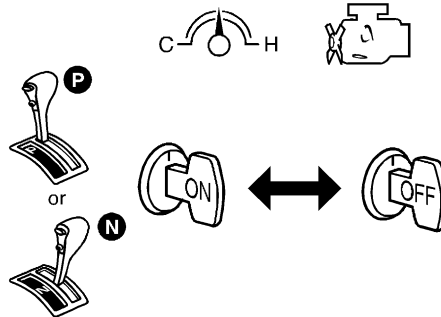
14 RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

 With CONSULT-II

NOTE:

Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.

1. Confirm that proper vacuum is applied. Refer to Test No. 10.
2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.
3. Start engine.
4. Warm up engine to normal operating temperature.
5. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode.
6. Stop engine. (Turn ignition switch "OFF".)
7. Turn ignition switch "ON" and wait at least 5 seconds.



SEF864V

8. Turn ignition switch "OFF" and wait at least 10 seconds.
9. Repeat steps 7 and 8 until "CLSD THL POS" signal changes to "ON".

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

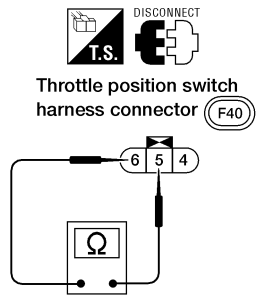
SEF715Y

▶ GO TO 19.

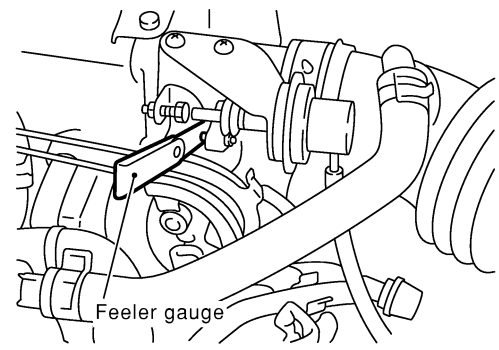
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15 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

- ⊗ **Without CONSULT-II**
1. Disconnect closed throttle position switch harness connector.
 2. Check continuity between closed throttle position switch terminals 5 and 6 under the following conditions.



- Insert the 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between the stopper and throttle drum as shown in the figure.



“Continuity should exist” while inserting 0.05 mm (0.0020 in) feeler gauge.
 “Continuity should not exist” while inserting 0.15 mm (0.0059 in) feeler gauge.

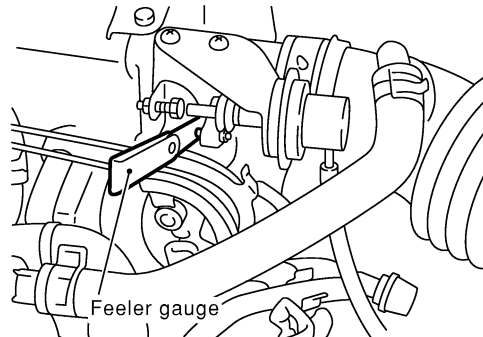
OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 16.

16 | **ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I**

⊗ Without CONSULT-II

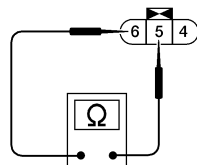
1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to Test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.



SEF459Y

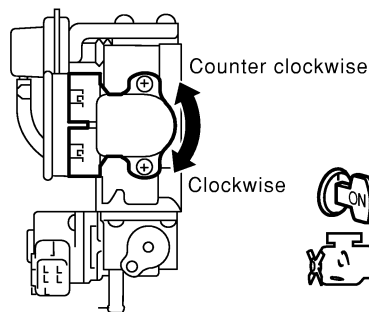


Throttle position switch harness connector (F40)



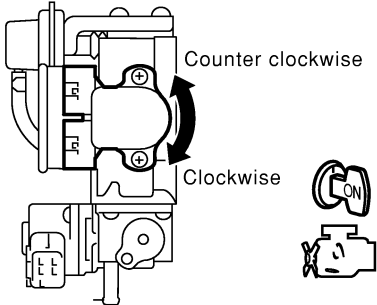
LAT193

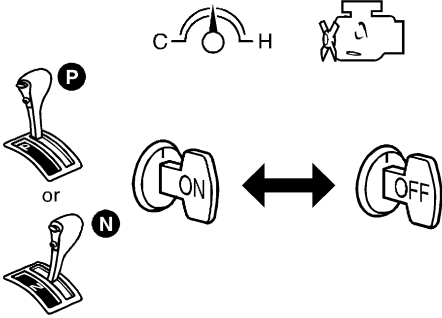
4. Turn throttle position sensor body counterclockwise until continuity does not exist.



SEF460Y

▶ GO TO 17.

17	ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II
<p>⊗ Without CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> ● Gradually move the sensor body clockwise and stop it when the continuity comes to exist, then temporarily tighten sensor body fixing bolts. 	
	
SEF460Y	
<p>2. Make sure two or three times that the continuity exists when the throttle valve is closed and continuity does not exist when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the continuity does not exist when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the continuity again.</p> <p style="color: blue;">Continuity does not exist while closing the throttle valve.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ GO TO 16.

18	RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY
<p>⊗ Without CONSULT-II</p> <p>NOTE:</p> <p>Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.</p>	
<p>1. Confirm that proper vacuum is applied. Refer to Test No. 10.</p> <p>2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.</p> <p>3. Start engine.</p> <p>4. Warm up engine to normal operating temperature.</p> <p>5. Stop engine. (Turn ignition switch "OFF".)</p> <p>6. Turn ignition switch "ON" and wait at least 5 seconds.</p>	
	
SEF864V	
<p>7. Turn ignition switch "OFF" and wait at least 10 seconds.</p> <p>8. Repeat steps 6 and 7, 20 times.</p>	
▶	GO TO 19.

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TROUBLE DIAGNOSIS — BASIC INSPECTION


QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

19	CHECK (1ST TRIP) DTC	
<p>1. Turn ignition switch "OFF". 2. Release vacuum from throttle opener. 3. Remove vacuum pump and vacuum hose from throttle opener. 4. Reinstall original vacuum hose to throttle opener securely. 5. Start engine and warm it up to normal operating temperature. 6. Rev engine (2,000 to 3,000 rpm) two or three times. 7. Make sure no (1st trip) DTC is displayed with CONSULT-II or GST.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 21.
OK (Without CONSULT-II) ▶		GO TO 22.
NG ▶		GO TO 20.

20	REPAIR OR REPLACE	
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".		
With CONSULT-II ▶		GO TO 21.
Without CONSULT-II ▶		GO TO 22.

21	CHECK TARGET IDLE SPEED	
<p> With CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Select "ENG SPEED" in "DATA MONITOR" mode. 3. Check idle speed. M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK ▶		GO TO 30.
NG ▶		GO TO 23.

22	CHECK TARGET IDLE SPEED	
<p> Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK ▶		GO TO 30.
NG ▶		GO TO 23.

23	PERFORM IDLE AIR VOLUME LEARNING	
<p>Refer to "Idle Air Volume Learning", EC-83. Which is the result CMLPT or INCMP?</p> <p style="text-align: center;">CMLPT or INCMP</p>		
CMLPT ▶		GO TO 24.
INCMP ▶		1. Follow the instruction of "Idle Air Volume Learning", EC-83. 2. GO TO 23.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

24	CHECK TARGET IDLE SPEED AGAIN						
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <p>1. Read "ENG SPEED" in "DATA MONITOR" mode with CONSULT-II. 2. Check idle speed. 3.</p> <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="padding: 2px;">DATA MONITOR</th> </tr> <tr> <th style="padding: 2px;">MONITOR</th> <th style="padding: 2px;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="padding: 2px;">ENG SPEED</td> <td style="padding: 2px;">XXX rpm</td> </tr> </tbody> </table> </div> <p style="text-align: right; margin-top: 10px;">SEF058Y</p> <p style="margin-top: 10px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>							
OK	▶ GO TO 28.						
NG	▶ 1. Replace IACV-AAC valve. 2. GO TO 25.						

25	PERFORM IDLE AIR VOLUME LEARNING
<p>Refer to "Idle Air Volume Learning", EC-755. Which is the result CMPLT or INCMP?</p> <p style="text-align: center; margin-top: 10px;">CMPLT or INCMP</p>	
CMPLT	▶ GO TO 26.
INCMP	▶ 1. Follow instruction for "Idle Air Volume Learning", EC-755 2. GO TO 23.

26	CHECK TARGET IDLE SPEED AGAIN
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>1. Select "ENG SPEED" in "DATA MONITOR" mode. 2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>	
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	▶ GO TO 28.
NG	▶ GO TO 27.

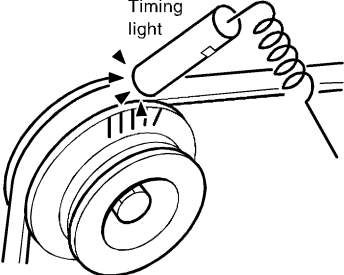
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TROUBLE DIAGNOSIS — BASIC INSPECTION

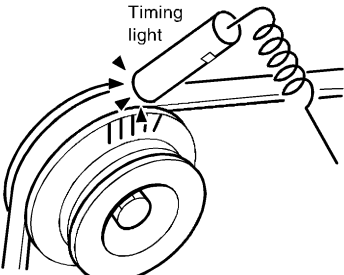
QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

27	CHECK ECM FUNCTION
<p>1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.)</p> <p>2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to “NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)”, EC-100.</p>	
▶ GO TO 23.	

28	CHECK IGNITION TIMING
<p>Check ignition timing at idle using a timing light.</p>	
	
SEF984U	
<p>Ignition timing: 9°±5° BTDC (in “P” or “N” position)</p>	
OK or NG	
OK	▶ GO TO 38.
NG	▶ GO TO 29.

29	CHECK TIMING CHAIN INSTALLATION
<p>Check timing chain installation. Refer to EM-24, “Installation”.</p>	
OK or NG	
OK	▶ GO TO 25.
NG	▶ 1. Repair. 2. GO TO 23.

30	CHECK IGNITION TIMING
<p>Check ignition timing at idle using a timing light.</p>	
	
SEF984U	
<p>Ignition timing: M/T = 9°± 5° BTDC A/T = 9°± 5° BTDC (in “P” or “N” position)</p>	
OK or NG	
OK	▶ GO TO 38.
NG	▶ GO TO 31.



TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

31	PERFORM IDLE AIR VOLUME LEARNING	
Refer to "Idle Air Volume Learning", EC-83. Which is the result CMPLT or INCMP?		
CMPLT or INCMP		
CMPLT	▶	GO TO 32.
INCMP	▶	1. Follow the instruction of "Idle Air Volume Learning", EC-83. 2. GO TO 31.

GI
MA
EM

32	CHECK TARGET IDLE SPEED AGAIN							
<p> With CONSULT-II</p> <p>1. Read "ENG SPEED" in "DATA MONITOR" mode with CONSULT-II. 2. Check idle speed. 3.</p> <div style="text-align: center; margin: 20px 0;"> <table border="1" style="border-collapse: collapse;"> <tr><th colspan="2">DATA MONITOR</th></tr> <tr><th>MONITOR</th><th>NO DTC</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> </table> </div> <p style="text-align: right; margin-top: 10px;">SEF058Y</p> <p style="margin-top: 20px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR								
MONITOR	NO DTC							
ENG SPEED	XXX rpm							
<p> Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature. 2. Check idle speed. M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 36.						
NG	▶	1. Replace IACV-AAC valve. 2. GO TO 33.						

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33	PERFORM IDLE AIR VOLUME LEARNING	
Refer to "Idle Air Volume Learning", EC-755. Which is the result CMPLT or INCMP?		
CMPLT or INCMP		
CMPLT	▶	GO TO 34.
INCMP	▶	1. Follow instruction for "Idle Air Volume Learning", EC-755 2. GO TO 31.

BT
HA
SC
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TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (EXC CALIF CA)

Basic Inspection (Cont'd)

34	CHECK TARGET IDLE SPEED AGAIN	
<p>⊗ Without CONSULT-II</p> <p>1. Select "ENG SPEED" in "DATA MONITOR" mode.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 650±50 rpm</p> <p style="margin-left: 20px;">A/T: 800±50 rpm (in "P" or "N" position)</p>		
<p>⊗ Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 650±50 rpm</p> <p style="margin-left: 20px;">A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: right; margin-right: 50px;">OK or NG</p>		
OK		▶ GO TO 36.
NG		▶ GO TO 35.

35	CHECK ECM FUNCTION	
<p>1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.)</p> <p>2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-100.</p>		
		▶ GO TO 31.

36	CHECK IGNITION TIMING AGAIN	
<p>Check ignition timing again. Refer to Test No. 30.</p> <p style="text-align: right; margin-right: 50px;">OK or NG</p>		
OK		▶ GO TO 38.
NG		▶ GO TO 37.

37	CHECK TIMING CHAIN INSTALLATION	
<p>Check timing chain installation. Refer to EM-24, "Installation".</p> <p style="text-align: right; margin-right: 50px;">OK or NG</p>		
OK		▶ GO TO 35.
NG		▶ 1. Repair. 2. GO TO 31.

38	ERASE UNNECESSARY DTC	
<p>After this inspection, unnecessary DTC No. might be displayed.</p> <p>Erase the stored memory in ECM and TCM (Transmission control module).</p> <p>Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98 and AT-37, "HOW TO ERASE DTC".</p>		
		▶ INSPECTION END

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

DTC Inspection Priority Chart

DTC Inspection Priority Chart

NIEC0039

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)	
1	<ul style="list-style-type: none"> ● P0100 Mass air flow sensor ● P0110 Intake air temperature sensor ● P0115, P0125 Engine coolant temperature sensor ● P0120 Throttle position sensor ● P0180 Fuel tank temperature sensor ● P0325 Knock sensor ● P0335, P1336 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0403 EGR volume control valve ● P0460, P0461, P0464, P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1126 Thermostat function ● P1320 Ignition signal ● P1605 A/T diagnosis communication line ● P1706 Park/Neutral position (PNP) switch 	GI MA EM LC EC FE CL
2	<ul style="list-style-type: none"> ● P0105 Absolute pressure sensor ● P0130-P0134, P0150-P0154 Heated oxygen sensor 1 (front) ● P0135, P0155 Heated oxygen sensor 1 heater (front) ● P0137-P0140, P0157-P0160 Heated oxygen sensor 2 (rear) ● P0141, P0161 Heated oxygen sensor 2 heater (rear) ● P0217 Coolant overtemperature enrichment protection ● P0335, P1336 Crankshaft position sensor (POS) ● P0443, P1444 EVAP canister purge volume control solenoid valve ● P0446, P1446, P1448 EVAP canister vent control valve ● P0450 EVAP control system pressure sensor ● P0510 Closed throttle position switch ● P0705-P0725, P0740-P1760 A/T related sensors, solenoid valves and switches ● P1111 Intake valve timing control solenoid valve ● P1140 Intake valve timing control position sensor circuit ● P1165 Swirl control valve control vacuum switch ● P1401 EGR temperature sensor ● P1447 EVAP control system purge flow monitoring ● P1490, P1491 Vacuum cut valve bypass valve 	MT AT AX SU BR ST
3	<ul style="list-style-type: none"> ● P0171, P0172 Fuel injection system function ● P0300-P0304 Misfire ● P0400, P1402 EGR function ● P0420 Three way catalyst function ● P0440/P1440, P1441 EVAP control system (SMALL LEAK, VERY SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0505 IACV-AAC valve ● P0600 A/T communication line ● P0731-P0734, P0744 A/T function ● P1110 Intake valve timing control function ● P1130, P1131 Swirl control valve control solenoid valve ● P1148 Closed loop control 	RS BT HA SC

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

Fail-safe Chart

Fail-safe Chart

=NIEC0040

The ECM enters fail-safe mode if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0100	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0115	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-II display)
		Just as ignition switch is turned ON or Start	40°C (104°F)
		More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
P0120	Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
		Condition	Driving condition
		When engine is idling	Normal
		When accelerating	Poor acceleration
P0403	EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.	
Unable to access ECM	ECM	ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.	
		Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and IACV-AAC valve operation are controlled under certain limitations.	
		ECM fail-safe operation	
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multiport fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		IACV-AAC valve	Full open
		Replace ECM, if ECM fail-safe condition is confirmed.	

*: In Diagnostic Test Mode II (Self-diagnostic results)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

Symptom Matrix Chart

Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

NIEC0041

NIEC0041S01

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-673
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-68
	Injector circuit	1	1	2	3	2		2	2			2			EC-664
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-48
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-65
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-127
	IACV-AAC valve circuit	1	1	2	3	3	2	2	2	2		2		2	EC-452
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-127
	Ignition circuit	1	1	2	2	2		2	2			2			EC-547
EGR	EGR volume control valve circuit		2	2	3	3						3			EC-374
	EGR system	2	1	2	3	3	3	2	2	3		3			EC-365, EC-570
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	EC-168
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	HA section

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

Symptom Matrix Chart (Cont'd)

	SYMPTOM												Reference page	
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor (PHASE) circuit	2	2	3	3	3		3	3			3			EC-359
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			EC-174
Heated oxygen sensor 1 (front) circuit		1	2	3	2		2	2			2			EC-213
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			EC-191, 208
Throttle position sensor circuit		1	2		2	2	2	2	2		2			EC-196
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			EC-127
Swirl control valve circuit	3	3						2						EC-510
Intake valve timing control system		3	3		3		3				3			EC-516
Vehicle speed sensor circuit		2	3		3						3			EC-448
Knock sensor circuit			2								3			EC-350
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-472, 144
Start signal circuit	2													EC-669
PNP switch circuit			3		3		3	3			3			EC-658
Power steering oil pressure switch circuit		2					3	3						EC-679
Electrical load signal circuit							3	3						EC-688

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NIEC0041S03

		SYMPTOM											Reference page				
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION			EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA			
Fuel	Fuel tank	5	5												FE section	—	
	Fuel piping			5	5	5		5	5			5					
	Vapor lock																
	Valve deposit																
	Poor fuel (Heavy weight gasoline, Low octane)	5		5	5	5		5	5				5				
Air	Air duct		5	5											FE section	—	
	Air cleaner																
	Air leakage from air duct (Mass air flow sensor — throttle body)				5	5		5	5	5				5			
	Throttle body, Throttle wire	5				5		5			5						
	Air leakage from intake manifold/Collector/Gasket																
Cranking	Battery	1	1	1		1		1	1					1	EL section	—	
	Alternator circuit																
	Starter circuit	3										1			EM section	—	
	Flywheel/Drive plate/Signal plate	6															
	PNP switch	4															AT section

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

Symptom Matrix Chart (Cont'd)

		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Engine	Cylinder head														EM section	
	Cylinder head gasket	5	5	5	5	5		5	5		4	5	3			
	Cylinder block												4			
	Piston															
	Piston ring															
	Connecting rod	6	6	6	6	6		6	6			6				
	Bearing															
	Crankshaft															
Valve mechanism	Timing chain														EM section	
	Camshaft															
	Intake valve	5	5	5	5	5		5	5		5					
	Exhaust valve												3			
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			FE section	
	Three way catalyst															
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			MA, EM and LC sections	
	Oil level (Low)/Filthy oil															
Cooling	Radiator/Hose/Radiator filler cap														LC section	
	Thermostat										5					
	Water pump															
	Water gallery	5	5	5	5	5		5	5		4	5				
	Cooling fan												5			EC-530
	Coolant level (low)/Contaminated coolant															MA section

1 - 6: The numbers refer to the order of inspection.

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC0042

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

(i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)

- If the real-time diagnosis results are NG, and the on board diagnostic system results are OK, when diagnosing the mass air flow sensor, first check to see if the fuel pump control circuit is normal.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.0 - 1.6 msec
		2,000 rpm 0.7 - 1.3 msec
A/F ALPHA-B1 A/F ALPHA-B2	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm 53 - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> ● Engine: After warming up 	More than 70°C (158°F)
HO2S1 (B1) HO2S1 (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 (B1) HO2S2 (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1) HO2S1 MNTR (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 MNTR (B1) HO2S2 MNTR (B2)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> ● Turn drive wheels and compare speedometer indication with the CONSULT-II value 	Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) 	11 - 14V
THRTL POS SEN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed 0.15 - 0.85V
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) ● Vacuum is applied using a vacuum pump 	Throttle valve: fully opened 3.5 - 4.7V
EGR TEMP SEN	<ul style="list-style-type: none"> ● Engine: After warming up 	Less than 4.5V
EVAP SYS PRES	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 3.4V
ABSOL PRES/SE	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 4.4V
START SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON → START → ON 	OFF → ON → OFF

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
CLSD THL POS CLSD THL/P SW	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) ● Vacuum is applied using a vacuum pump 	Throttle valve: Idle position ON
		Throttle valve: Slightly open OFF
AIR COND SIG	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	A/C switch "OFF" OFF
		A/C switch "ON" (Compressor operates) ON
P/N POSI SW	<ul style="list-style-type: none"> ● Ignition switch: ON 	Shift lever "P" or "N" ON
		Except above OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction) OFF
		The steering wheel is turned ON
IGNITION SW	<ul style="list-style-type: none"> ● Ignition switch: ON → OFF 	ON → OFF
INJ PULSE-B1 INJ PULSE-B2	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 2.4 - 3.2 msec
		2,000 rpm 1.9 - 3.2 msec
IGN TIMING	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 9°±5° BTDC
		2,000 rpm More than 25° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 27.0%
ABSOL TH-P/S	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed 0.0°
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: fully opened Approx. 80.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle 1.4 - 4.0 g·m/s
		2,500 rpm 5.0 - 10.0 g·m/s
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 5 - 20 steps
		2,000 rpm —
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle 0 %
		2,000 rpm —
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle 0 step
		Engine speed: Revving from idle up to 3,000 rpm quickly 10 - 55 steps
AIR COND RLY	<ul style="list-style-type: none"> ● Air conditioner switch: OFF → ON 	OFF → ON

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION	
FUEL PUMP RLY	<ul style="list-style-type: none"> ● Ignition switch is turned to ON (Operates for 5 seconds) ● Engine running and cranking ● When engine is stopped (stops in 1.0 seconds) 	ON	GI
	<ul style="list-style-type: none"> ● Except as shown above 	OFF	MA
INT/V SOL-B1	<ul style="list-style-type: none"> ● Engine is running ● Engine speed is more than 2,000 rpm ● Quickly depressed accelerator pedal 	OFF → ON	EM
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON 	OFF	LC
VENT CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON 	OFF	
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less OFF	EC
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F) LOW	FE
		Engine coolant temperature is 105°C (221°F) or more HIGH	CL
HO2S1 HTR (B1) HO2S1 HTR (B2)	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm 	ON	
	<ul style="list-style-type: none"> ● Engine speed: Above 3,600 rpm 	OFF	MT
HO2S2 HTR (B1) HO2S2 HTR (B2)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 	OFF	AT
	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 	ON	AX
SWRL CONT S/V	<ul style="list-style-type: none"> ● Engine speed: Idle 	Engine coolant temperature is between 15°C (59°F) to 55°C (131°F). ON	SU
		Engine coolant temperature is above 55°C (131°F). OFF	BR
SWL CON VC SW	<ul style="list-style-type: none"> ● Engine speed: Idle ● Engine coolant temperature is between 15°C (59°F) to 55°C (131°F). 	OFF	ST
	<ul style="list-style-type: none"> ● Engine speed: Idle ● Engine coolant temperature is more than 55°C (131°F). 	ON	RS

GI
MA
EM
LC
EC
FE
CL
MT
AT
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SU
BR
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RS
BT
HA
SC
EL
IDX

Major Sensor Reference Graph in Data Monitor Mode

Major Sensor Reference Graph in Data Monitor Mode

=NIEC0043

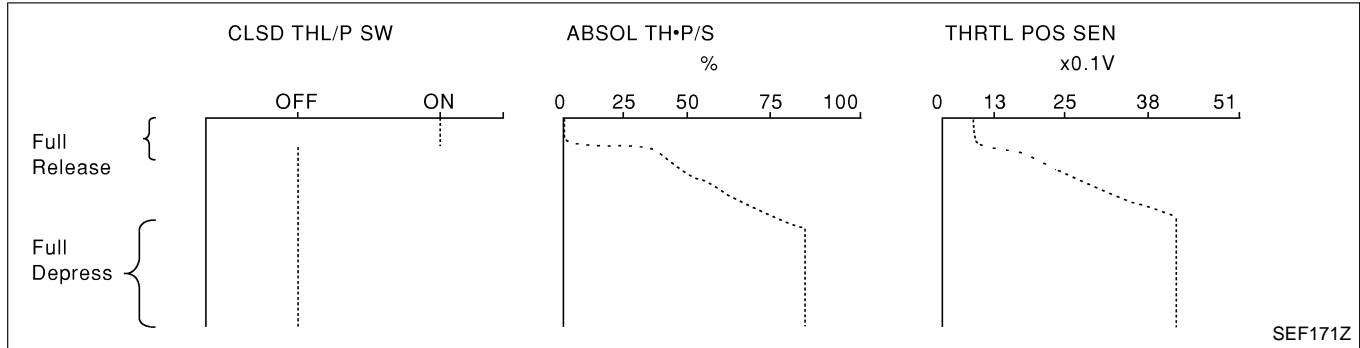
The following are the major sensor reference graphs in “DATA MONITOR” mode.

THRTL POS SEN, ABSOL TH·P/S, CLSD THL/P SW

NIEC0043S01

Below is the data for “THRTL POS SEN”, “ABSOL TH·P/S” and “CLSD THL/P SW” when depressing the accelerator pedal with the ignition switch “ON”.

The signal of “THRTL POS SEN” and “ABSOL TH·P/S” should rise gradually without any intermittent drop or rise after “CLSD THL/P SW” is changed from “ON” to “OFF”.

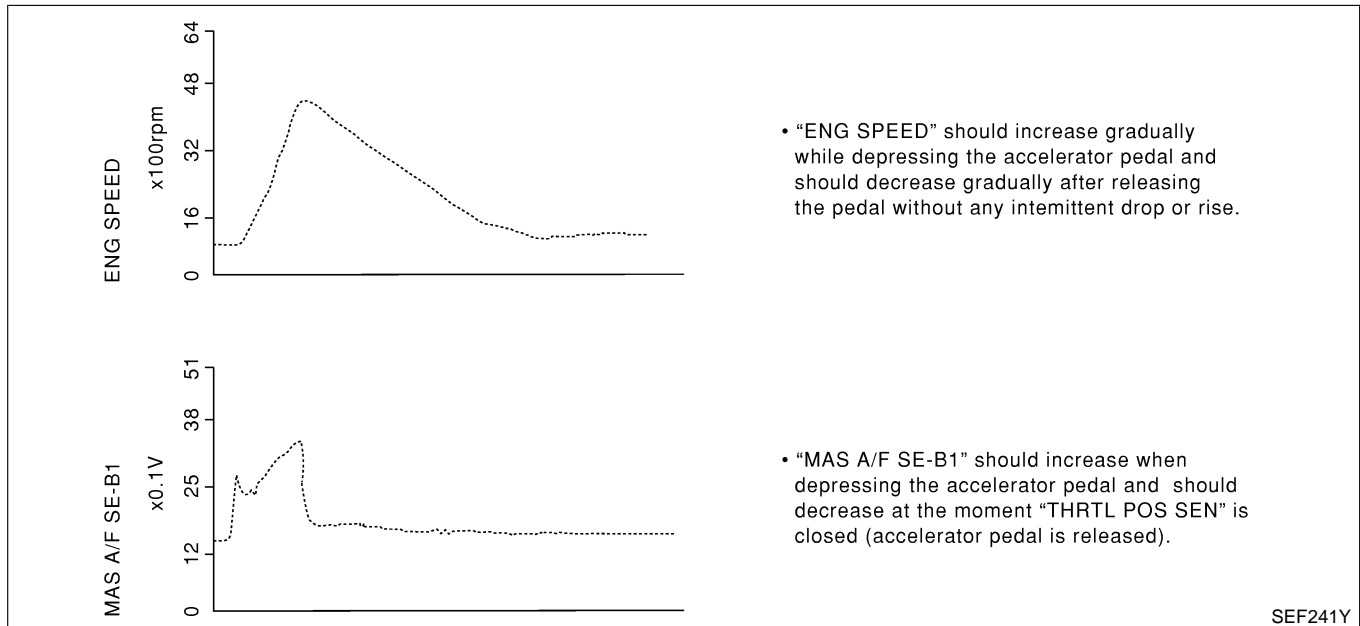


ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1/B2), HO2S1 (B1/B2), INJ PULSE-B1

NIEC0043S02

Below is the data for “ENG SPEED”, “MAS A/F SE-B1”, “THRTL POS SEN”, “HO2S2 (B1/B2)”, “HO2S1 (B1/B2)” and “INJ PULSE” when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

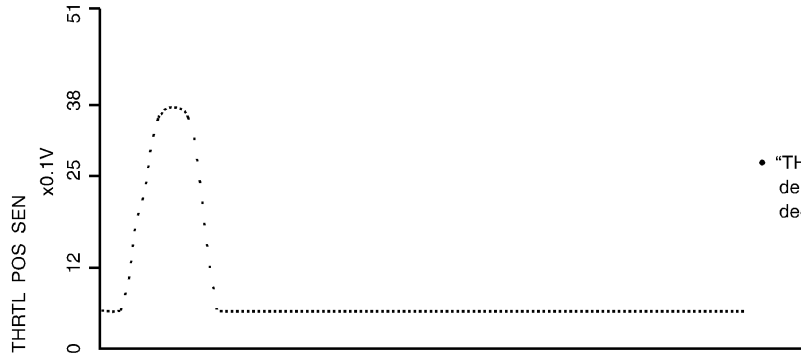
Each value is for reference, the exact value may vary.



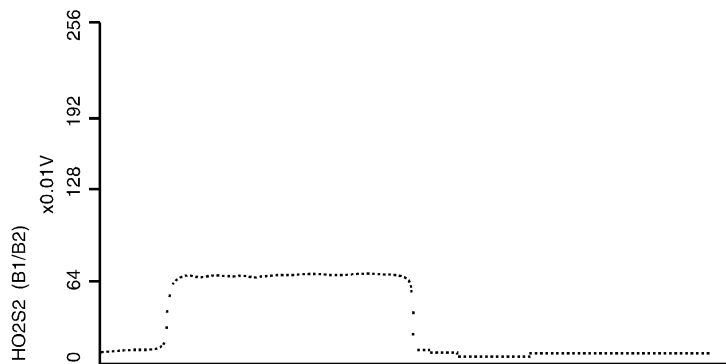
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

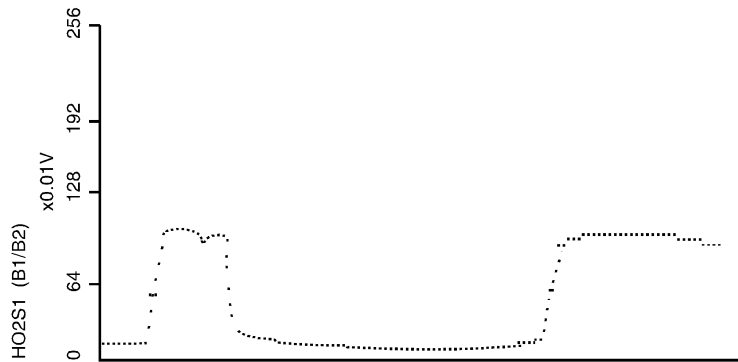
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



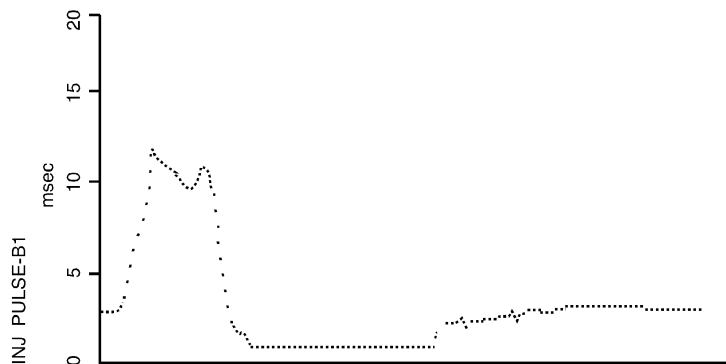
- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1/B2)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "HO2S1 (B1/B2)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

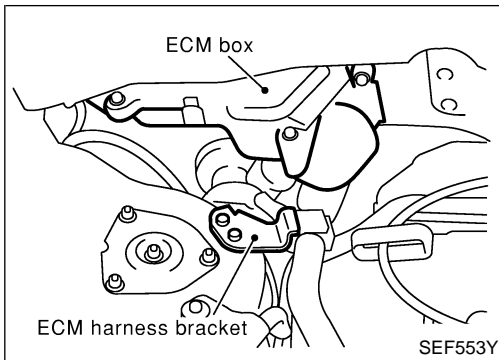
SC

EL

IDX

SEF242YB

Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



ECM Terminals and Reference Value

NIEC0044

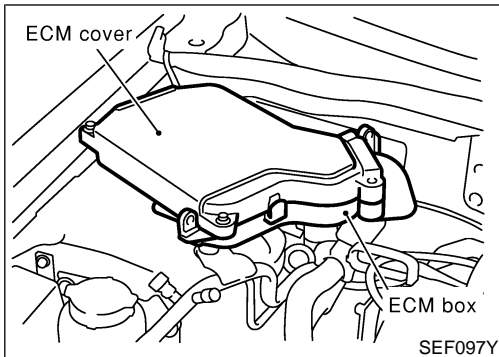
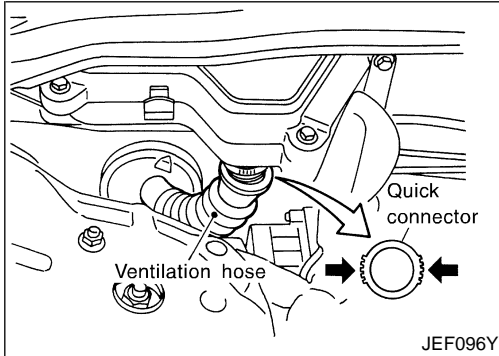
PREPARATION

NIEC0044S01

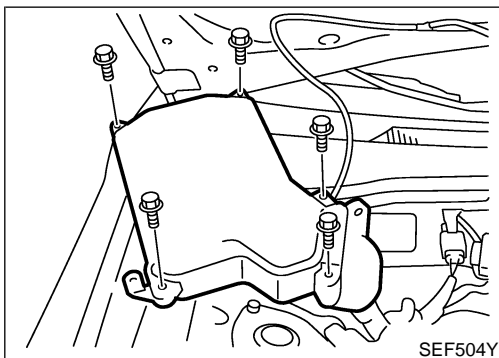
1. ECM is located in the right side of the cowl top (behind the strut tower).

For this inspection:

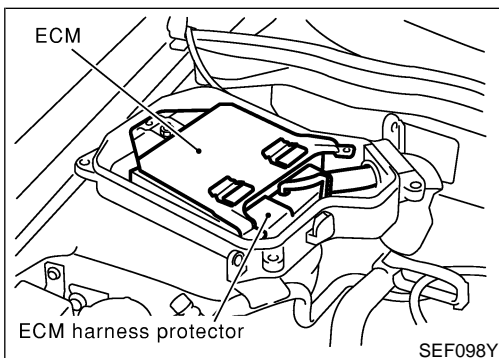
- Remove engine control harness bracket on the strut tower.
- Remove quick connector on the ventilation hose.
- Remove ECM fixing bolts and pull ECM out all the way.



- Remove ECM cover fixing bolts.



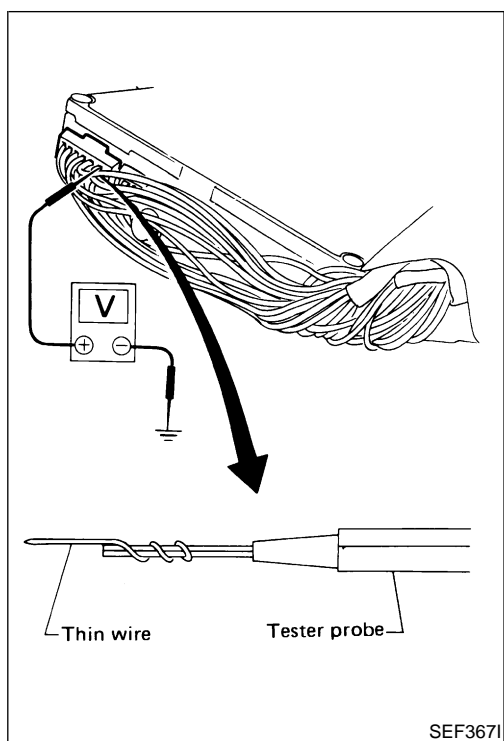
- Remove ECM fixing bolts.
 - Remove ECM with the harness from the cover.
2. Remove ECM harness protector.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

ECM Terminals and Reference Value (Cont'd)



3. Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
 - Open harness securing clip to make testing easier.
 - Use extreme care not to touch 2 pins at one time.
 - Data is for comparison and may not be exact.

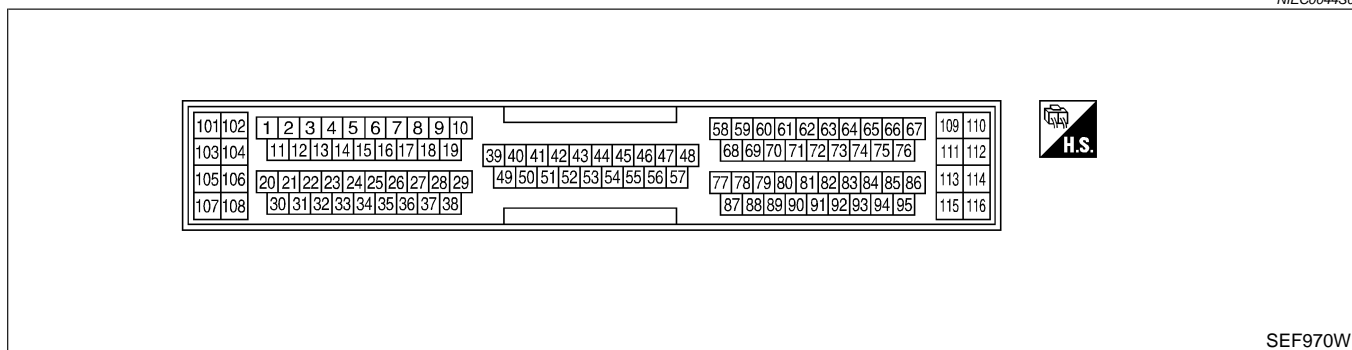
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

GI
MA
EM
LC
EC

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NIEC0044S02



FE
CL
MT
AT
AX
SU
BR
ST

ECM INSPECTION TABLE

NIEC0044S03

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

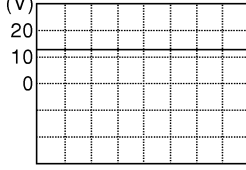
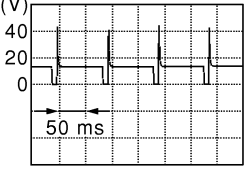
RS
BT
HA
SC
EL
IDX

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	Y/R	Intake valve timing control solenoid valve	[Engine is running] ● Intake valve timing control is operating	Approximately 0V
			[Engine is not running] ● Intake valve timing control is not operating	BATTERY VOLTAGE (11 - 14V)
2	L/B	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

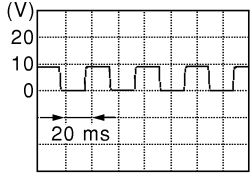
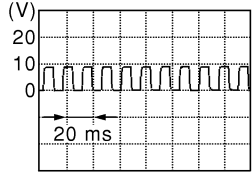
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	W/R	Heated oxygen sensor 2 (rear) heater (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
30	G/Y	Heated oxygen sensor 2 (rear) heater (bank 1)	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)
4	R/B	Heated oxygen sensor 1 (front) heater (bank 2)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. 	0 - 1.0V
49	GY/L	Heated oxygen sensor 1 (front) heater (bank 1)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)
6 7 15 16	R LG P OR	IACV-AAC valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
8 9 17 18	SB W/B R/Y Y	EGR volume control valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
10	Y/B	A/T signal No. 3	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0 - 1.0V
12	LG/B	Cooling fan relay (High)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan (High) is operating 	0 - 0.6V
13	LG/R	Cooling fan relay (Low)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is operating 	0 - 0.6V
14	GY/L	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)  SEF462Y
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	BATTERY VOLTAGE (11 - 14V)  SEF461Y

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

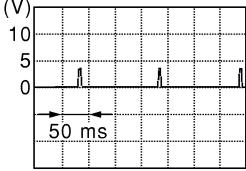
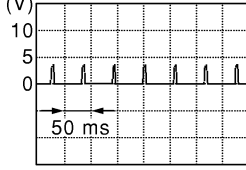
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
19	BR/W	A/T signal No. 5	[Engine is running] ● Idle speed	Approximately 8V	GI
20 With- out NVIS (NATS)	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 5 seconds after turning ignition switch "ON"	0 - 1V	MA
21 With NVIS (NATS)			[Engine is running] ● More than 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)	EM
22	OR/L	Malfunction indicator lamp	[Ignition switch "ON"]	0 - 1.0V	LC
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)	EC
23	L/W	Air conditioner relay	[Engine is running] ● Both A/C switch and blower switch are "ON" (Compressor operates)	0 - 0.6V	FE
			[Engine is running] ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)	CL
31	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For 7 seconds after turning ignition switch "OFF"	0 - 1.0V	MT
			[Ignition switch "OFF"] ● 7 seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	AT
32	L/OR	Tachometer	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 4 - 5V 	BR
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 4 - 5V 	ST
					RS
					BT
					HA
					SC
					EL
					IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

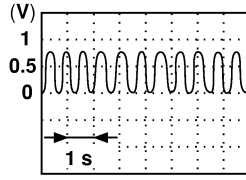
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35 36 37 38	BR PU L/R GY/R	Ignition signal	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0.3V  <p style="text-align: right; margin-right: 50px;">SEF465Y</p>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 0.5V  <p style="text-align: right; margin-right: 50px;">SEF466Y</p>
40	Y/PU	Throttle position switch (Closed position)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Accelerator pedal depressed 	Approximately 0V
41	B/Y	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 12V
42	G/OR	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position is "Neutral position" (M/T models) ● Gear position is "P" or "N" (A/T models) 	Approximately 0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	BATTERY VOLTAGE (11 - 14V)
43	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
44	L/R	Air conditioner switch	[Engine is running] <ul style="list-style-type: none"> ● Both A/C switch and blower switch are "ON" 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> ● A/C switch is "OFF" 	BATTERY VOLTAGE (11 - 14V)
46	PU	Power steering oil pressure switch	[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is being turned. 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is not being turned. 	Approximately 5V
48	B	ECM ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Engine ground
50	R/W	Electrical load signal	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Lighting switch and/or rear window defogger switch "ON" 	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Lighting switch and rear window defogger switch "OFF" 	0V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

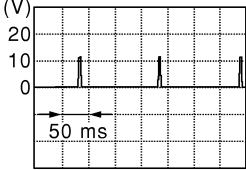
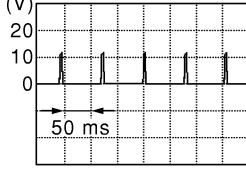
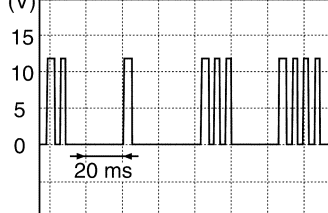
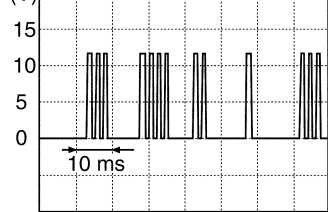
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
51	LG/B	Heater fan switch	[Engine is running] ● Heater fan switch "ON"	Approximately 0V	GI
			[Engine is running] ● Heater fan switch "OFF"	Approximately 5V	MA
54	Y/R	A/T signal No. 1	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	EM
55	Y/G	A/T signal No. 2	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	LC
56	G/Y	A/T signal No. 4	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	EC
57	B	ECM ground	[Engine is running] ● Idle speed	Engine ground	FE
58	B	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V	CL
59	P/L	Swirl control valve control vacuum check switch	[Engine is running] ● Idle speed ● Engine coolant temperature is between 15 to 50°C (59 to 122°F).	Approximately 5V	MT
			[Engine is running] ● Idle speed ● Engine coolant temperature is above 50°C (122°F).	0 - 1.0V	AT AX
61	G	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.3 - 1.7V	SU
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm	1.8 - 2.4V	BR
62	W	Heated oxygen sensor 1 (front) (bank 2)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V (Periodically change)	ST
94	W	Heated oxygen sensor 1 (front) (bank 1)		 <p style="text-align: right; margin-right: 50px;">SEF059V</p>	RS BT
63	W	Heated oxygen sensor 2 (rear) (bank 2)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V	HA
95	R/L	Heated oxygen sensor 2 (rear) (bank 1)			SC
64	R/Y	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.	EL IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

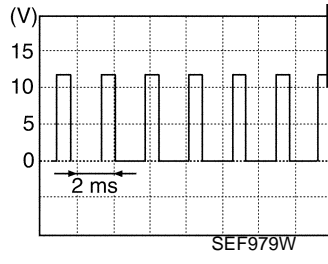
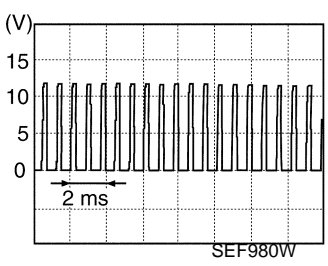
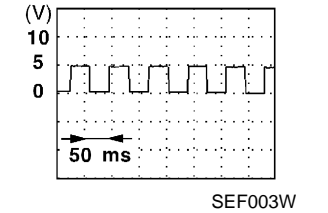
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
65	R	Intake valve timing control position sensor	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>Approximately 0.5 - 0.6V</p>  <p style="text-align: right; font-size: small;">SEF191Z</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	<p>Approximately 0.5 - 0.6V</p>  <p style="text-align: right; font-size: small;">SEF192Z</p>
66 or 75 With NVIS (NATS)	R	Camshaft position sensor (PHASE)	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	<p>Approximately 2.0 - 3.0V</p>  <p style="text-align: right; font-size: small;">SEF977W</p>
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	<p>Approximately 2.0 - 3.0V</p>  <p style="text-align: right; font-size: small;">SEF978W</p>
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
70	BR/W	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
71	GY	Throttle position sensor signal output	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	Approximately 0.4V
			<p>[Ignition switch "ON"]</p> <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	Approximately 4V
72	PU	EGR temperature sensor	<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Less than 4.5V
			<p>[Engine is running]</p> <ul style="list-style-type: none"> ● Warm-up condition ● EGR system is operating 	0 - 1.5V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

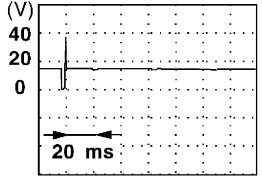
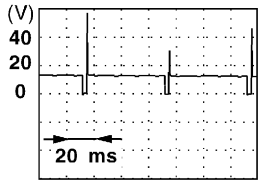
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
73	B	Mass air flow sensor ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V	GI MA
74	R/L	Refrigerant pressure sensor	[Engine is running] ● Warm-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates)	1.0 - 4.0V	EM LC
75 With- out NVIS (NATS)	R	Crankshaft position sensor (POS)	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 3.0 - 4.0V 	EC FE CL
85 With NVIS (NATS)			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 3.0 - 4.0V 	MT AT AX
81	W	Knock sensor	[Engine is running] ● Idle speed	Approximately 2.5V	SU
82	G/OR	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.	BR
83	G	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.	ST
84	P	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V	RS
86	PU/R	Vehicle speed sensor	[Engine is running] ● Lift up the vehicle ● In 2nd gear position ● Vehicle speed is 40 km/h (25 MPH)	0 - Approximately 4.2V 	BT HA SC
90	B/W	Fuel level sensor ground	[Engine is running] ● Idle speed	Approximately 0V	EL
91	PU	A/T check signal	[Ignition switch "ON"]	0 - Approximately 5V	IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (EXC CALIF CA)

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
92	Y	Throttle position sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released ● Vacuum is created using vacuum pump 	0.15 - 0.85V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed ● Vacuum is created using vacuum pump 	3.5 - 4.7V
101 103 105 107	R/B Y/B G/B L/B	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V)  <small>SEF011W</small>
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V)  <small>SEF012W</small>
102	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
104	P/L	Swirl control valve control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Engine coolant temperature is between 15 to 50°C (59 to 122°F). 	0 - 1.0V
			[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Engine coolant temperature is above 50°C (122°F). 	BATTERY VOLTAGE (11 - 14V)
106 108	B B	ECM ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Engine ground
110 112	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
115	L/G	DATA link connector	[Ignition switch "ON"] <ul style="list-style-type: none"> ● CONSULT-II or GST is disconnected. 	Approximately 8V

Description

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of engine control system. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the engine control system is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the engine control system may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the engine control system, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction.)
- A/F ALPHA-B1/B2 (The mean value of air/fuel ratio feedback correction factor per cycle.)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor.)

TESTING CONDITION

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 14.25 - 15.12 psi)
- Atmosphere temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up *1
- Electrical load: Not applied *2
- Engine speed: Idle

*1: For A/T models, after the engine is warmed-up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates less than 0.9V. For M/T models, drive vehicle for 5 minutes after the engine is warmed-up to normal operating temperature.

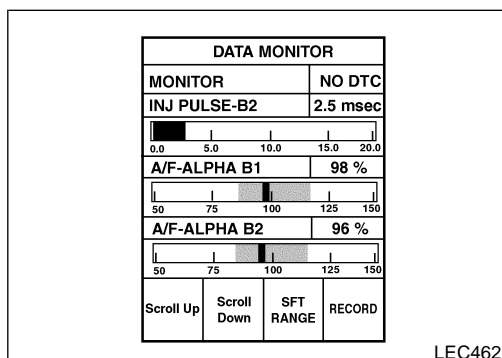
*2: Rear window defogger switch, air conditioner switch, and lighting switch are “OFF”. Cooling fans are not operating. Steering wheel straight ahead.

INSPECTION PROCEDURE

NOTE:

Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform “Basic Inspection”. Refer to “Basic Inspection”, EC-127.
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1”, “A/F ALPHA-B2”, and “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to “Diagnostic Procedure”. Refer to “Diagnostic Procedure”, EC-164.

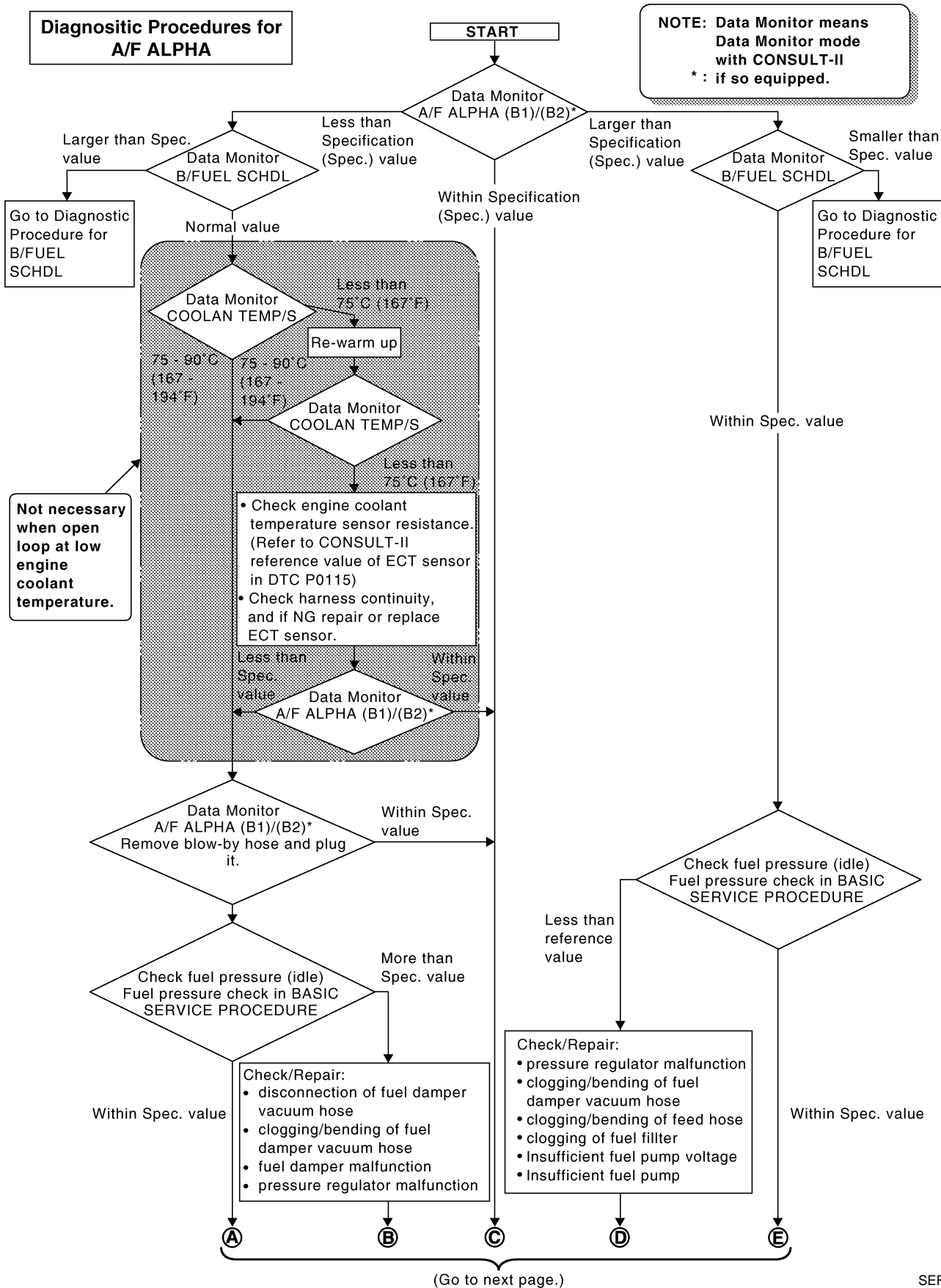


LEC462

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Diagnostic Procedure

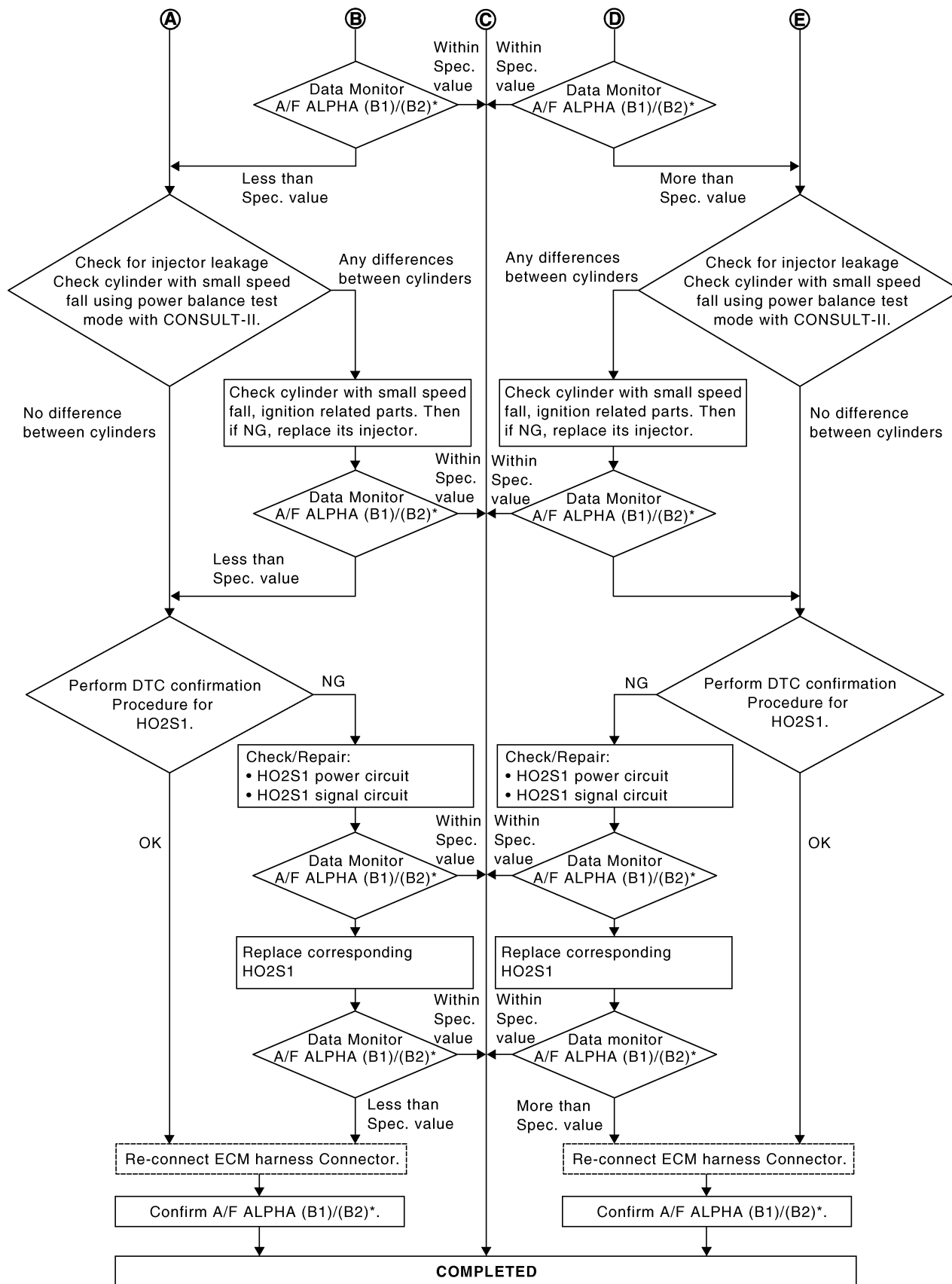
NIEC1184



TROUBLE DIAGNOSIS — SPECIFICATION VALUE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)



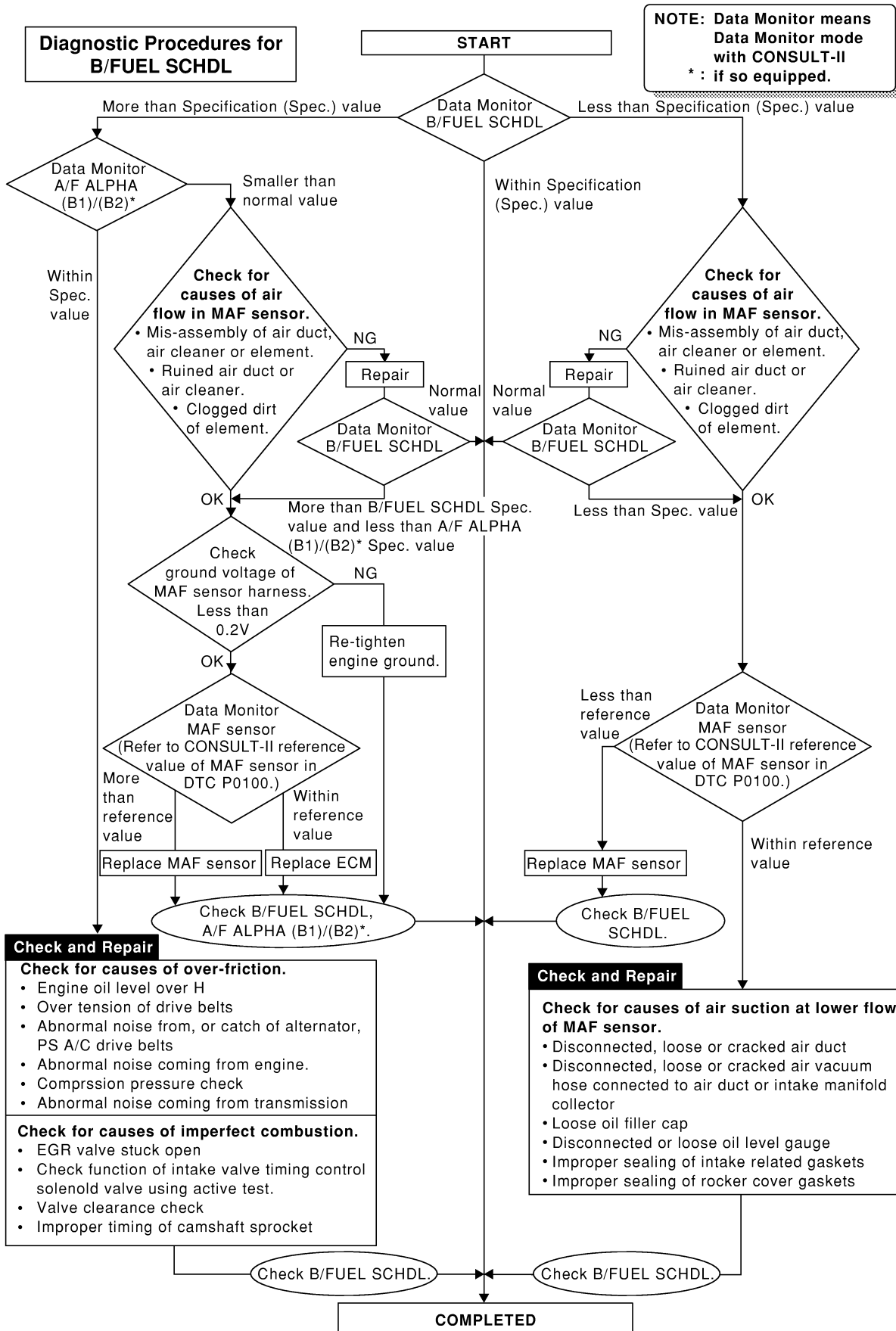
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SEF768Z

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)



SEF615Z

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

QG18DE (EXC CALIF CA)

Description

Description

NIEC0045

Intermittent incidents (I/I) may occur. In many cases, the problem resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific problem area.

COMMON I/I REPORT SITUATIONS

NIEC0045S01

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.
VI	The TROUBLE DIAGNOSIS for PXXXX does not indicate the problem area.

Diagnostic Procedure

NIEC0046

1	INSPECTION START	
		Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION-RELATED INFORMATION", EC-98.
	▶	GO TO 2.
2	CHECK GROUND TERMINALS	
		Check ground terminals for corroding or loose connection. Refer to GI-30 , "GROUND INSPECTION".
		OK or NG
	OK ▶	GO TO 3.
	NG ▶	Repair or replace.
3	SEARCH FOR ELECTRICAL INCIDENT	
		Refer to GI-25 , "Incident Simulation Tests".
		OK or NG
	OK ▶	GO TO 4.
	NG ▶	Repair or replace.
4	CHECK CONNECTOR TERMINALS	
		Refer to GI-22 , "How to Check Enlarged Contact Spring of Terminal".
		OK or NG
	OK ▶	INSPECTION END
	NG ▶	Repair or replace connector.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

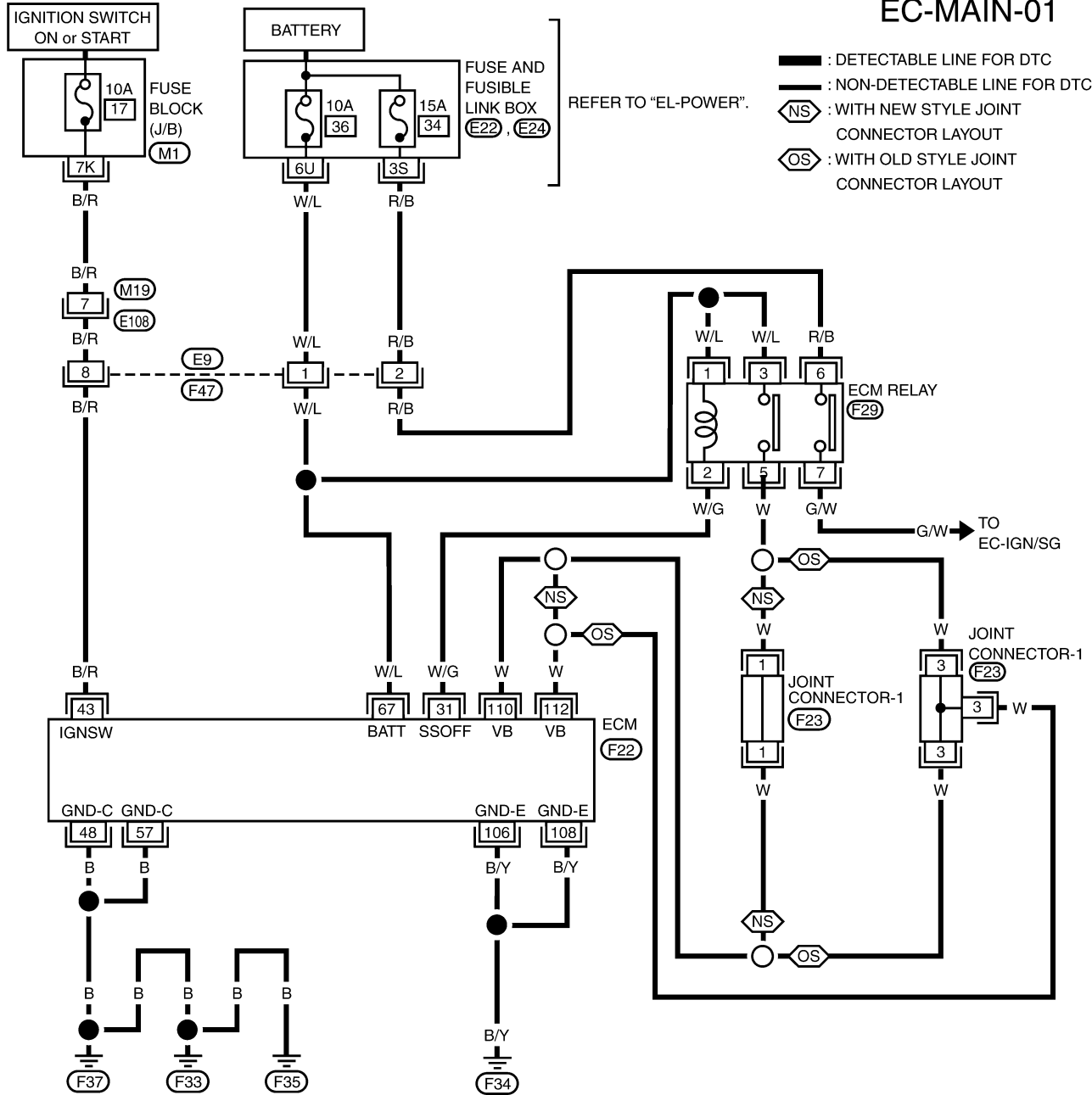
QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit

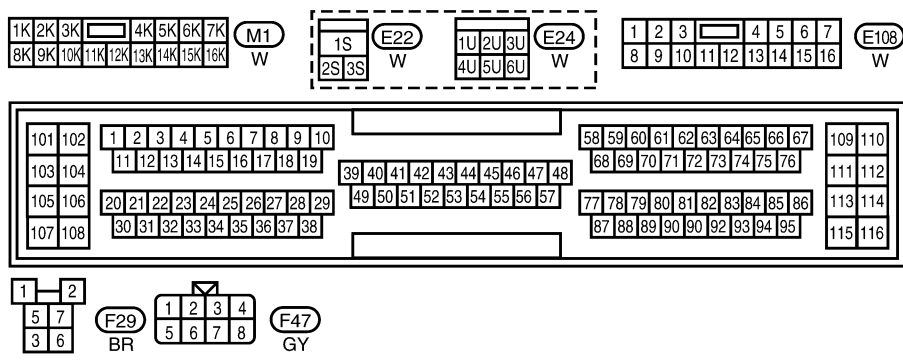
Main Power Supply and Ground Circuit WIRING DIAGRAM

NIEC0047

EC-MAIN-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- NS : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- OS : WITH OLD STYLE JOINT CONNECTOR LAYOUT



REFER TO THE FOLLOWING.
(F23) - JOINT CONNECTOR

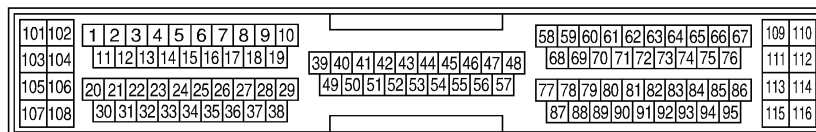


WEC939

TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)



SEF970W

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
31	W/G	ECM RELAY (SELF-SHUTOFF)	ENGINE RUNNING FOR 5 SECONDS AFTER TURNING IGN OFF	0 - 1.0V
			5 SECONDS PASSED AFTER TURNING IGN OFF	BATTERY VOLTAGE
43	B/R	IGN	IGN OFF	0V
			IGN ON	BATTERY VOLTAGE
48	B	ECM GROUND	ENGINE RUNNING	ENGINE GROUND
57	B	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
67	W/L	POWER SUPPLY (BACK-UP)	IGN OFF	BATTERY VOLTAGE
106	B/Y	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
108	B/Y			
110	W	POWER SUPPLY FOR ECM	IGN ON	BATTERY VOLTAGE
112	W			

SEF563Y

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TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

DIAGNOSTIC PROCEDURE

=NIEC0049

1	INSPECTION START	
Start engine. Is engine running?		
Yes or No		
Yes	▶	GO TO 4.
No	▶	GO TO 2.

2	CHECK POWER SUPPLY-I	
1. Turn ignition switch "OFF" and then "ON". 2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.		
SEF291X		
OK	▶	GO TO 14.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors M19, E108 ● Harness for open or short between ECM and 10A fuse 		
▶		Repair harness or connectors.

4	CHECK POWER SUPPLY-II	
1. Stop engine. 2. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.		
SEF293X		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between ECM and 10A fuse 	
	Repair harness or connectors.

6	CHECK POWER SUPPLY-III
<p>1. Turn ignition switch "ON" and then "OFF".</p> <p>2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>	
<p>Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.</p>	
SEF294X	
OK or NG	
OK	GO TO 14.
NG (Battery voltage does not exist.)	GO TO 7.
NG (Battery voltage exists for more than a few seconds.)	GO TO 13.

7	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM
<p>1. Disconnect ECM harness connector.</p> <p>2. Disconnect ECM relay.</p>	
<p>View with glove box removed</p>	
LEC444	
<p>3. Check harness continuity between ECM terminals 110, 112 and ECM relay terminal 5. Refer to "Wiring Diagram", EC-168. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	GO TO 9.
NG	GO TO 8.

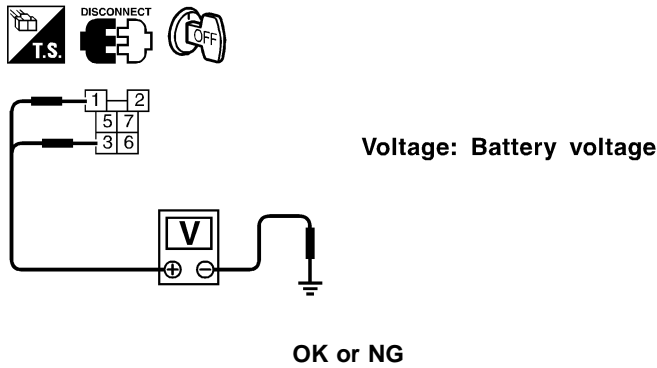
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TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

8	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Joint connector-1 ● Harness for open or short between ECM relay and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK VOLTAGE BETWEEN ECM RELAY AND GROUND
<p>Check voltage between ECM relay terminals 1, 3 and ground with CONSULT-II or tester.</p>	
	
OK	▶ GO TO 11.
NG	▶ GO TO 10.

SEF469Y

10	DETECT MALFUNCTIONING PART
<p>Check the harness for open or short between ECM relay and fuse.</p>	
▶	Repair harness or connectors.

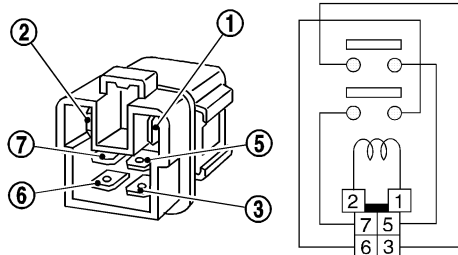
11	CHECK OUTPUT SIGNAL CIRCUIT
<p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 2. Refer to "Wiring Diagram", EC-168. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 13.
NG	▶ GO TO 12.

12	DETECT MALFUNCTIONING PART
<p>Check the harness for open or short between ECM relay and ECM.</p>	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (EXC CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

13	CHECK ECM RELAY		
<ol style="list-style-type: none"> 1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7. 			
			
<p>12V (1 - 2) applied: Continuity exists. No voltage applied: No continuity</p>			
SEC202BC			
OK or NG			
OK	▶	GO TO 14.	
NG	▶	Replace ECM relay.	

14	CHECK GROUND CIRCUIT		
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to "Wiring Diagram", EC-168. Continuity should exist. 4. Also check harness for short to power. 			
OK or NG			
OK	▶	GO TO 15.	
NG	▶	Repair open circuit or short to power in harness or connectors.	

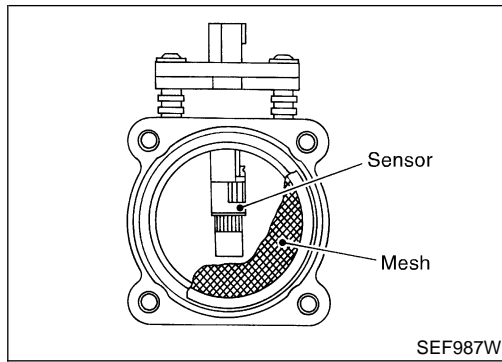
15	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.			
		▶	INSPECTION END

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss. Therefore, the ECM must supply more electric current to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.0 - 1.7V
	2,500 rpm	1.5 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	20.0 - 35.5%
	2,500 rpm	12.0 - 27.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.4 - 4.0 g·m/s
	2,500 rpm	5.0 - 10.0 g·m/s

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0100	A)	An excessively high voltage from the sensor is sent to ECM when engine is not running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
	C)	A high voltage from the sensor is sent to ECM under light load driving condition.	
	B)	An excessively low voltage from the sensor is sent to ECM* when engine is running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor
	D)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	
	E)	A voltage from the sensor exists constantly approx. 1.0V when engine is running.	

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC0054

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B and E". If there is no problem on "PROCEDURE FOR MALFUNCTION B and E", perform "PROCEDURE FOR MALFUNCTION C". If there is no problem on "PROCEDURE FOR MALFUNCTION C", perform "PROCEDURE FOR MALFUNCTION D".

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

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3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC0054S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-179.

With GST

Follow the procedure "With CONSULT-II" above.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B AND E

NIEC0054S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-179.

With GST

Follow the procedure "With CONSULT-II" above.

NOTE:

If 1st trip DTC is confirmed after more than 5 seconds, there may be Malfunction C.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION C

NIEC0054S03

NOTE:

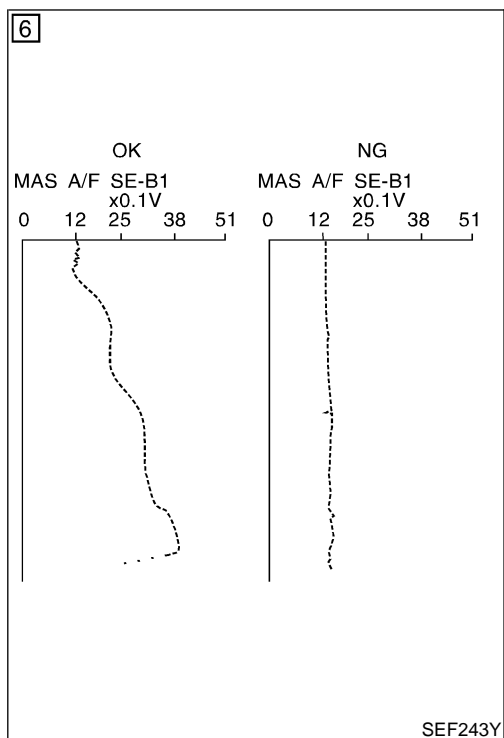
If engine will not start or stops soon wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Run engine for at least 10 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-179.

With GST

Follow the procedure "With CONSULT-II" above.



PROCEDURE FOR MALFUNCTION D

NIEC0054S04

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature. If engine cannot be started, go to "Diagnostic Procedure", EC-179.
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
- 5) Increases engine speed to about 4,000 rpm.
- 6) Monitor the linear voltage rise in response to engine speed increases.
If NG, go to "Diagnostic Procedure", EC-179.
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL POS SEN	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

7

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF719Y

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-179.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

Overall Function Check

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

Overall Function Check

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed. NIEC0055

PROCEDURE FOR MALFUNCTION D

With GST NIEC0055S01

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Select "MODE 1" with GST.
- 4) Check the mass air flow sensor signal with "MODE 1".
- 5) Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.
- 6) If NG, go to "Diagnostic Procedure", EC-179.

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

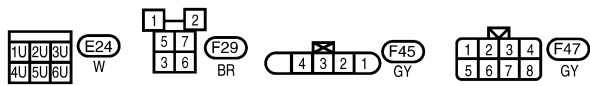
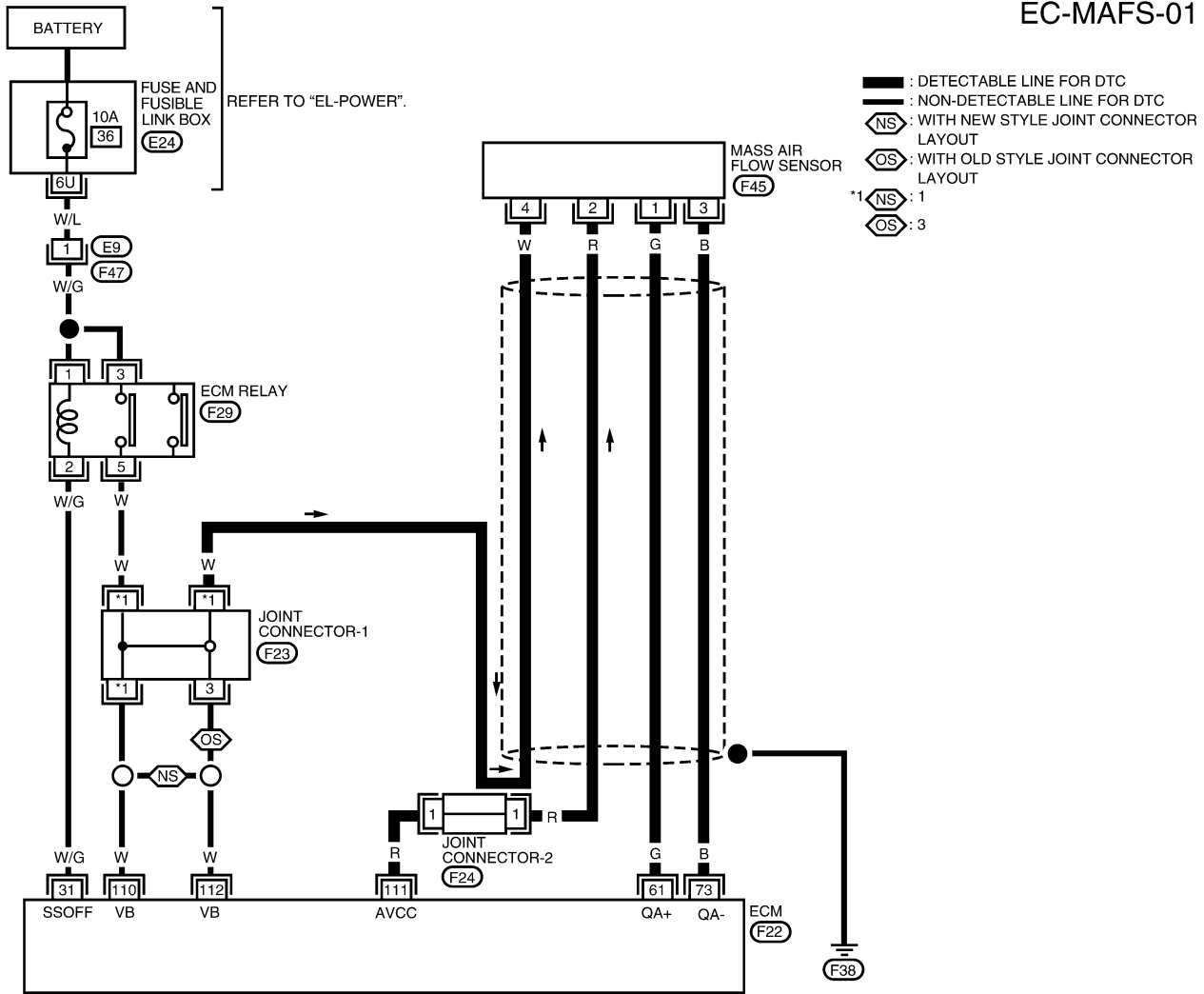
QG18DE (EXC CALIF CA)

Wiring Diagram

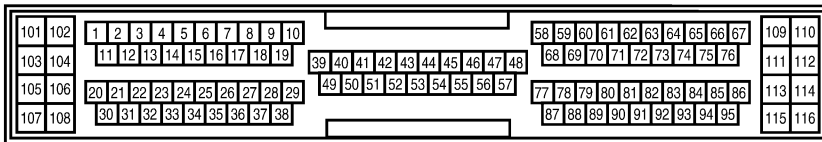
Wiring Diagram

NIEC0056

EC-MAFS-01



REFER TO THE FOLLOWING.
 F23, F24 - JOINT CONNECTOR



WEC940

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
61	G	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.3 - 1.7V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.8 - 2.4V
73	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF564Y

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0057

1	INSPECTION START							
Which malfunction (A, B, C, D or E) is duplicated?								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A and/or C</td> <td style="text-align: center;">I</td> </tr> <tr> <td style="text-align: center;">B, D and/or E</td> <td style="text-align: center;">II</td> </tr> </tbody> </table>			MALFUNCTION	Type	A and/or C	I	B, D and/or E	II
MALFUNCTION	Type							
A and/or C	I							
B, D and/or E	II							
MTBL0373								
Type I or Type II								
Type I	▶	GO TO 3.						
Type II	▶	GO TO 2.						

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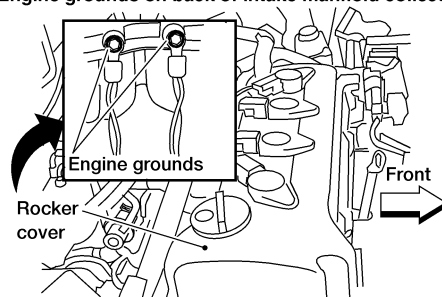
EC

2	CHECK INTAKE SYSTEM	
Check the following connections.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to collector 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

FE

CL

MT

3	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
		▶ GO TO 4.

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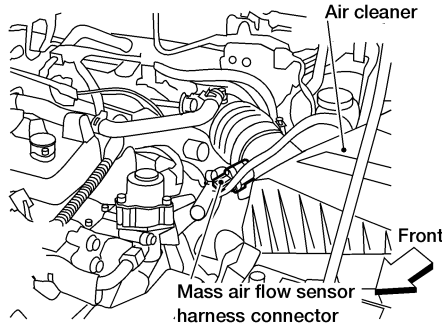
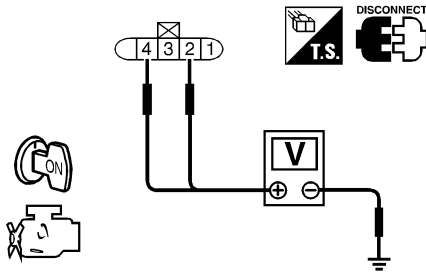
EL

IDX

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK POWER SUPPLY								
<p>1. Disconnect mass air flow sensor harness connector.</p> <div style="text-align: center;">  </div>									
WEC250									
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAFS terminal 4 and ground with CONSULT-II or tester.</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  </div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Terminal</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table> </div>				Terminal	Voltage	2	Approximately 5	4	Battery voltage
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
SEF297X									
OK or NG									
OK	▶	GO TO 6.							
NG	▶	GO TO 5.							

5	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Joint connector-2 ● Harness for open or short between ECM relay and mass air flow sensor ● Harness for open or short between mass air flow sensor and ECM 			
		▶	Repair harness or connectors.

6	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAFS terminal 3 and ECM terminal 73. Refer to "Wiring Diagram", EC-178. Continuity should exist.</p> <p>4. Also check harness for short to power.</p>			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Repair open circuit or short to power in harness or connectors.	

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

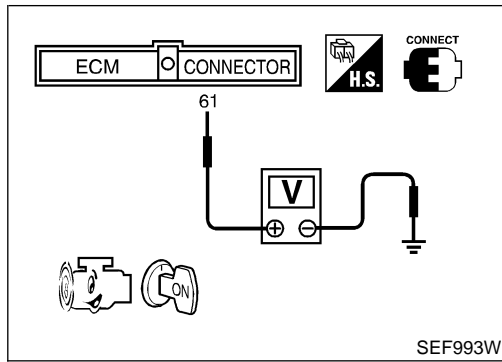
Diagnostic Procedure (Cont'd)

7	CHECK INPUT SIGNAL CIRCUIT			
	1. Check harness continuity between MAFS terminal 1 and ECM terminal 61. Refer to "Wiring Diagram", EC-178. Continuity should exist.		GI	
	2. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		MA	
	OK	▶	GO TO 8.	EM
	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	LC
8	CHECK MASS AIR FLOW SENSOR			
	Refer to "Component Inspection", EC-182.			
	OK or NG			
	OK	▶	GO TO 9.	EC
	NG	▶	Replace mass air flow sensor.	FE
9	CHECK INTERMITTENT INCIDENT			
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.			
	▶	INSPECTION END		CL
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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (EXC CALIF CA)

Component Inspection



Component Inspection MASS AIR FLOW SENSOR

=NIEC0058

NIEC0058S01

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 61 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.4
Idle to about 4,000 rpm*	1.3 - 1.7 to Approx. 3.6

*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Repeat above check.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

DTC P0105 ABSOLUTE PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Component Description

Component Description

The absolute pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the micro computer. As the pressure increases, the voltage rises.

NIEC0059

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On Board Diagnosis Logic

NIEC0060

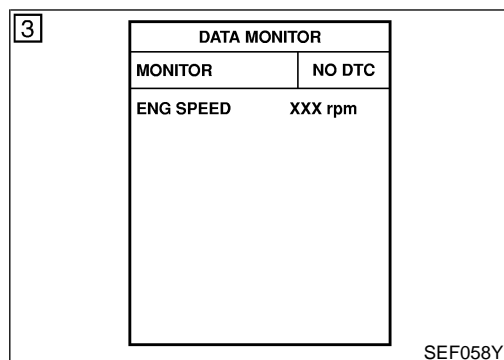
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0105	An excessively low or high voltage from the sensor is sent to micro computer.	ECM

EC

FE

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DTC Confirmation Procedure

NIEC0061

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-184.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0105 ABSOLUTE PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0064

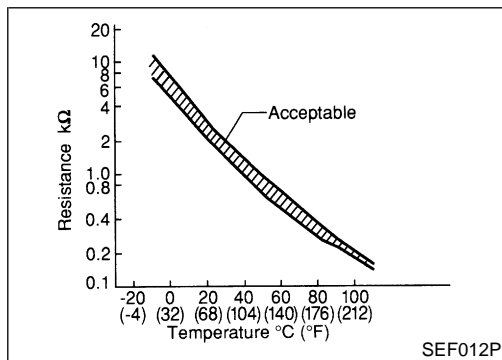
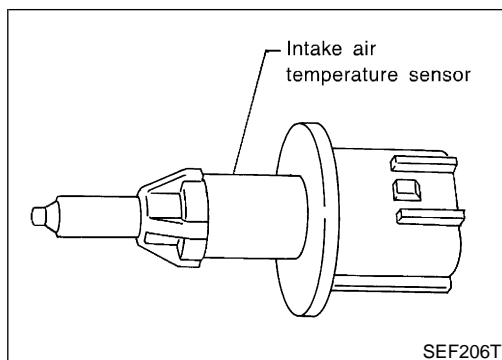
1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-100. 3. Perform "Idle Air Volume Learning", EC-83. Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the instruction of "Idle Air Volume Learning".

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0066

The intake air temperature sensor is mounted to the air duct housing. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
80 (176)	1.23	0.27 - 0.38

*: These data are reference values and are measured between ECM terminal 64 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

On Board Diagnosis Logic

NIEC0067

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0110	A)	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Intake air temperature sensor
	B)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	

DTC Confirmation Procedure

NIEC0068

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC0068S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-188.

With GST

Follow the procedure "With CONSULT-II" above.

5	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S XXX °C VHCL SPEED SE XXX km/h	

SEF176Y

PROCEDURE FOR MALFUNCTION B

NIEC0068S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

This test may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-II

- 1) Wait until engine coolant temperature is less than 90°C (194°F).
- a) Turn ignition switch "ON".
- b) Select "DATA MONITOR" mode with CONSULT-II.
- c) Check the engine coolant temperature.
- d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine.
- 5) Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-188.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR




QG18DE (EXC CALIF CA)

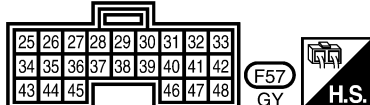
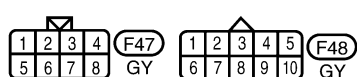
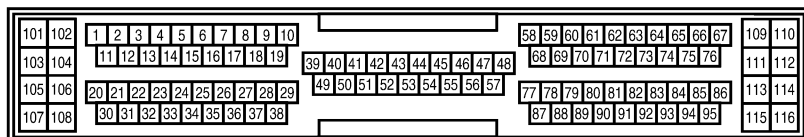
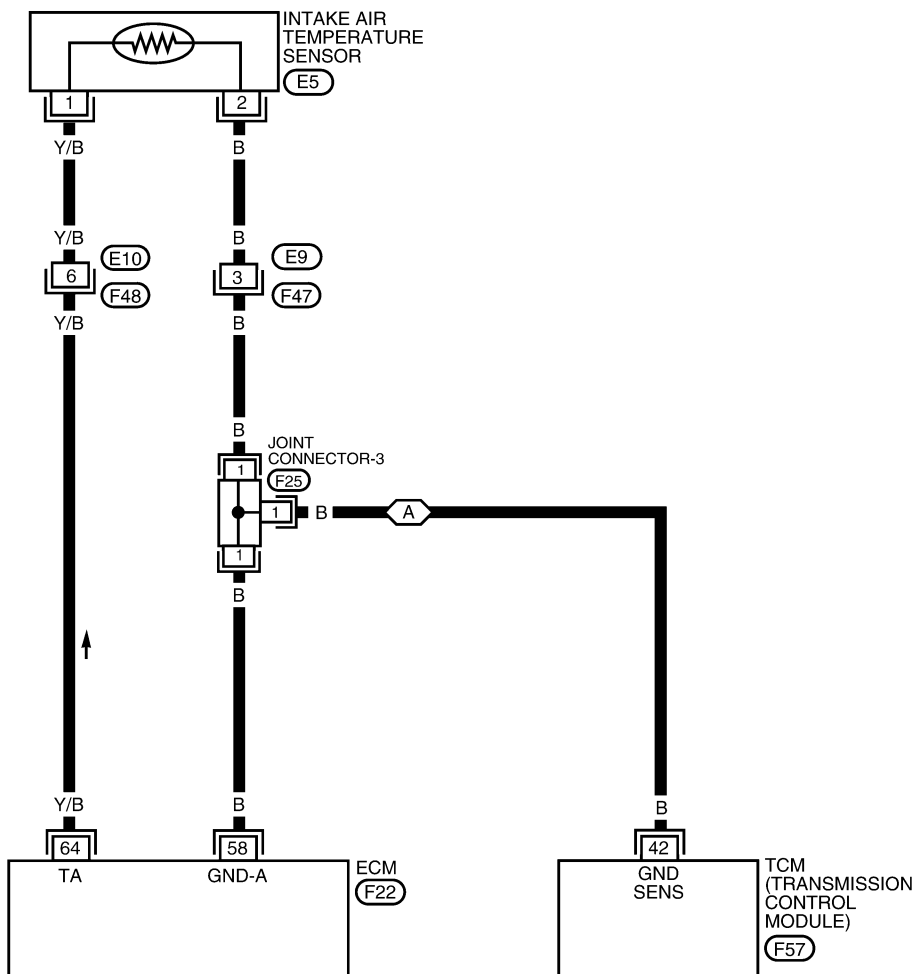
Wiring Diagram


Wiring Diagram

NIEC0069

EC-IATS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



REFER TO THE FOLLOWING.
 - JOINT CONNECTOR

GI
 MA
 EM
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EC
 FE
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 AT
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WEC158A

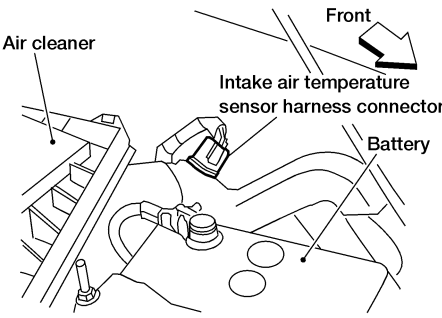
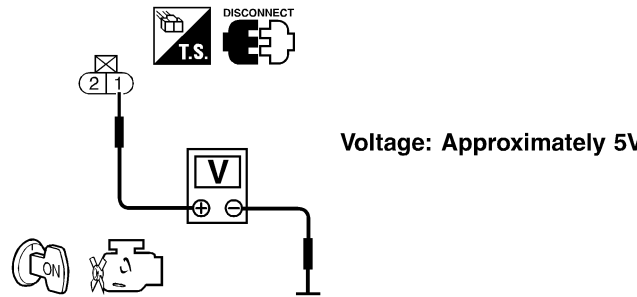
DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0070

1	CHECK POWER SUPPLY		
<p>1. Turn ignition switch "OFF". 2. Disconnect intake air temperature sensor harness connector.</p>			
			
LEEC243			
<p>3. Turn ignition switch "ON". 4. Check voltage between intake air temperature sensor terminal 1 and ground with CONSULT-II or tester.</p>			
			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

SEF301X

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between ECM and intake air temperature sensor 			
▶		Repair harness or connectors.	

3	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between terminal 2 and engine ground. Refer to "Wiring Diagram", EC-187. Continuity should exist.</p>			
<p>3. Also check harness for short to power.</p>			
OK or NG			
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Joint connector-3 ● Harness for open or short between ECM and intake air temperature sensor ● Harness for open or short between TCM (Transmission control module) and air intake temperature sensor 		
▶		Repair open circuit or short to power in harness or connectors.

GI

MA

EM

5	CHECK INTAKE AIR TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-190.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace intake air temperature sensor.

LC

EC

FE

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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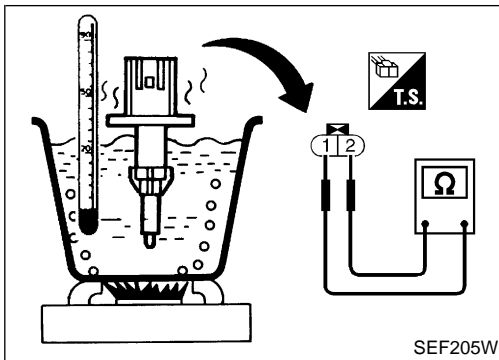
EL

IDX

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Component Inspection

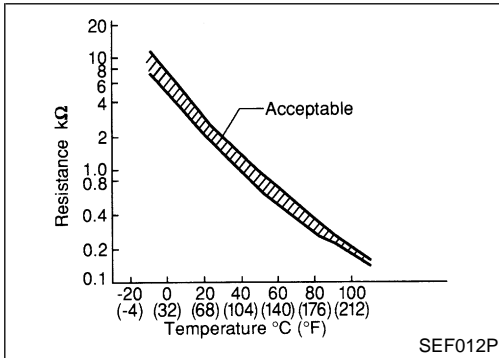


Component Inspection INTAKE AIR TEMPERATURE SENSOR

Check resistance as shown in the figure.

=NIEC0071

NIEC0071S01



<Reference data>

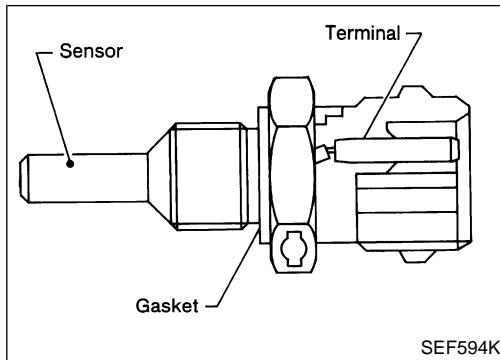
Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

If NG, replace intake air temperature sensor.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (EXC CALIF CA)

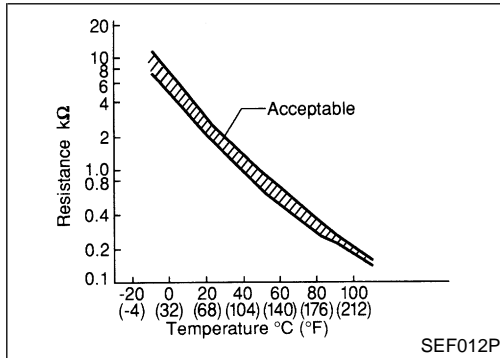
Component Description



Component Description

NIEC0072

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.



<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0073

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC0074

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0115	● An excessively high or low voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor

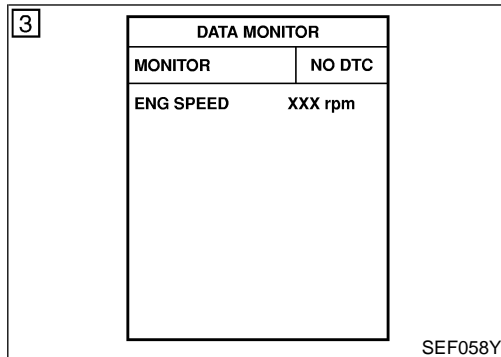
*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while the engine is running.		



DTC Confirmation Procedure

NIEC0075

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-194.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)




QG18DE (EXC CALIF CA)

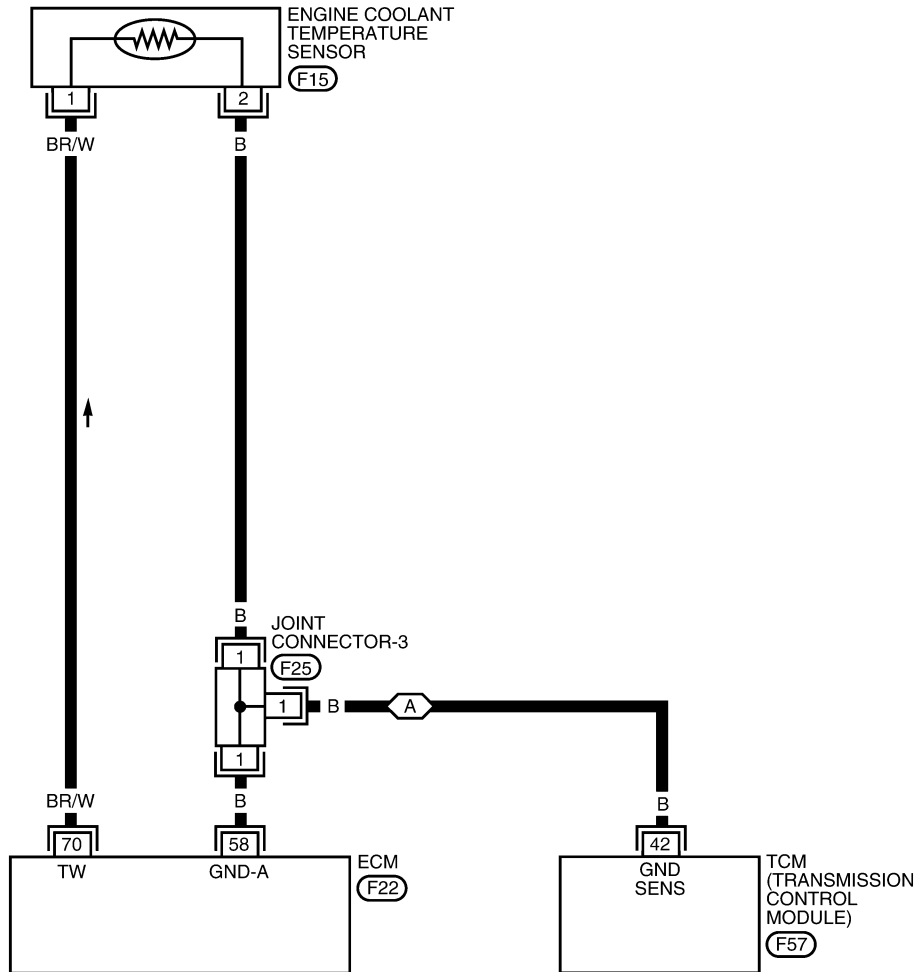
Wiring Diagram

Wiring Diagram

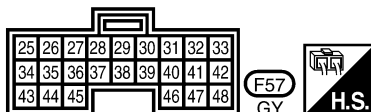
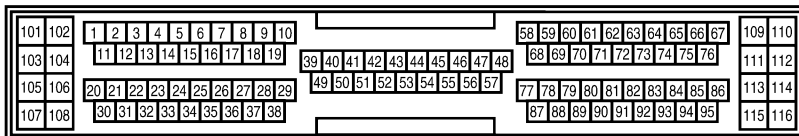
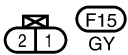
NIEC0076

EC-ECTS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



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REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR

WEC578

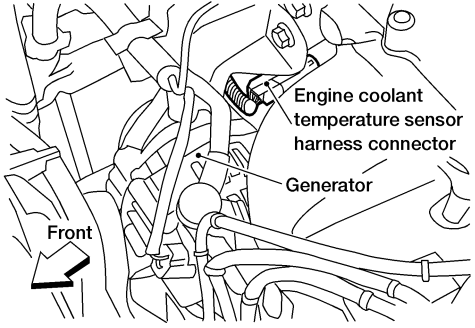
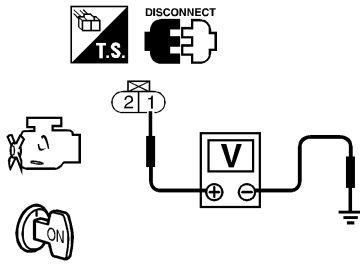
DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0077

1	CHECK POWER SUPPLY	
<p>1. Turn ignition switch "OFF". 2. Disconnect engine coolant temperature sensor (ECTS) harness connector.</p>		
		
WEC251		
<p>3. Turn ignition switch "ON". 4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p>		
		
SEF585X		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
Check the harness for open or short between ECM and engine coolant temperature sensor.		
		▶ Repair harness or connectors.

3	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between ECTS terminal 2 and engine ground. Refer to "Wiring Diagram", EC-193. Continuity should exist.</p>		
3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
Check the following.		
<ul style="list-style-type: none"> ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between TCM (Transmission control module) and engine coolant temperature sensor. ● Joint connector-3 		
		▶ Repair open circuit or short to power in harness or connectors.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

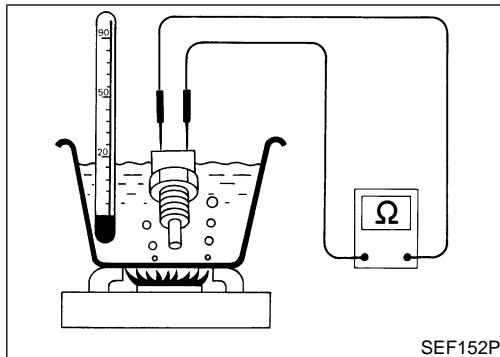
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-195.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace engine coolant temperature sensor.

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

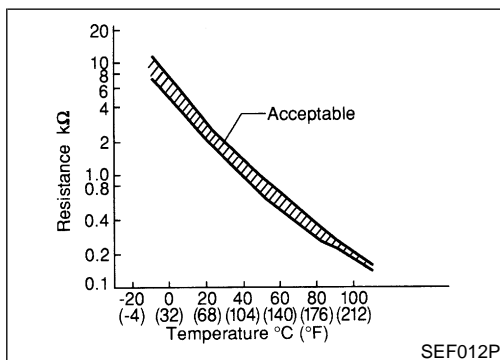
NIEC0078

NIEC0078S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



If NG, replace engine coolant temperature sensor.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Component Description

Component Description

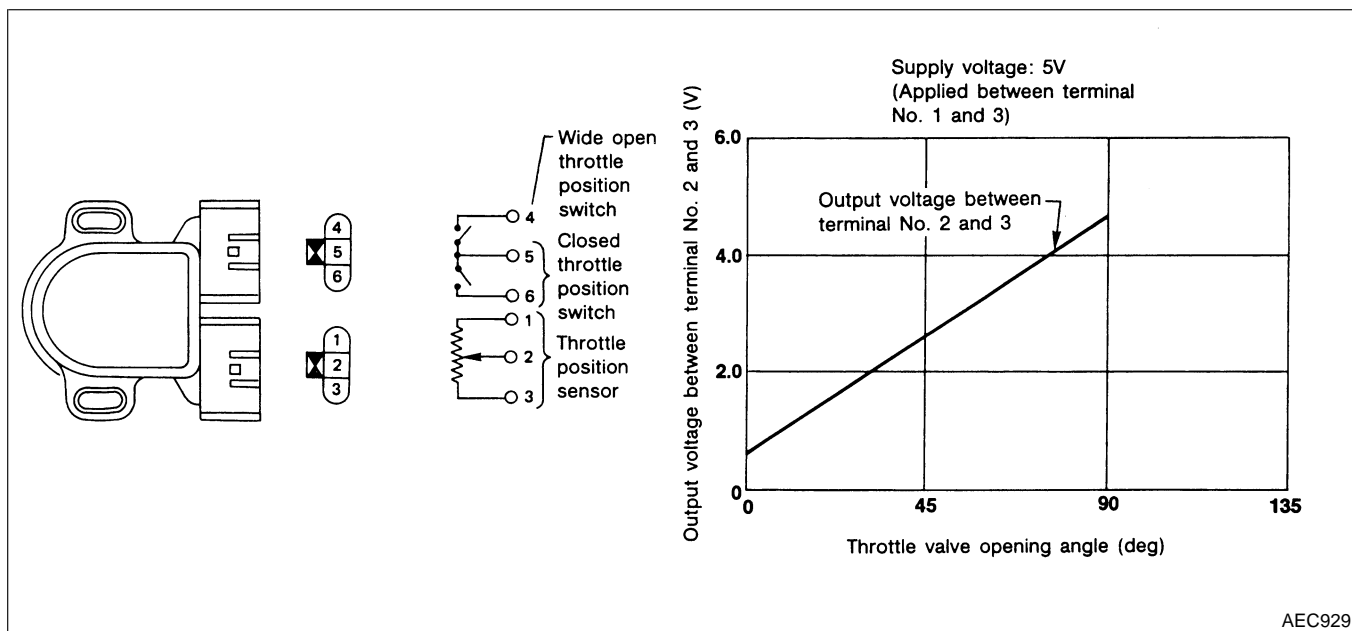
NIEC0079

NOTE:

If DTC P0120 (0403) is displayed with DTC P0510 (0203), first perform trouble diagnosis for DTC P0510, EC-461.

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This sensor controls engine operation such as fuel cut. On the other hand, the "Wide open and closed throttle position switch", which is built into the throttle position sensor unit, is not used for engine control.



CONSULT-II Reference Value in Data Monitor Mode

NIEC0080

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
THRTL POS SEN	● Engine: After warming up, idle the engine	Throttle valve: fully closed	0.15 - 0.85V
	● Engine: After warming up ● Ignition switch: ON (Engine stopped)	Throttle valve: fully opened	3.5 - 4.7V
ABSOL TH-P/S	● Engine: After warming up, idle the engine	Throttle valve: fully closed	0.0°
	● Engine: After warming up ● Ignition switch: ON (Engine stopped)	Throttle valve: fully opened	Approx. 88.0%

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0082

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0120	A)	An excessively low or high voltage from the sensor is sent to ECM.* <ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor
	B)	A high voltage from the sensor is sent to ECM under light load driving condition. <ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor ● Fuel injector ● Camshaft position sensor (PHASE) ● Mass air flow sensor
	C)	A low voltage from the sensor is sent to ECM under heavy load driving condition. <ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Intake air leaks ● Throttle position sensor

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
	Condition	Driving condition
	When engine is idling	Normal
	When accelerating	Poor acceleration

DTC Confirmation Procedure

NIEC0083

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

NIEC0083S01

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.
- This test may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	P/N POSI SW	OFF

SEF065Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position except "P" or "N" position

- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-202.

With GST

Follow the procedure "With CONSULT-II" above.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B

NIEC0083S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds.
If idle speed is over 1,000 rpm, maintain the following conditions for at least 10 seconds to keep engine speed below 1,000 rpm.

A/T model	Selector lever	Suitable position except "P" or "N" position
	Brake pedal	Depressed
	Vehicle speed	0 km/h (0 MPH)
M/T model	Selector lever	Suitable position except "N" (Higher gear position such as 3rd or 4th is better to keep low engine rpm.)
	Accelerator pedal	Released
	Vehicle speed	As slow as possible

- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-202.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

NIEC0083S03

6	DATA MONITOR	
	MONITOR	NO DTC
	THRTL POS SEN	XXX V
	ABSOL TH-P/S	XXX %

SEF177Y

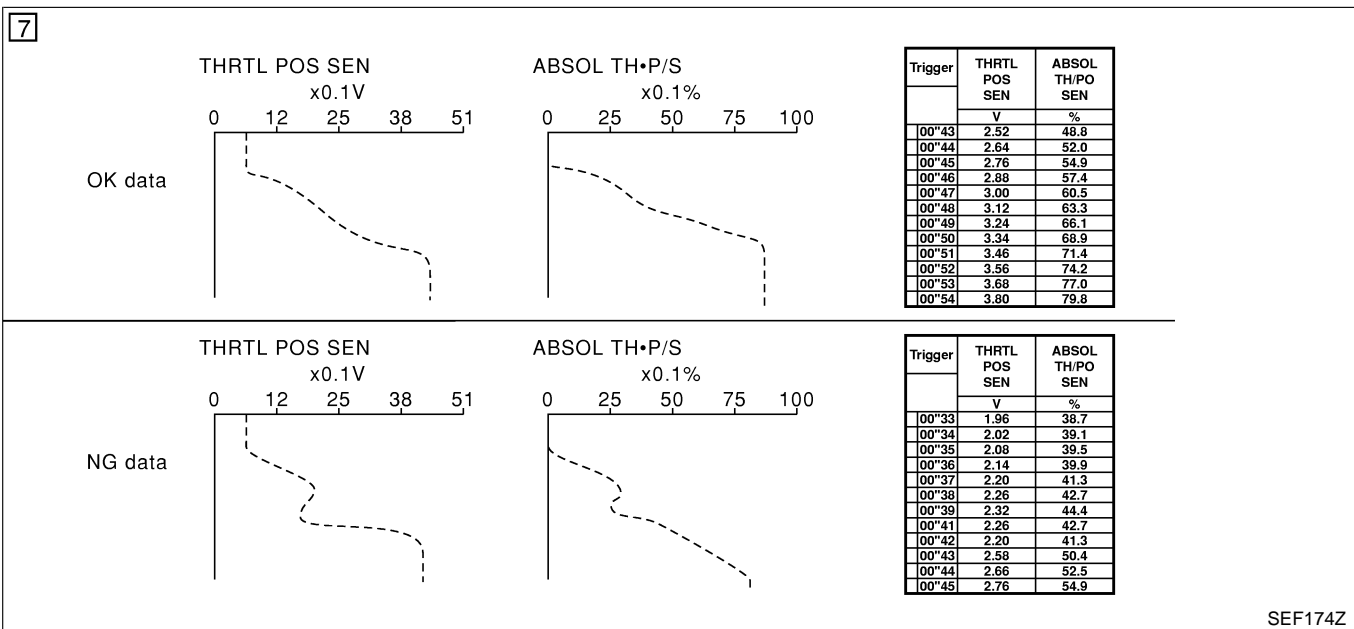
PROCEDURE FOR MALFUNCTION C

CAUTION:

Always drive vehicle at a safe speed.

④ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 3) Turn ignition switch "ON".
 - 4) Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-II.
 - 5) Select "THRTL POS SEN" and "ABSOL TH-P/S" in "DATA MONITOR" mode with CONSULT-II.
 - 6) Press RECORD on CONSULT-II SCREEN at the same time accelerator pedal is depressed.
 - 7) Print out the recorded graph and check the following:
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal is fully depressed is approximately 4V.
- If NG, go to "Diagnostic Procedure", EC-202.
If OK, go to following step.



- 8) Select "AUTO TRIG" in "DATA MONITOR" mode with CONSULT-II.

9	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	MAS A/F SE-B1	XXX V
	COOLAN TEMP/S	XXX °C

SEF178Y

- 9) Maintain the following conditions for at least 10 consecutive seconds.

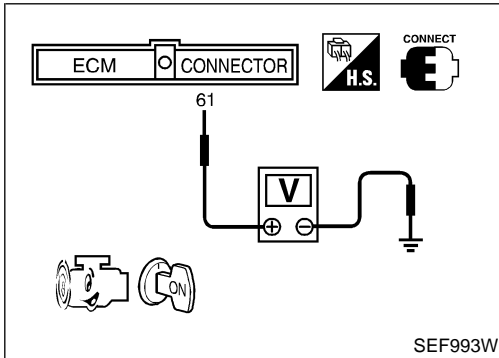
ENG SPEED	More than 2,000 rpm
MAS AIR/FL SE	More than 3V
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 10) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-202.



With GST

- 1) Maintain the following conditions for at least 10 consecutive seconds.

Gear position	Suitable position
Engine speed	More than 2,000 rpm
Engine coolant temperature	More than 70°C (158°F)
Voltage between ECM terminal 61 (Mass air flow sensor signal) and ground	More than 3V

- 2) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-202.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

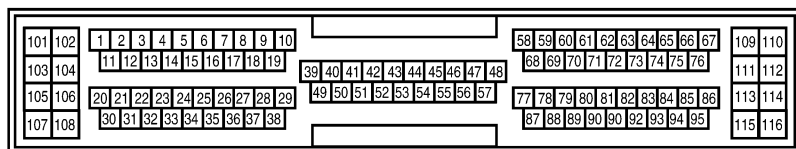
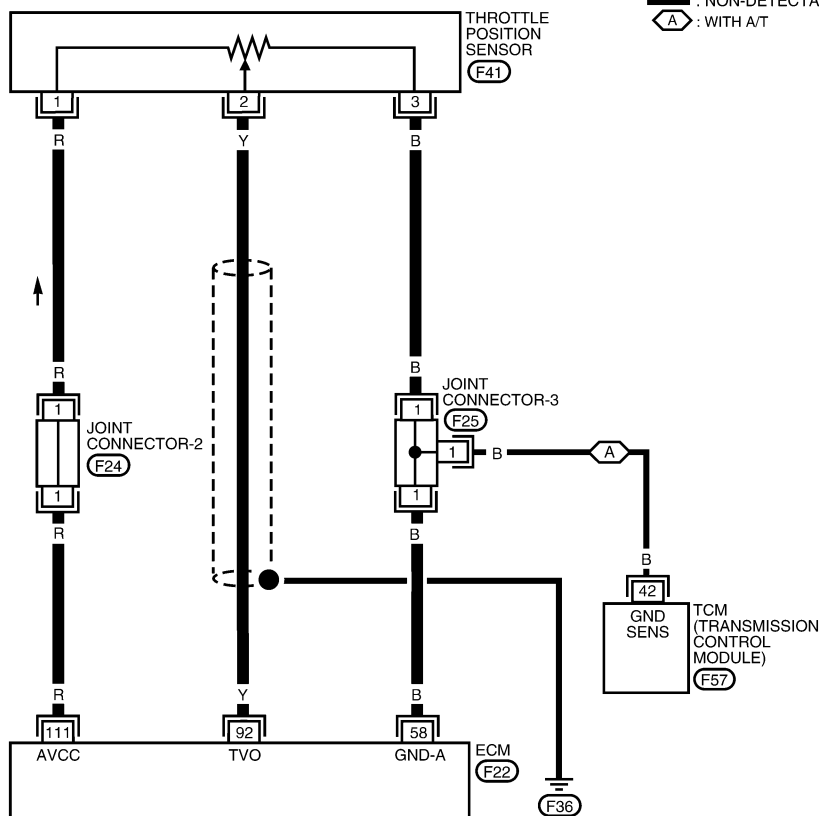
Wiring Diagram

Wiring Diagram

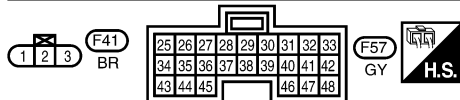
NIEC0084

EC-TPS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC
A : WITH A/T



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR



WEC605

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
92	Y	THROTTLE POSITION SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH ACCELERATOR PEDAL FULLY RELEASED	0.15 - 0.85V
			IGN ON WITH ACCELERATOR PEDAL FULLY DEPRESSED	3.5 - 4.7V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF175ZA

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

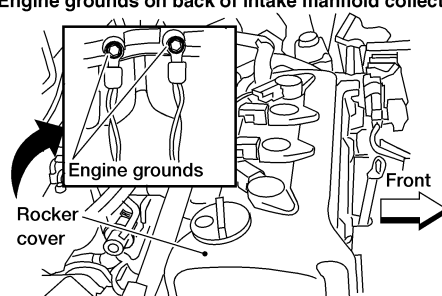
Diagnostic Procedure

NIEC0085

1	INSPECTION START									
Which malfunction (A, B or C) is duplicated?										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">B</td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">C</td> </tr> </tbody> </table>			MALFUNCTION	Type	A	A	B	B	C	C
MALFUNCTION	Type									
A	A									
B	B									
C	C									
MTBL0066										
Type A, B or C										
Type A or B	▶	GO TO 4.								
Type C	▶	GO TO 2.								

2	ADJUST THROTTLE POSITION SENSOR	
Perform "Basic Inspection", EC-127.		
OK or NG		
OK	▶	GO TO 3.

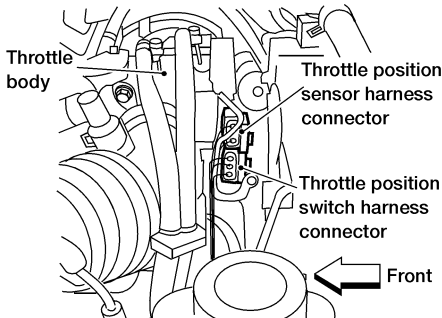
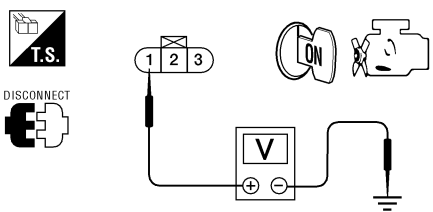
3	CHECK INTAKE SYSTEM	
Check the following connections.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to intake manifold collector 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Reconnect the parts.

4	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
		▶ GO TO 5.

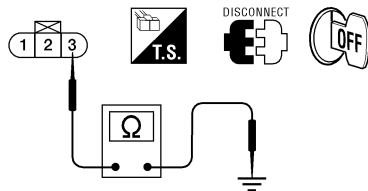
DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK POWER SUPPLY		
<p>1. Disconnect throttle position sensor harness connector.</p> <div style="text-align: center;">  </div>			
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between throttle position sensor terminal 1 and ground with CONSULT-II or tester.</p>			
		WEC244	EC
		 <p style="text-align: right;">Voltage: Approximately 5V</p>	
		LEC433	
OK or NG			
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

6	DETECT MALFUNCTIONING PARTS		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between throttle position sensor and ECM 			
		▶ Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between throttle position sensor terminal 3 and engine ground.</p>			
		LEC434	EC
		 <p style="text-align: right;">Continuity should exist.</p>	
OK or NG			
OK	▶	GO TO 9.	
NG	▶	GO TO 8.	

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DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and throttle position sensor ● Harness for open or short between TCM (Transmission control module) and throttle position sensor 		
▶		Repair open circuit or short to power in harness or connectors.

9	CHECK INPUT SIGNAL CIRCUIT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 92 and throttle position sensor terminal 2. Refer to the "Wiring Diagram", EC-201. <b style="color: blue;">Continuity should exist.		
3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK THROTTLE POSITION SENSOR	
Refer to "Component Inspection", EC-206.		
OK or NG		
OK (Type B in step1)	▶	GO TO 11.
OK (Type A or C in step1)	▶	GO TO 14.
NG	▶	Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-127.

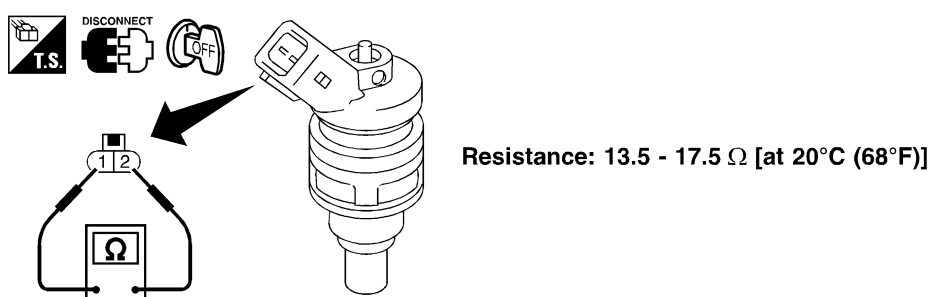
11	CHECK MASS AIR FLOW SENSOR	
Refer to "Component Inspection", EC-182.		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace mass air flow sensor.

12	CHECK CAMSHAFT POSITION SENSOR (PHASE)	
Refer to "Component Inspection", EC-364.		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace camshaft position sensor (PHASE).

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

13	CHECK FUEL INJECTOR
<p>1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.</p>	
	
SEF964XA	
OK or NG	
OK	▶ GO TO 14.
NG	▶ Replace fuel injector.

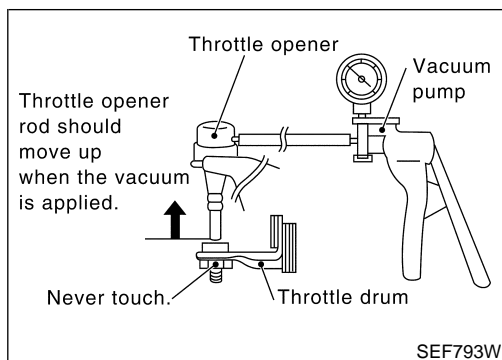
14	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

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DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Component Inspection



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF719Y

Component Inspection THROTTLE POSITION SENSOR

=NIEC0086

NIEC0086S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Select "DATA MONITOR" mode with CONSULT-II.
- 8) Check voltage of "THRTL POS SEN" under the following conditions.

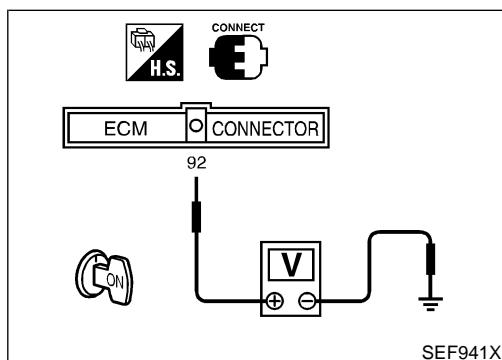
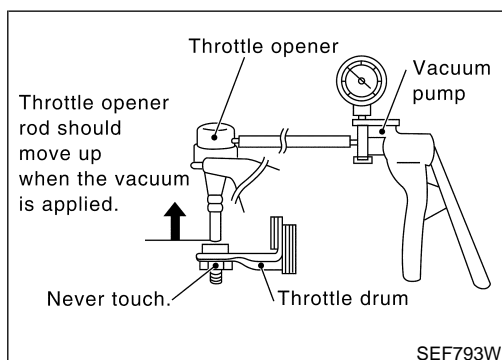
NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-127.

- 9) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground under the following conditions.

NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-127.

- 8) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

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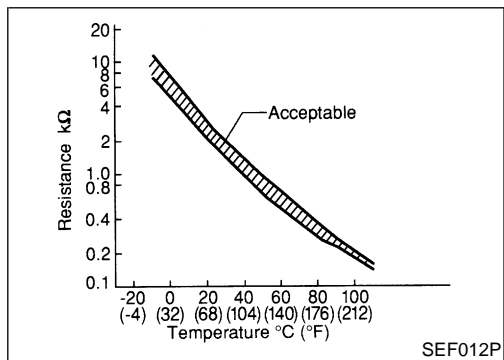
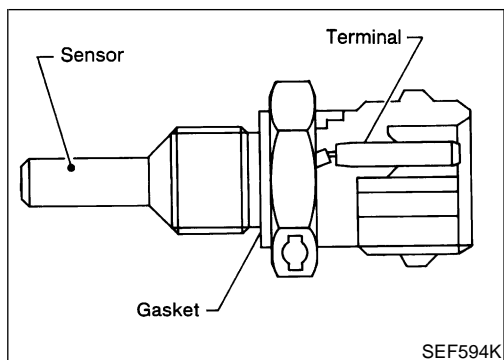
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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0087

NOTE:

If DTC P0125 (0908) is displayed with P0115 (0103), first perform trouble diagnosis for DTC P0115, EC-191.

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0088

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC0089

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0125	<ul style="list-style-type: none"> ● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. ● Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> ● Harness or connectors (High resistance in the circuit) ● Engine coolant temperature sensor ● Thermostat

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

=NIEC0090

CAUTION:

Be careful not to overheat engine.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Check that "COOLAN TEMP/S" is above 10°C (50°F).
If it is above 10°C (50°F), the test result will be OK. If it is below 10°C (50°F), go to following step.
- 4) Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-211.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR




QG18DE (EXC CALIF CA)

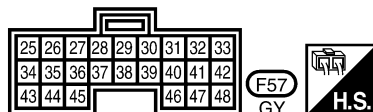
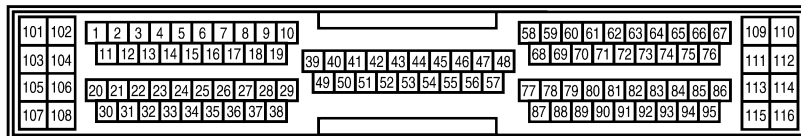
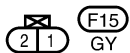
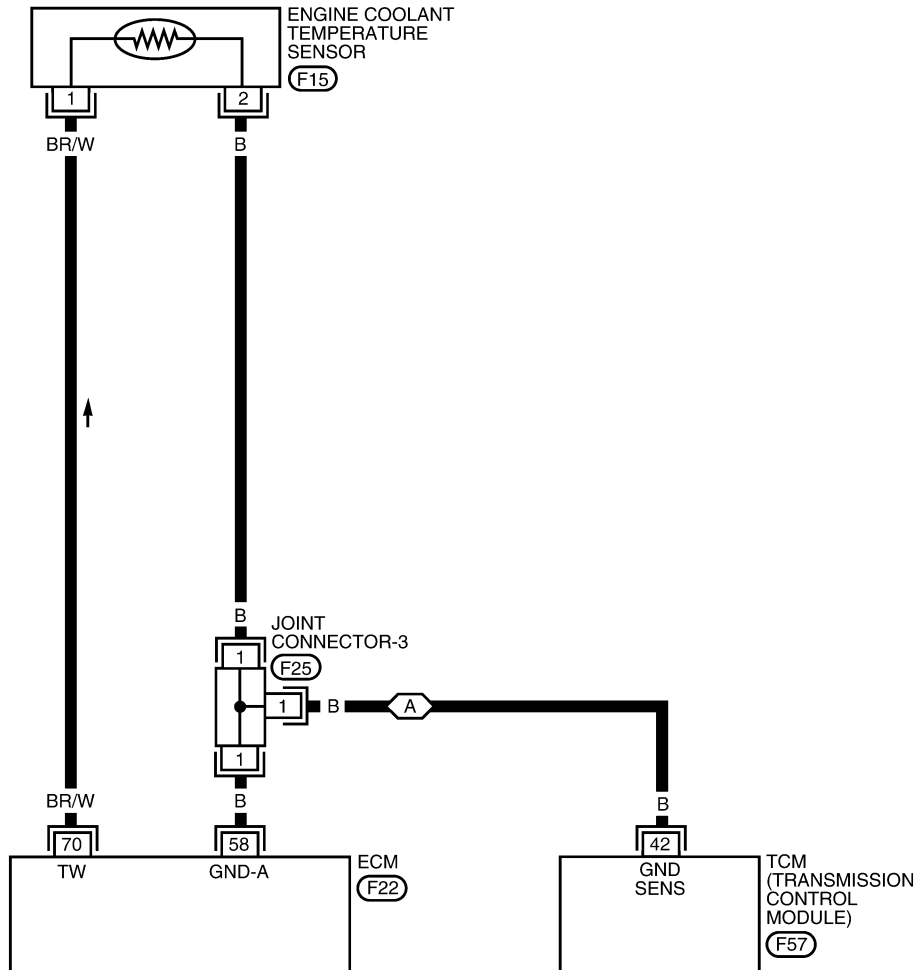
Wiring Diagram

Wiring Diagram

NIEC0091

EC-ECTS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T



REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR

WEC578

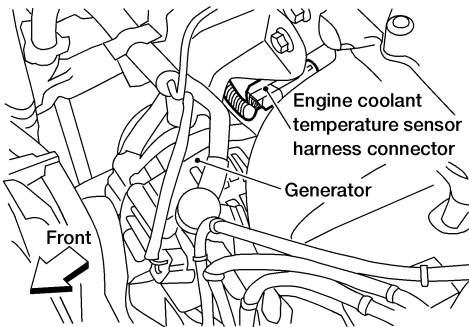
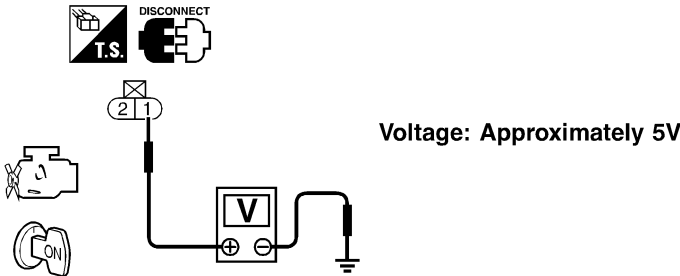
DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0092

1	CHECK POWER SUPPLY
<p>1. Turn ignition switch "OFF". 2. Disconnect engine coolant temperature sensor harness connector.</p> <div style="text-align: center;">  <p>Engine coolant temperature sensor harness connector Generator Front</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>DISCONNECT T.S.</p> <p>Voltage: Approximately 5V</p> </div> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

WEC251

SEF303X

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM and engine coolant temperature sensor.	
	▶ Repair harness or connectors.

3	CHECK GROUND CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between ECTS terminal 2 and engine ground. Refer to the "Wiring Diagram", EC-210. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between TCM (Transmission control module) and engine coolant temperature sensor ● Joint connector-3 	
	▶ Repair open circuit or short to power in harness or connectors.

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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

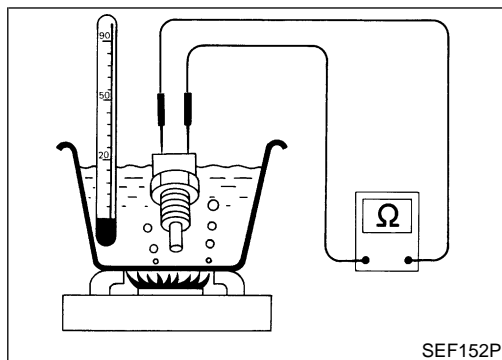
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-212.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace engine coolant temperature sensor.

6	CHECK THERMOSTAT OPERATION	
When the engine is cooled [lower than 82°C (180°F)], grasp lower radiator hose and confirm the engine coolant does not flow.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace thermostat. Refer to LC-13 , "Thermostat".

7	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END



Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

NIEC0093

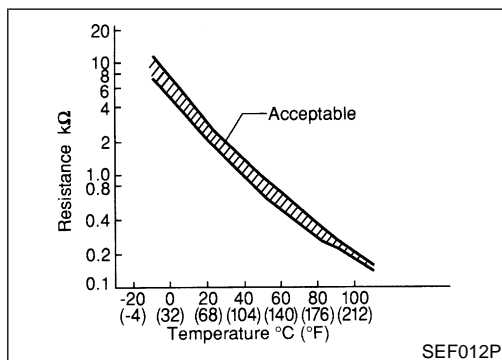
NIEC0093S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

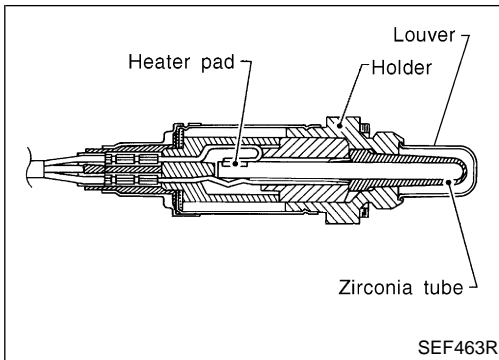
If NG, replace engine coolant temperature sensor.



DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Component Description

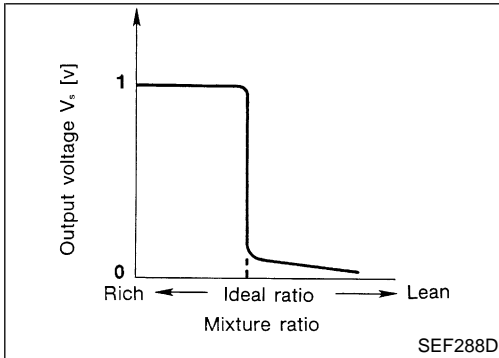


SEF463R

Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0094



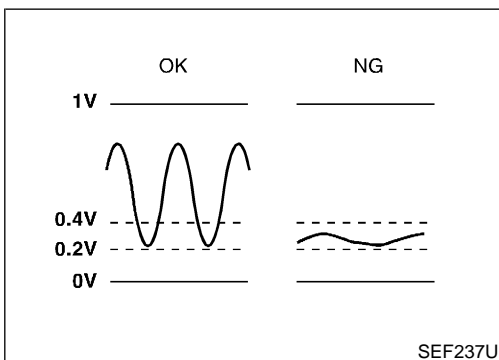
SEF288D

CONSULT-II Reference Value in Data Monitor Mode

NIEC0095

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)/(B2)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)/(B2)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



SEF237U

On Board Diagnosis Logic

Under the condition in which the heated oxygen sensor 1 (front) signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.

NIEC0097

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0130	<ul style="list-style-type: none"> The voltage from the sensor is constantly approx. 0.3V. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)
P0150		

DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

5	HO2S1 (B1) P0130	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF643Y

5	HO2S1 (B1) P0130	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF644Y

5	HO2S1 (B1) P0130	
	COMPLETED	

SEF645Y

DTC Confirmation Procedure

NIEC0098

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "HO2S1 (B1)/(B2), P0130 (P0150)" of "HO2S1 (B1)/(B2)" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 3) Touch "START".
- 4) Let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 4.

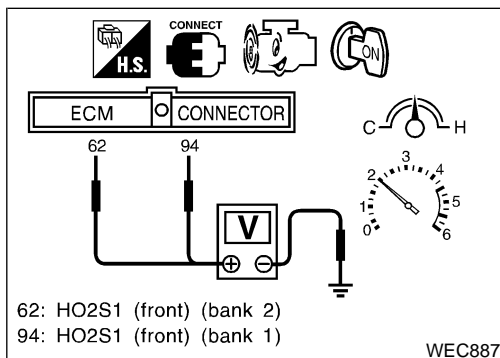
- 5) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,600 - 3,400 rpm (A/T) 1,900 - 4,100 rpm (M/T)
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.4 - 12.5 msec (A/T) 2.8 - 10 msec (M/T)
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 6) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-218.

During this test, P1148, P1168 may be displayed on CONSULT-II screen.



Overall Function Check

NIEC0099

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2 signal) or 94 (HO2S1 bank 1) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage does not remain in the range of 0.2 - 0.4V.

**DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(CIRCUIT)**

QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

4) If NG, go to "Diagnostic Procedure", EC-218.

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DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Wiring Diagram

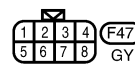
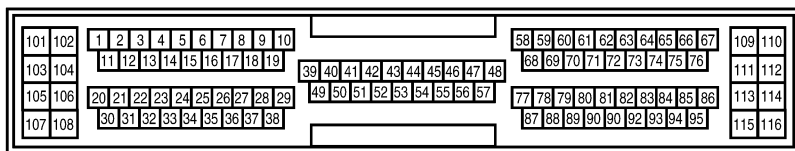
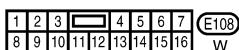
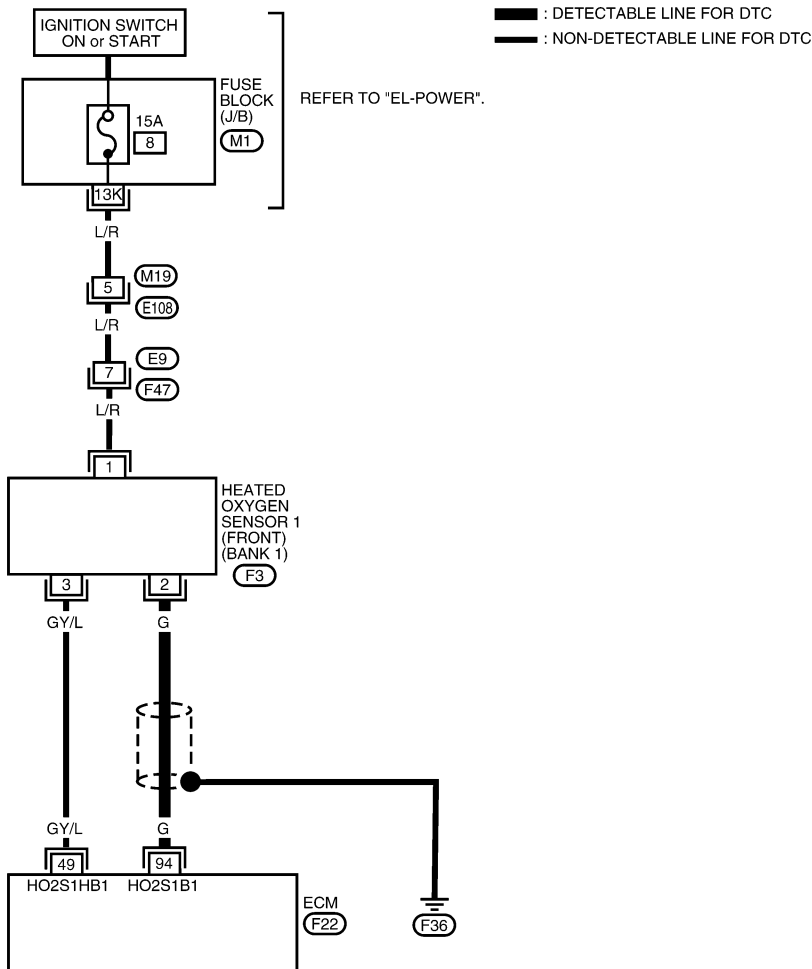
Wiring Diagram

=NIEC0100

NIEC0100S03

BANK 1

EC-O2S1B1-01



WEC878

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
94	G	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	<p>0 - APPROX. 1.0V</p>

WEC889

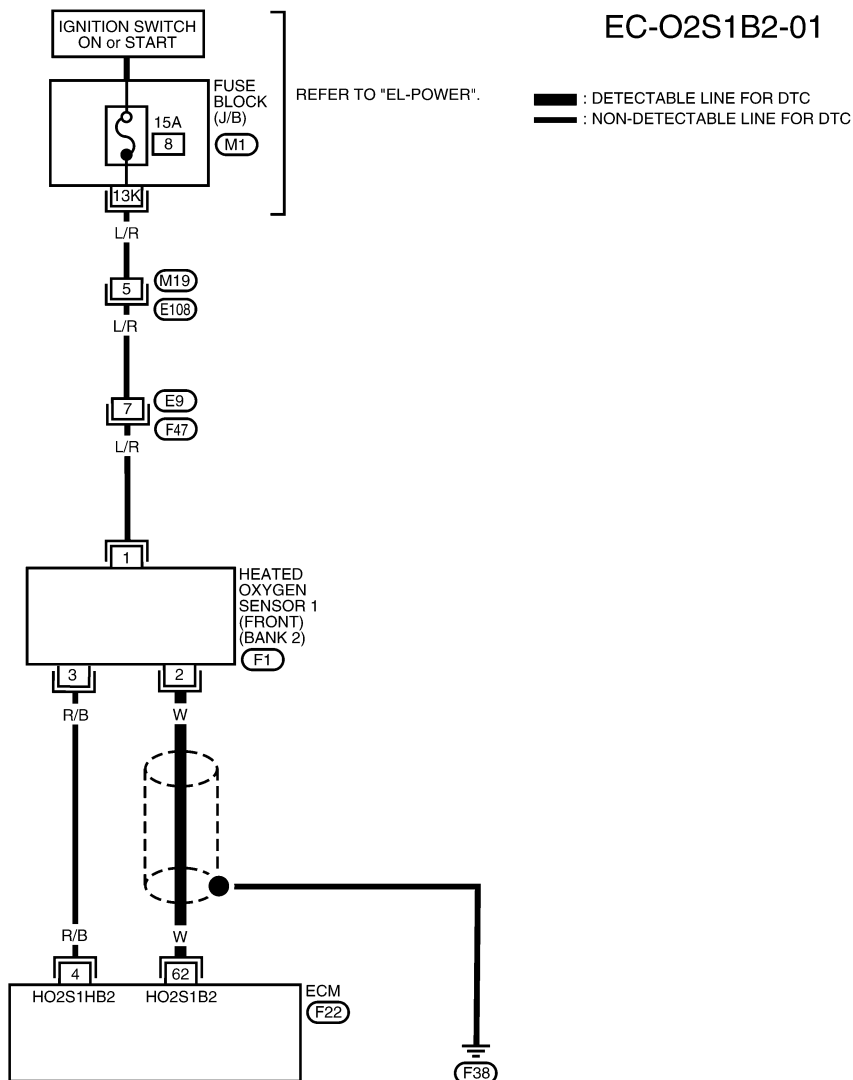
DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

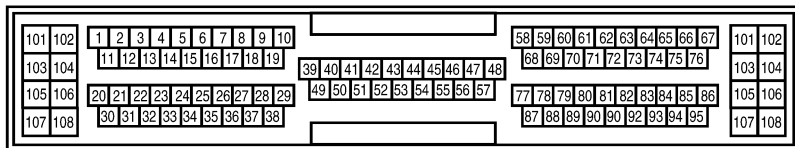
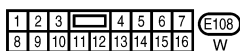
Wiring Diagram (Cont'd)

BANK 2

NIEC0100S04



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WEC877

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V (V)

WEC888

DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

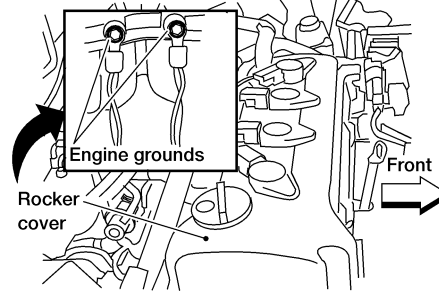
Diagnostic Procedure

NIEC0101

1 INSPECTION START

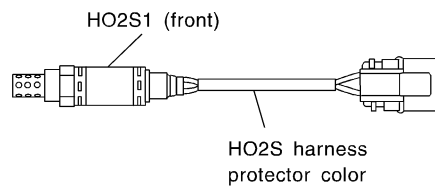
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



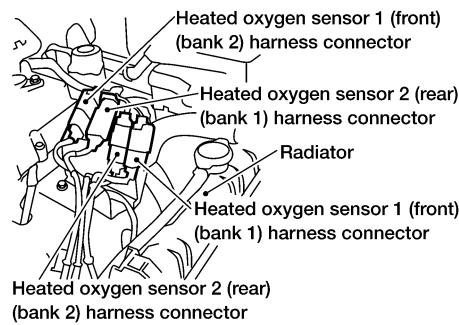
WEC249

3. Check the HO2S1 (front) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) harness connector.



HO2S1 (front) (bank 1): Black
HO2S1 (front) (bank 2): Blue

LEC646



WEC835

▶ GO TO 2.

DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK INPUT SIGNAL CIRCUIT															
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal and HO2S1 (front) as follows. Refer to "Wiring Diagram", EC-216.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0130</td> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> </tr> <tr> <td>P0150</td> <td style="text-align: center;">94</td> <td style="text-align: center;">2</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>			DTC	Terminals		Bank	ECM or Sensor	Sensor	P0130	62	2	2	P0150	94	2	1
DTC	Terminals			Bank												
	ECM or Sensor	Sensor														
P0130	62	2	2													
P0150	94	2	1													
WEC890																
<p style="color: blue;">Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal or HO2S1 (front) and ground as follows. Refer to "Wiring Diagram", EC-216.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM or Sensor</th> <th>Ground</th> </tr> </thead> <tbody> <tr> <td>P0130</td> <td style="text-align: center;">62 or 2</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">2</td> </tr> <tr> <td>P0150</td> <td style="text-align: center;">94 or 2</td> <td style="text-align: center;">Ground</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>			DTC	Terminals		Bank	ECM or Sensor	Ground	P0130	62 or 2	Ground	2	P0150	94 or 2	Ground	1
DTC	Terminals			Bank												
	ECM or Sensor	Ground														
P0130	62 or 2	Ground	2													
P0150	94 or 2	Ground	1													
WEC891																
<p style="color: blue;">Continuity should not exist.</p> <p>4. Also check harness for short to power.</p>																
OK or NG																
OK	▶	GO TO 3.														
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.														

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-220.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Replace corresponding heated oxygen sensor.

4	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

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DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Component Inspection

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

Bank 1	cycle	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
MNTR (B1)/(B2) indicates RICH
L means HO2S1
MNTR (B1)/(B2) indicates LEAN

SEF647Y

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

=NIEC0102

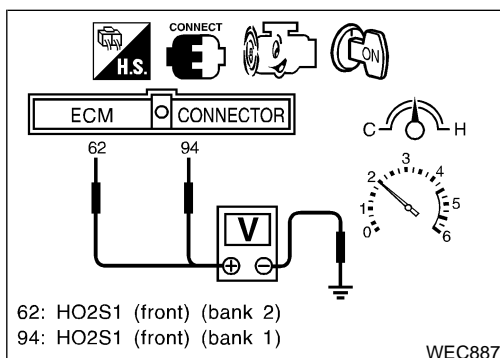
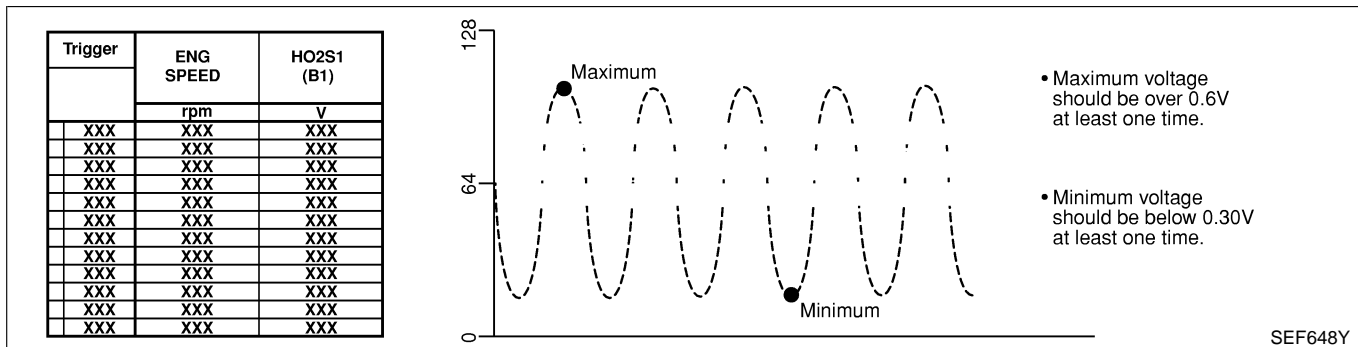
NIEC0102S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)/(B2)", "RICH"
L = "HO2S1 MNTR (B1)/(B2)", "LEAN"
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S1 bank 1) and engine ground.
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.
- 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V**
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

DTC P0130, P0150 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (CIRCUIT)

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

GI

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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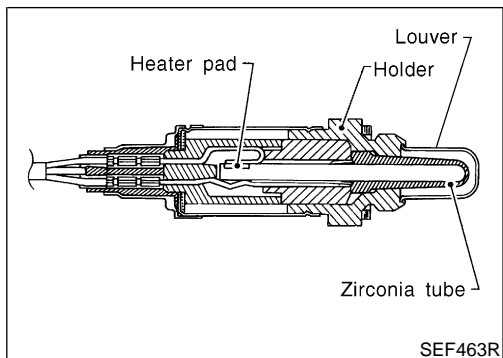
SC

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DTC P0131, P0151 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (LEAN SHIFT MONITORING) QG18DE (EXC CALIF CA)

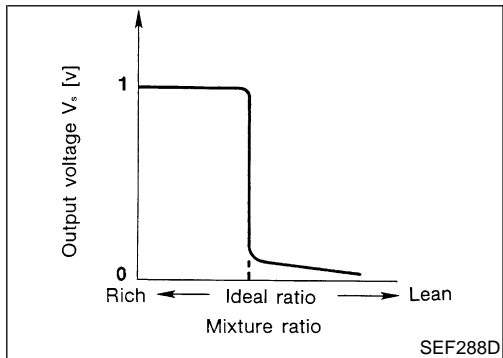
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0103

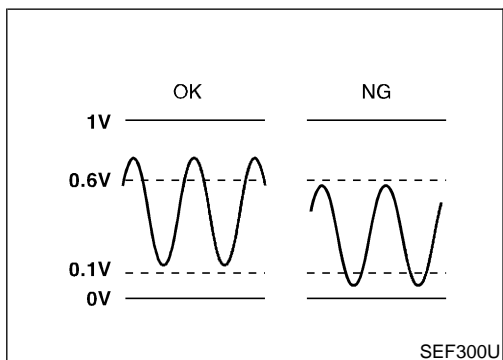


CONSULT-II Reference Value in Data Monitor Mode

NIEC0104

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)/(B2)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)/(B2)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the "rich" output is sufficiently high and whether the "lean" output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.

NIEC0106

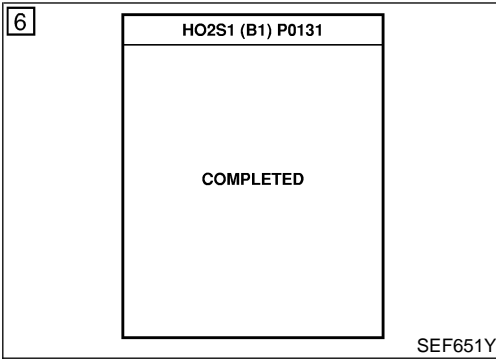
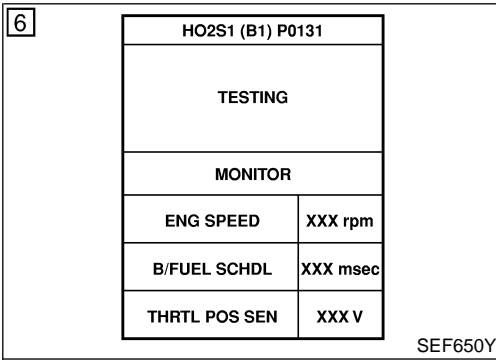
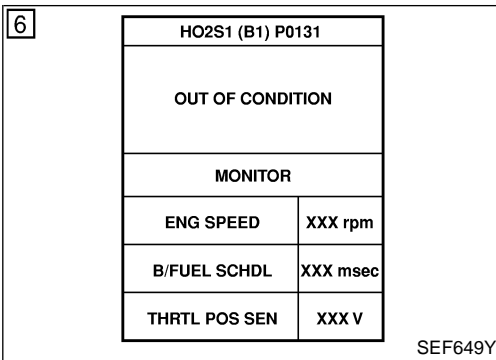
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0131	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are not reached to the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor heater 1 (front) Fuel pressure Injectors Intake air leaks
P0151		

DTC P0131, P0151 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (LEAN SHIFT MONITORING)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

NIEC0107



DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 5 seconds.
- Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P0131 (P0151)" of "HO2S1 (B1)/(B2)" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 20 seconds or more.)

ENG SPEED	1,350 - 2,700 rpm (A/T) 1,450 - 3,200 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.6 - 12.5 msec (A/T) 2.4 - 10.0 msec (M/T)
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-224.

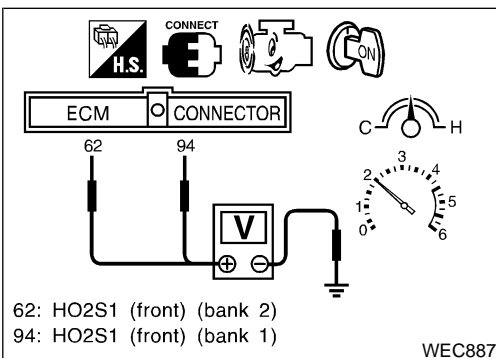
Overall Function Check

NIEC0108

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- Start engine and warm it up to normal operating temperature.
 - Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S1 bank 1) and engine ground.
 - Check the following with engine speed held at 2,000 rpm constant under no load.
- The maximum voltage is over 0.6V at least one time.




DTC P0131, P0151 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (LEAN SHIFT MONITORING) QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

- The minimum voltage is over 0.1V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-224.

Diagnostic Procedure

NIEC0109

1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten the corresponding heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
	GO TO 2.

DTC P0131, P0151 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (LEAN SHIFT MONITORING)

QG18DE (EXC CALIF CA)

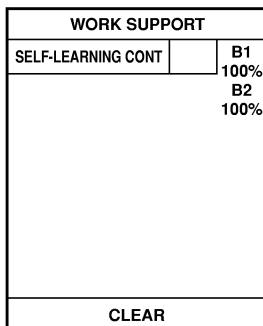
Diagnostic Procedure (Cont'd)

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2 CLEAR THE SELF-LEARNING DATA.

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

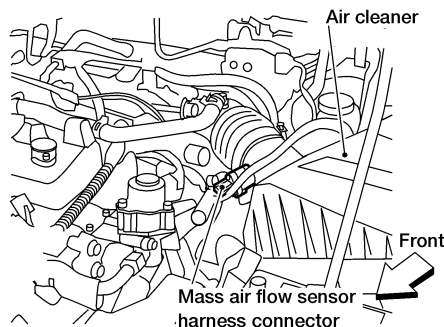


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 (P0174) detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



WEC250

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

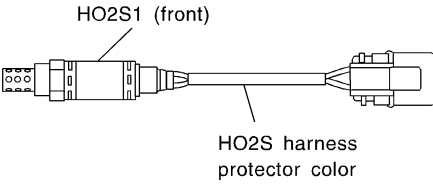
Is the 1st trip DTC P0171 (P0174) detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171 (P0174). Refer to EC-301.
No	▶	GO TO 3.

DTC P0131, P0151 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (LEAN SHIFT MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
<p>1. Turn ignition switch "OFF". 2. Check the HO2S1 (front) harness protector color, and disconnect the corresponding HO2S1 (front) harness connector.</p>		
		
<p>HO2S1 (front) (bank 1): Black HO2S1 (front) (bank 2): Blue</p>		
LEC646		
<p>3. Check HO2S1 heater (front), refer to EC-259.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Replace corresponding heated oxygen sensor.

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-226.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace corresponding heated oxygen sensor 1.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167. Refer to "Wiring Diagram", EC-216, for circuit.	
INSPECTION END	

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

Bank 1	cycle	1 2 3 4 5	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1)/(B2) indicates RICH			
L means HO2S1 MNTR (B1)/(B2) indicates LEAN			

SEF647Y

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0110

NIEC0110S02

With CONSULT-II

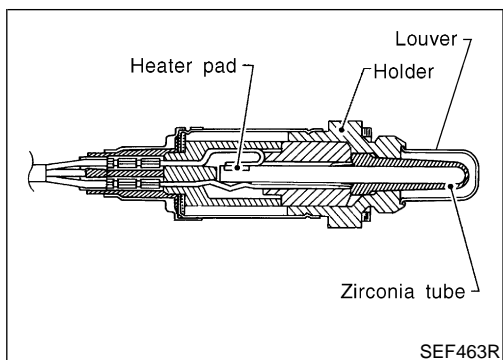
- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below:
 R = "HO2S1 MNTR (B1)/(B2)", "RICH"
 L = "HO2S1 MNTR (B1)/(B2)", "LEAN"
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

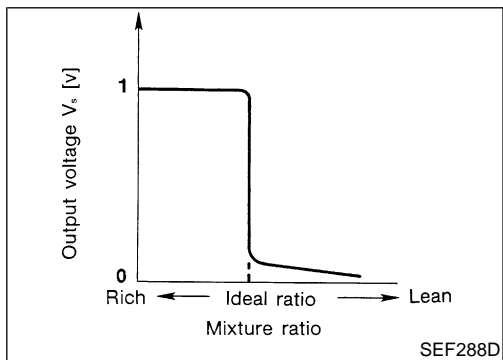
DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RICH SHIFT MONITORING) QG18DE (EXC CALIF CA)

Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

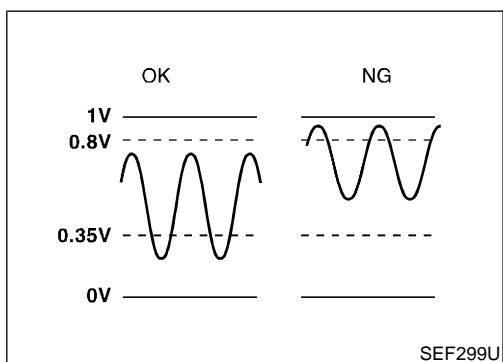


CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC0112

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)/(B2)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)/(B2)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the "rich" output is sufficiently high. The "lean" output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.

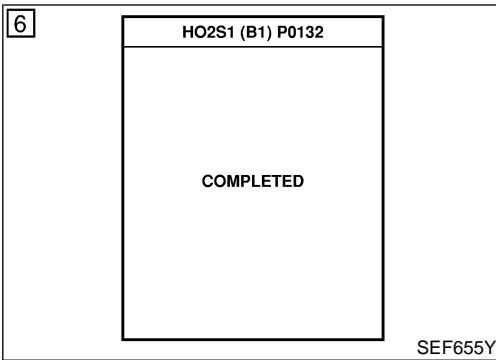
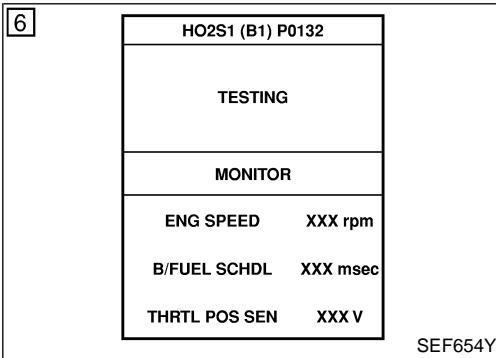
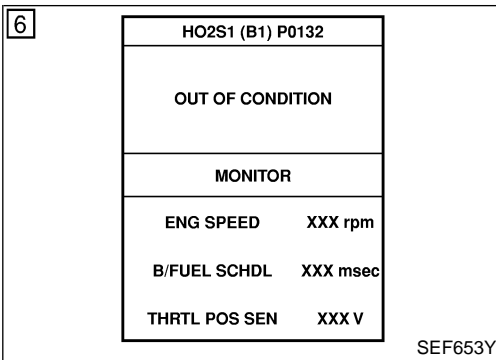
NIEC0114

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0132	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are beyond the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor heater 1 (front) Fuel pressure Injectors
P0152		

DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RICH SHIFT MONITORING)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)



DTC Confirmation Procedure

NIEC0115

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P0132 (P0152)" of "HO2S1 (B1)/(B2)" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 20 seconds or more.)

ENG SPEED	1,350 - 2,700 rpm (A/T) 1,450 - 3,200 rpm (M/T)
Vehicle speed	Less than 100 km/h (62 MPH)
B/FUEL SCHDL	2.6 - 12.5 msec (A/T) 2.4 - 10.0 msec (M/T)
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-231.

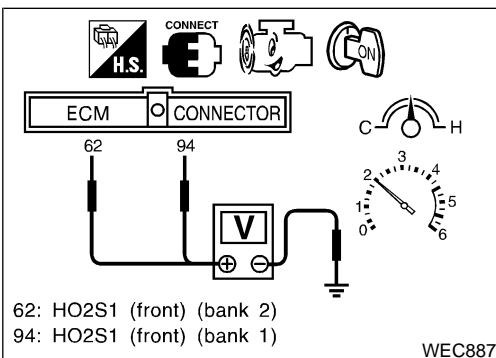
Overall Function Check

NIEC0116

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S1 bank 1) and engine ground.
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
- The maximum voltage is below 0.8V at least one time.



**DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(RICH SHIFT MONITORING) QG18DE (EXC CALIF CA)**

Overall Function Check (Cont'd)

- The minimum voltage is below 0.35V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-231.

Diagnostic Procedure

=NIEC0117

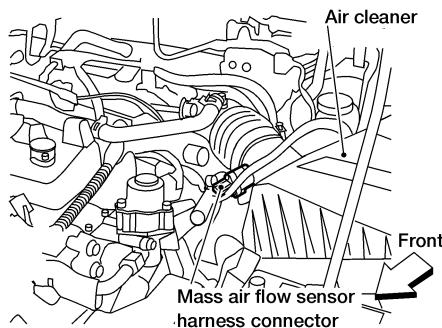
1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten the corresponding heated oxygen sensor 1 (front). <p style="margin-left: 20px;">Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
▶	GO TO 2.

GI
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2	CLEAR THE SELF-LEARNING DATA								
<p>☑ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">B1 100%</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">B2 100%</td> </tr> <tr> <td colspan="2" style="padding: 2px; text-align: center;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%		B2 100%	CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
	B2 100%								
CLEAR									
<p>4. Run engine for at least 10 minutes at idle speed.</p> <p>Is the 1st trip DTC P0172 (P0175) detected? Is it difficult to start engine?</p>									

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SEF652Y

<p>☒ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 	
	
<ol style="list-style-type: none"> 4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0172 (P0175) detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p>	
Yes	▶ Perform trouble diagnosis for DTC P0172 (P0175). Refer to EC-310.
No	▶ GO TO 3.

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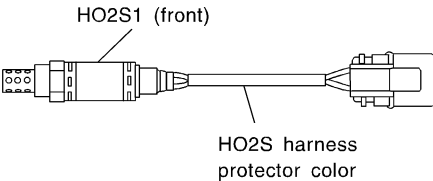
WEC250

DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RICH SHIFT MONITORING)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK HARNESS CONNECTOR	
1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector. 3. Check harness connector for water. Water should not exit.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace harness connector.

4	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
1. Turn ignition switch "OFF". 2. Make sure HO2S1 (front) harness protector color, and disconnect the corresponding HO2S1 (front) harness connector.		
 <p style="margin-left: 200px;">HO2S1 (front)</p> <p style="margin-left: 200px;">HO2S harness protector color</p>		
HO2S1 (front) (bank 1): Black HO2S1 (front) (bank 2): Blue		
LEC646		
3. Check HO2S1 heater (front), refer to EC-259.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).

5	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-233.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 1 (front).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167. Refer to "Wiring Diagram", EC-216, for circuit.		
▶		INSPECTION END

DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RICH SHIFT MONITORING)

QG18DE (EXC CALIF CA)

Component Inspection

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

Bank 1	cycle	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R

R means HO2S1
MNTR (B1)/(B2) indicates RICH
L means HO2S1
MNTR (B1)/(B2) indicates LEAN

SEF647Y

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0118

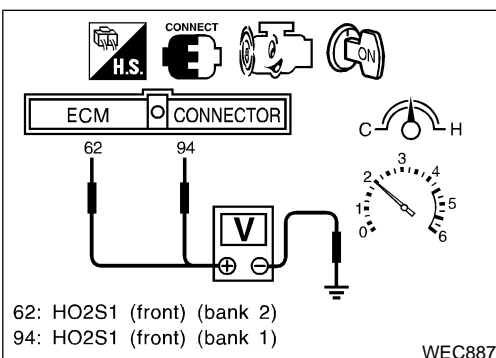
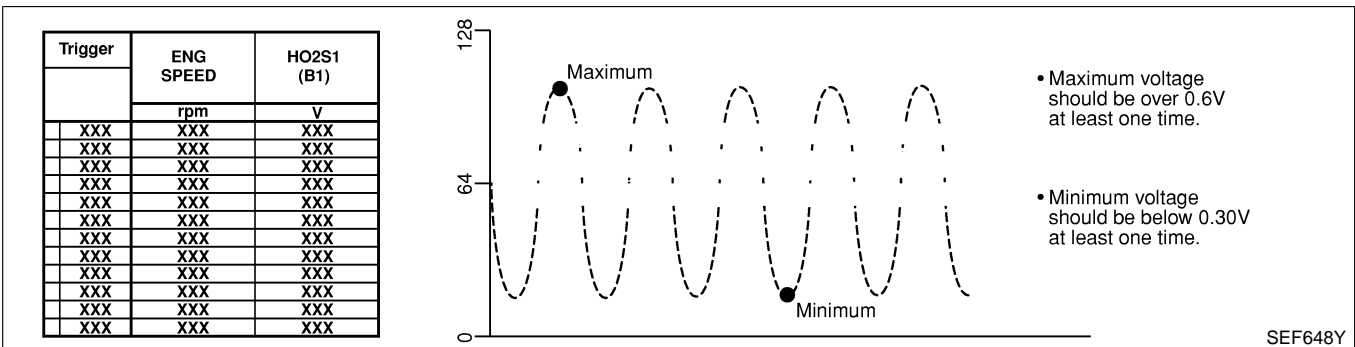
NIEC0118S02

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)/(B2)", "RICH"
L = "HO2S1 MNTR (B1)/(B2)", "LEAN"
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S1 bank 1) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than 5 times when 10 seconds.
1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

**DTC P0132, P0152 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(RICH SHIFT MONITORING)**

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

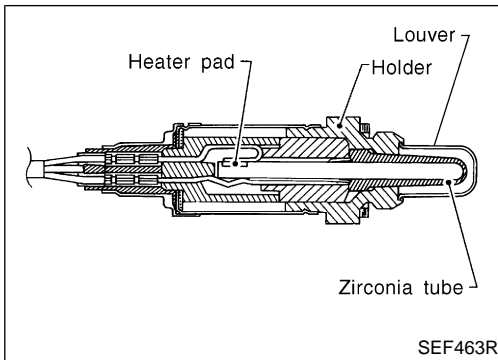
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

Component Description



SEF463R

Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0119

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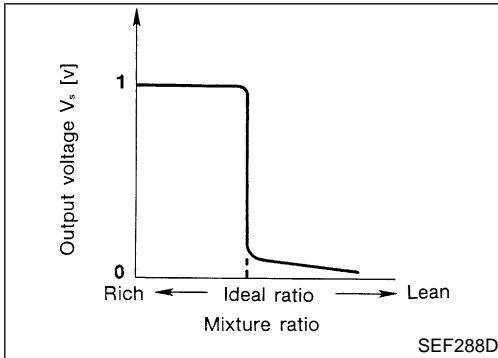
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SEF288D

CONSULT-II Reference Value in Data Monitor Mode

NIEC0120

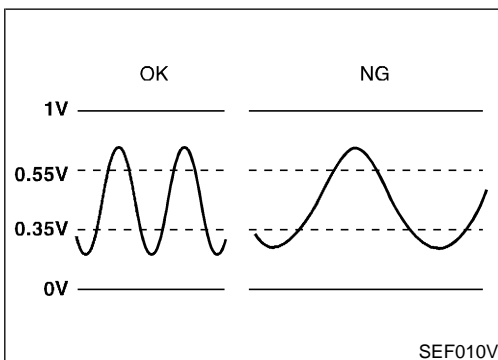
Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)/(B2)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)/(B2)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.

AX

SU

BR



SEF010V

On Board Diagnosis Logic

NIEC0122

To judge the malfunction of heated oxygen sensor 1 (front), this diagnosis measures response time of heated oxygen sensor signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor temperature index. Judgment is based on whether the compensated time (heated oxygen sensor cycling time index) is inordinately long or not.

ST

RS

BT

HA

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0133	<ul style="list-style-type: none"> The response of the voltage signal from the sensor takes more than the specified time. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front) Heated oxygen sensor heater 1 (front) Fuel pressure Injectors Intake air leaks Exhaust gas leaks PCV Mass air flow sensor
P0153		

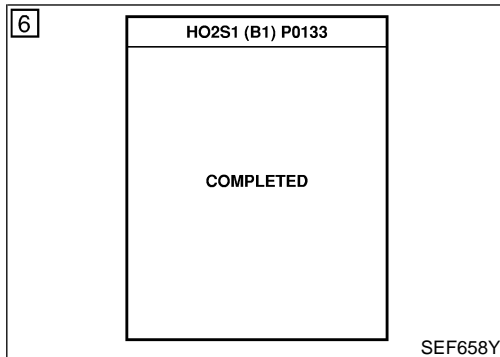
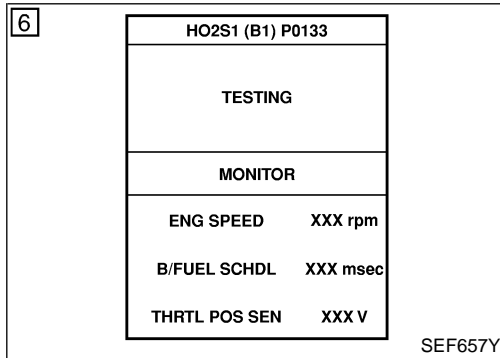
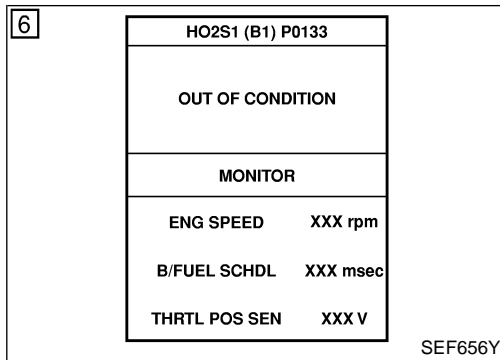
SC

EL

IDX

DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)



DTC Confirmation Procedure

NIEC0123

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1)/(B2) P0133 (P0153)" of "HO2S1 (B1)/(B2)" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,600 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 20 seconds.)

ENG SPEED	1,950 - 3,200 rpm (A/T) 2,300 - 3,750 rpm (M/T)
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	3.5 - 12.5 msec (A/T) 3 - 10 msec (M/T)
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-240.

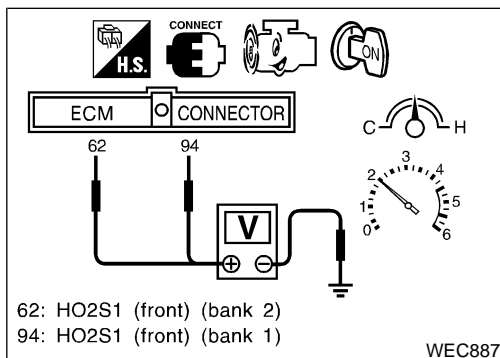
Overall Function Check

NIEC0124

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S2 bank 1) and engine ground.
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more



**DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(RESPONSE MONITORING)**

QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

than five times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

- 4) If NG, go to "Diagnostic Procedure", EC-240.

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DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Wiring Diagram

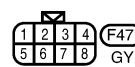
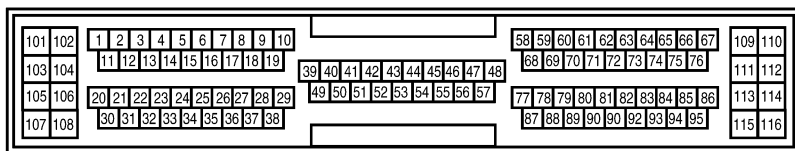
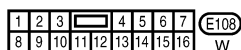
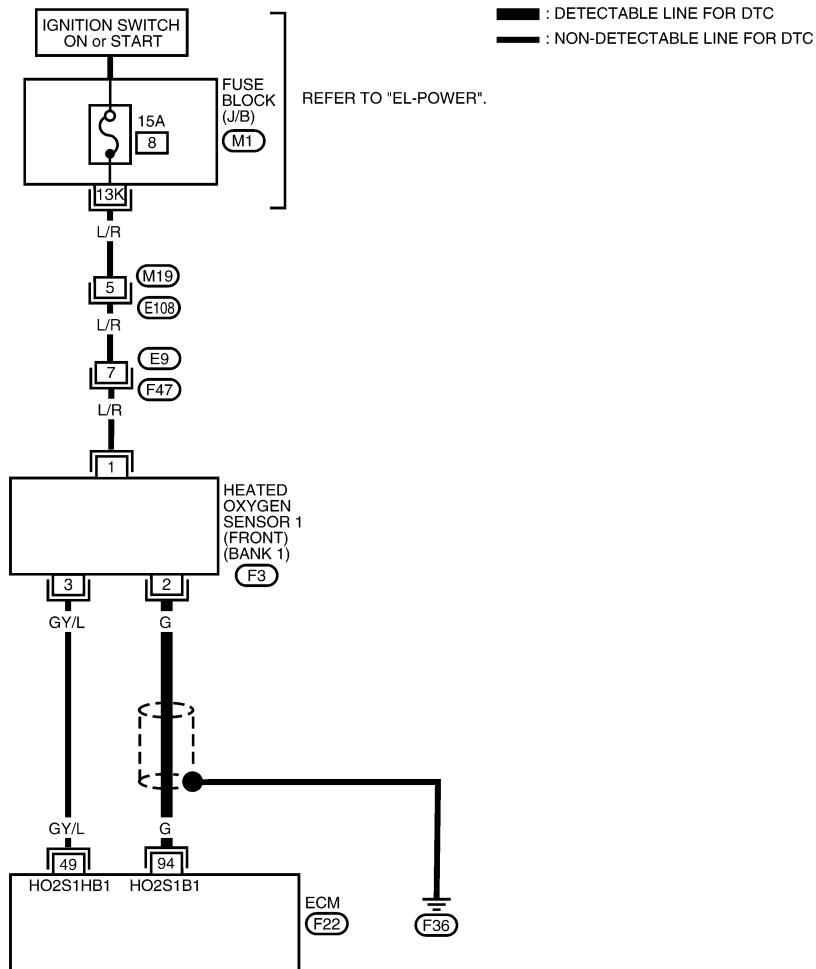
Wiring Diagram

=NIEC0125

NIEC0125S03

BANK 1

EC-O2S1B1-01



WEC878

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
94	G	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

WEC889

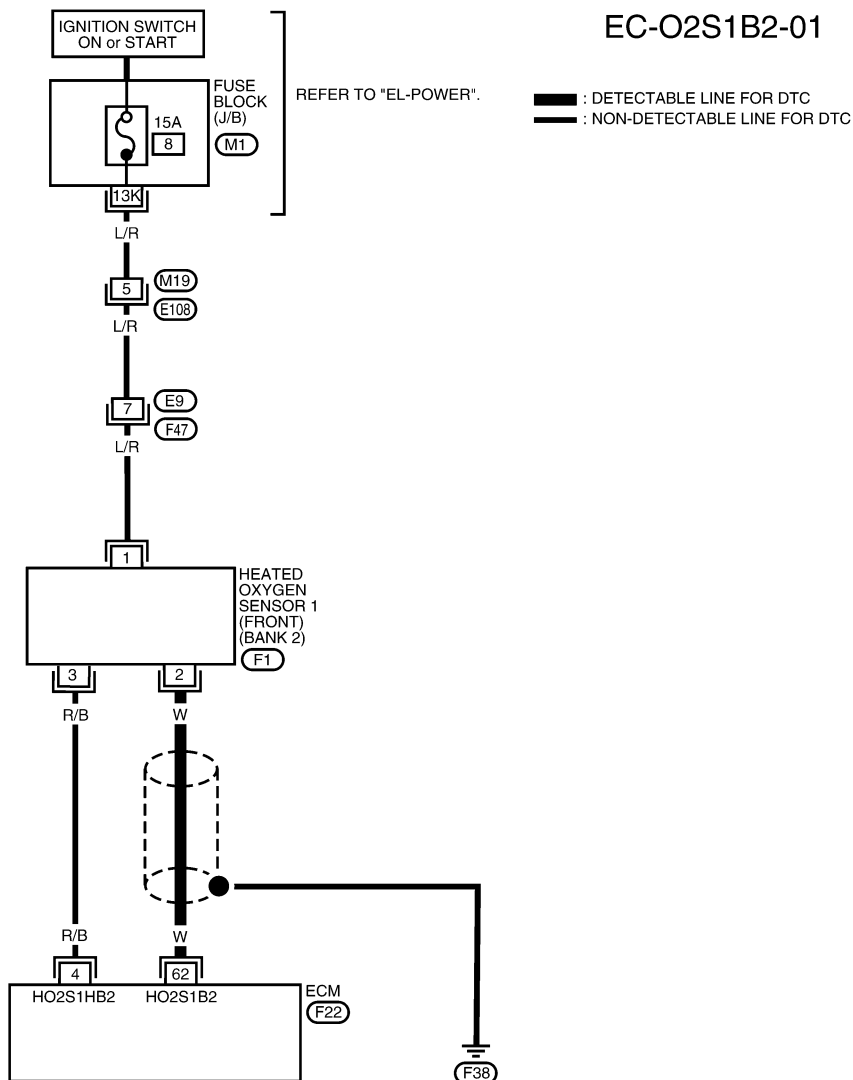
DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

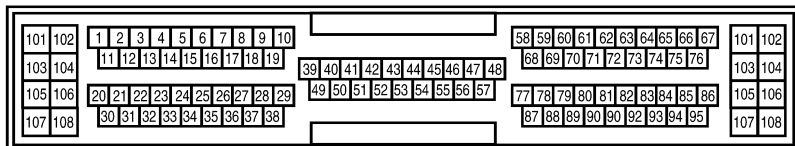
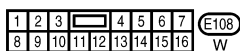
Wiring Diagram (Cont'd)

BANK 2

NIEC0125S04



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WEC877

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V (V)

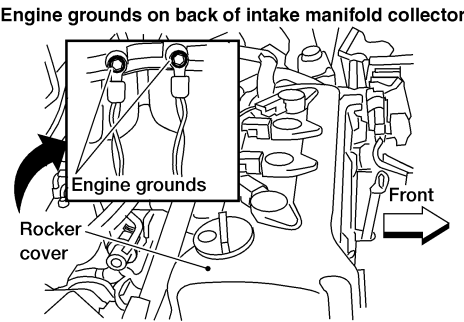
WEC888

DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

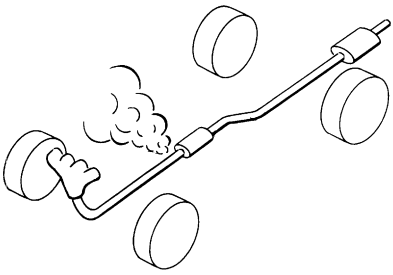
Diagnostic Procedure

Diagnostic Procedure

NIEC0126

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p>	
	
WEC249	
▶	GO TO 2.

2	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<p>Loosen and retighten the corresponding heated oxygen sensor 1 (front).</p> <p>Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
▶	GO TO 3.

3	CHECK EXHAUST AIR LEAK
<p>1. Start engine and run it at idle.</p> <p>2. Listen for an exhaust air leak before three way catalyst.</p>	
	
SEF099P	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace.

4	CHECK FOR INTAKE AIR LEAK
<p>Listen for an intake air leak after the mass air flow sensor.</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Repair or replace.

DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

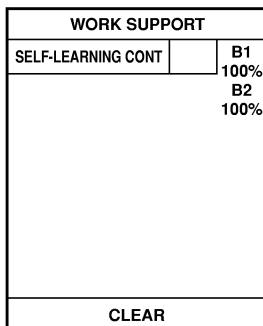
Diagnostic Procedure (Cont'd)

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5 CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".



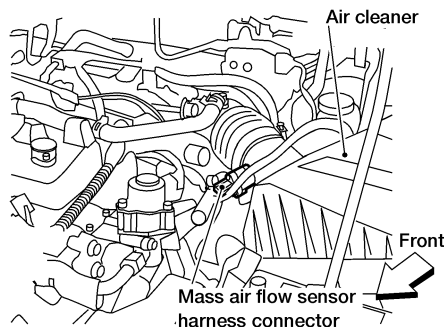
SEF652Y

4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0174 or P0172, P0175 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



WEC250

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0174 or P0172, P0175 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0174, P0172, P0175. Refer to EC-301, 310.
No	▶	GO TO 6.

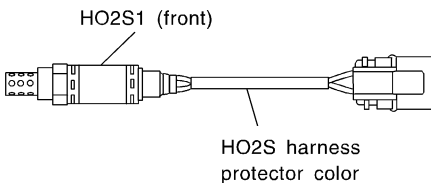
DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6 CHECK INPUT SIGNAL CIRCUIT

1. Check the HO2S1 (front) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) harness connector and ECM harness connector.



HO2S1 (front) (bank 1): Black
HO2S1 (front) (bank 2): Blue

LEC646

2. Check harness continuity between ECM terminal and HO2S1 (front) as follows. Refer to "Wiring Diagram", EC-238.

DTC	Terminals		Bank
	ECM	Sensor	
P0133	62	2	2
P0153	94	2	1

WEC892

Continuity should exist.

3. Check harness continuity between ECM terminal or HO2S1 (front) and ground as follows. Refer to "Wiring Diagram", EC-238.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0133	62 or 2	Ground	2
P0153	94 or 2	Ground	1

WEC893

Continuity should not exist.

4. Also check harness for short to power.

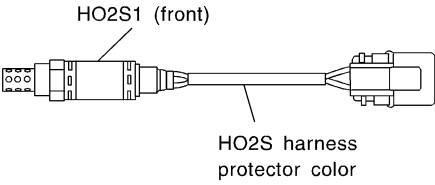
OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
<p>1. Turn ignition switch "OFF".</p> <p>2. Check the HO2S1 (front) harness protector color, and disconnect the corresponding HO2S1 (front) harness connector.</p>		
 <p style="margin-left: 100px;">HO2S1 (front)</p> <p style="margin-left: 100px;">HO2S harness protector color</p>		
<p>HO2S1 (front) (bank 1): Black HO2S1 (front) (bank 2): Blue</p>		
<p>3. Check HO2S1 heater (front), refer to EC-259.</p>		
LEC646		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace corresponding heated oxygen sensor 1 (front).

8	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-244.		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace corresponding heated oxygen sensor bank 1 (bank 2) sensor 1 (front).

9	CHECK MASS AIR FLOW SENSOR	
Refer to "Component Inspection", EC-182.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace mass air flow sensor.

10	CHECK PCV VALVE	
Refer to "Positive Crankcase Ventilation", EC-66.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Repair or replace PCV valve.

11	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

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DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Component Inspection

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

Bank 1	cycle	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1)/(B2) indicates RICH		
L means HO2S1 MNTR (B1)/(B2) indicates LEAN		

SEF647Y

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0127

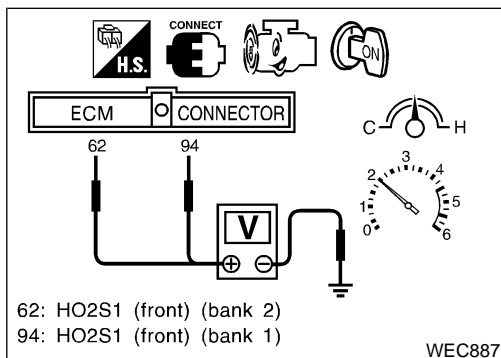
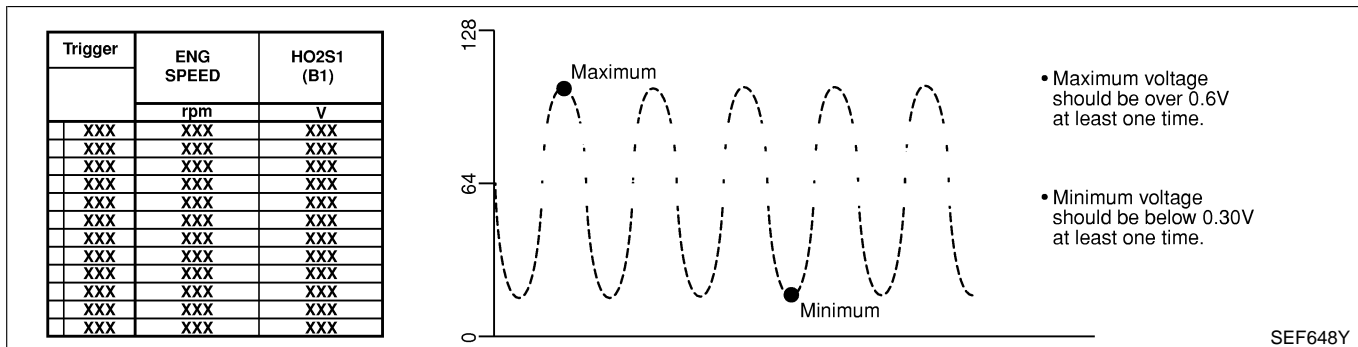
NIEC0127S02

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)/(B2)", "RICH"
L = "HO2S1 MNTR (B1)/(B2)", "LEAN"
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 (HO2S1 bank 2) or 94 (HO2S1 bank 1) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

**DTC P0133, P0153 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(RESPONSE MONITORING)**

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

GI

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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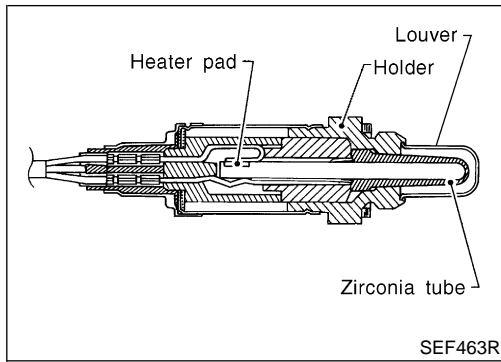
EL

IDX

DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

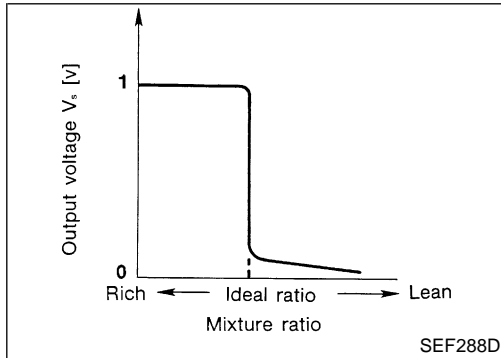
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0128

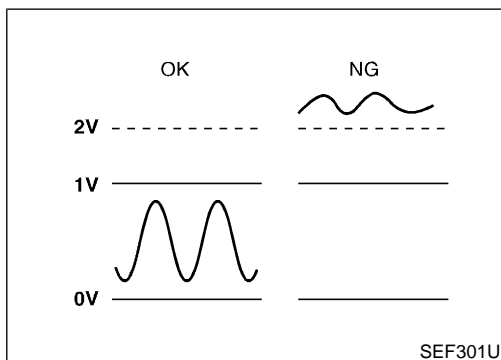


CONSULT-II Reference Value in Data Monitor Mode

NIEC0129

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)/(B2)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)/(B2)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 (front) output is not inordinately high.

NIEC0131

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0134	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)
P0154		

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

NIEC0132

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Restart engine and let it idle for 2 minutes.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-250.

Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Restart engine and let it idle for 2 minutes.
- 4) Turn ignition switch "OFF" and wait at least 10 seconds.
- 5) Restart engine and let it idle for 2 minutes.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-250.

- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

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DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Wiring Diagram

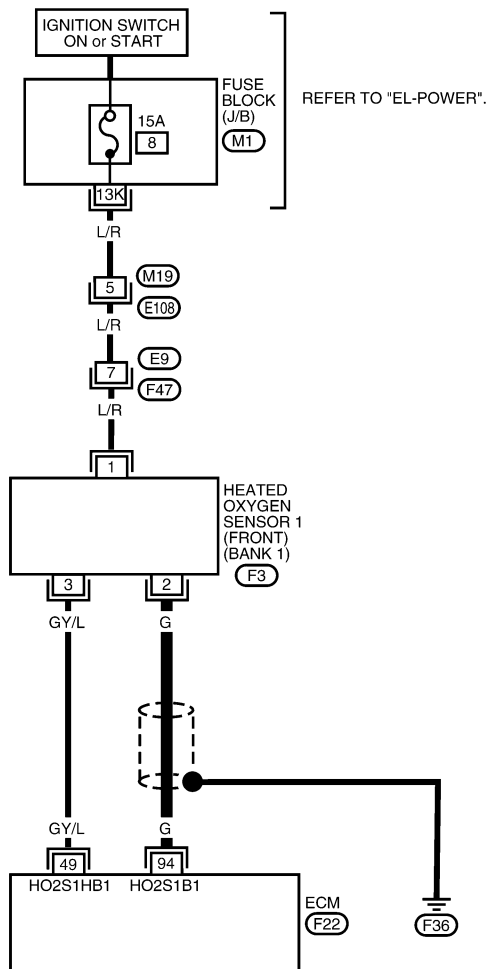
Wiring Diagram

NIEC0133

NIEC0133S03

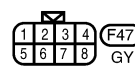
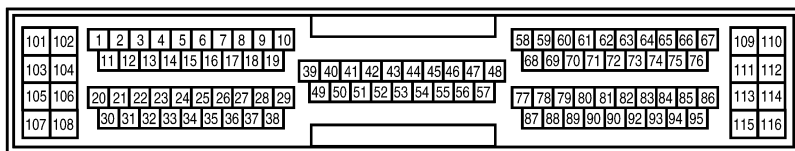
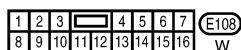
BANK 1

EC-O2S1B1-01



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "EL-POWER".



WEC878

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
94	G	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

WEC889

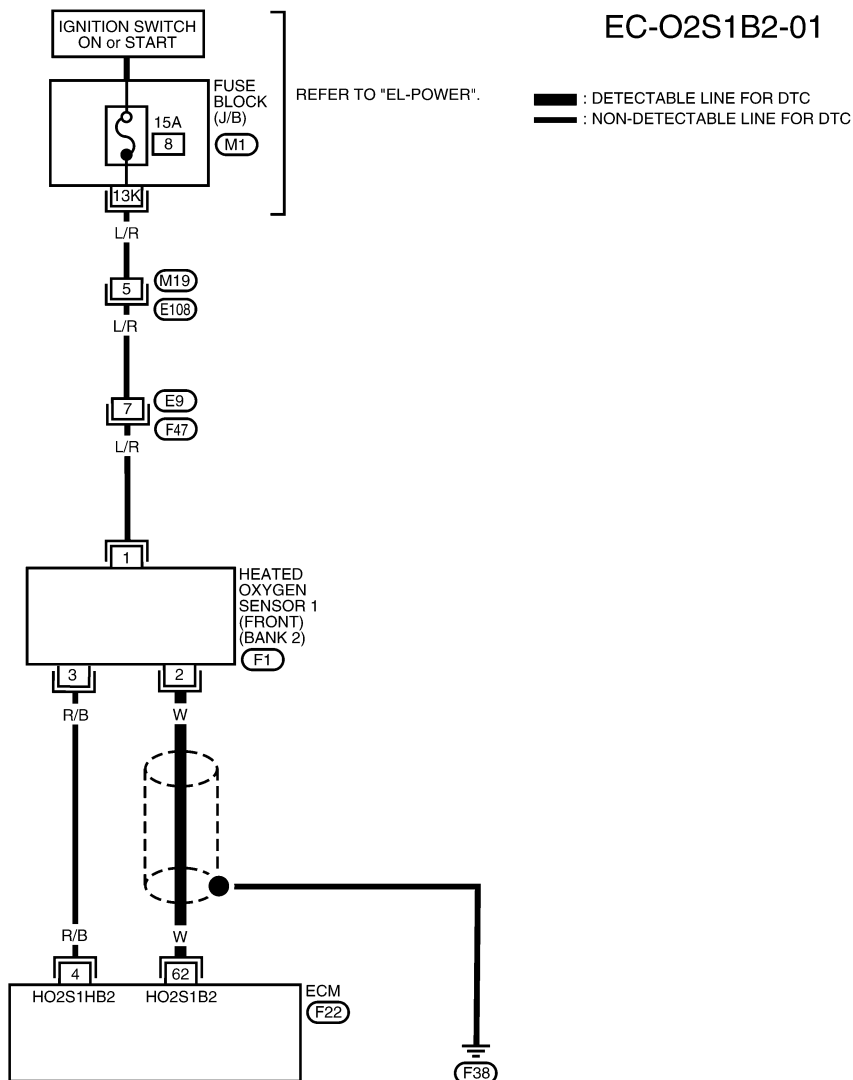
DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

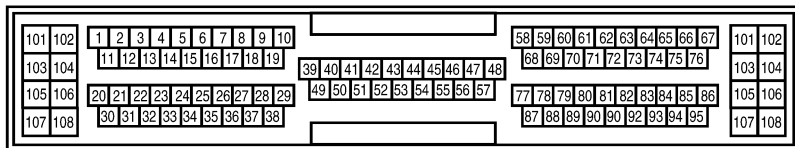
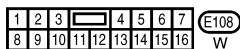
Wiring Diagram (Cont'd)

BANK 2

NIEC0133S04



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WEC877

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT) (BANK 2)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V (V)

WEC888


**DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2)
(HIGH VOLTAGE)**

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0134

1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
Loosen and retighten the corresponding heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)	
	GO TO 2.

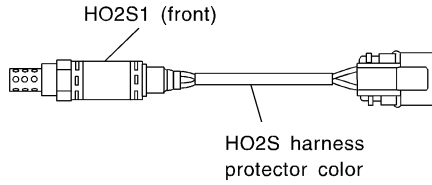
DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

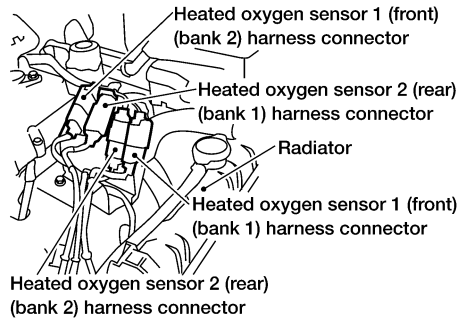
2 CHECK INPUT SIGNAL CIRCUIT

1. Check the HO2S1 (front) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) harness connector and ECM harness connector.



HO2S1 (front) (bank 1): Black
HO2S1 (front) (bank 2): Blue

LEC646



WEC835

2. Check harness continuity between ECM terminal and HO2S1 (front) as follows. Refer to "Wiring Diagram", EC-248.

DTC	Terminals		Bank
	ECM	Sensor	
P0134	62	2	2
P0154	94	2	1

WEC894

Continuity should exist.

3. Check harness continuity between ECM terminal or HO2S1 (front) and ground. Refer to "Wiring Diagram", EC-248.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0134	62 or 2	Ground	2
P0154	94 or 2	Ground	1

WEC895

Continuity should not exist.

4. Also check harness for short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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DTC P0134, P0154 HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK HARNESS CONNECTOR
Check heated oxygen sensor 1 (front) harness connector for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace harness connector.

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)
Refer to "Component Inspection", EC-252.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace corresponding heated oxygen sensor.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

Bank 1	cycle	1 2 3 4 5
	HO2S1 MNTR (B1)	R-L-R-L-R-L-R-L-R-L-R
Bank 2	cycle	1 2 3 4 5
	HO2S1 MNTR (B2)	R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1)/(B2) indicates RICH		
L means HO2S1 MNTR (B1)/(B2) indicates LEAN		

SEF647Y

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0135

NIEC0135S01

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)/(B2)" and "HO2S1 MNTR (B1)/(B2)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)/(B2)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)/(B2)", "RICH"
L = "HO2S1 MNTR (B1)/(B2)", "LEAN"
 - "HO2S1 (B1)/(B2)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)/(B2)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)/(B2)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

Description

Description

NIEC0136

SYSTEM DESCRIPTION

NIEC0136S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Heated oxygen sensor 1 heater (front) control	Heated oxygen sensor 1 heater (front)

The ECM performs ON/OFF control of the heated oxygen sensor 1 heater (front) corresponding to the engine operating condition.

OPERATION

NIEC0136S02

Engine speed	Heated oxygen sensor 1 heater (front)
Above 3,600 rpm	OFF
Below 3,600 rpm	ON

CONSULT-II Reference Value in Data Monitor Mode

NIEC0137

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)/(B2)	● Engine speed: Below 3,600 rpm	ON
	● Engine speed: Above 3,600 rpm	OFF

On Board Diagnosis Logic

NIEC0139

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0135	● The current amperage in the heated oxygen sensor 1 heater (front) circuit is out of the normal range. (An improper voltage drop signal is sent to ECM through the front heated oxygen sensor heater.)	● Harness or connectors (The heated oxygen sensor 1 heater (front) circuit is open or shorted.) ● Heated oxygen sensor 1 heater (front)
P0155		

DTC Confirmation Procedure

NIEC0140

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 6 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-258.

With GST

- 1) Start engine and run it for at least 6 seconds at idle speed.
 - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 3) Start engine and run it for at least 6 seconds at idle speed.
 - 4) Select "MODE 3" with GST.
 - 5) If DTC is detected, go to "Diagnostic Procedure", EC-258.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

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DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

Wiring Diagram

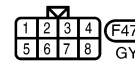
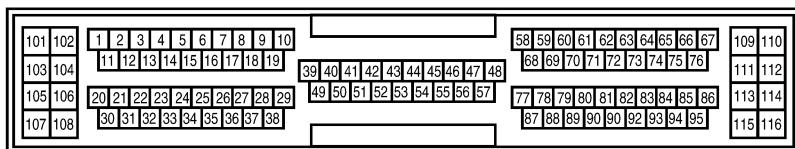
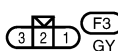
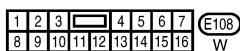
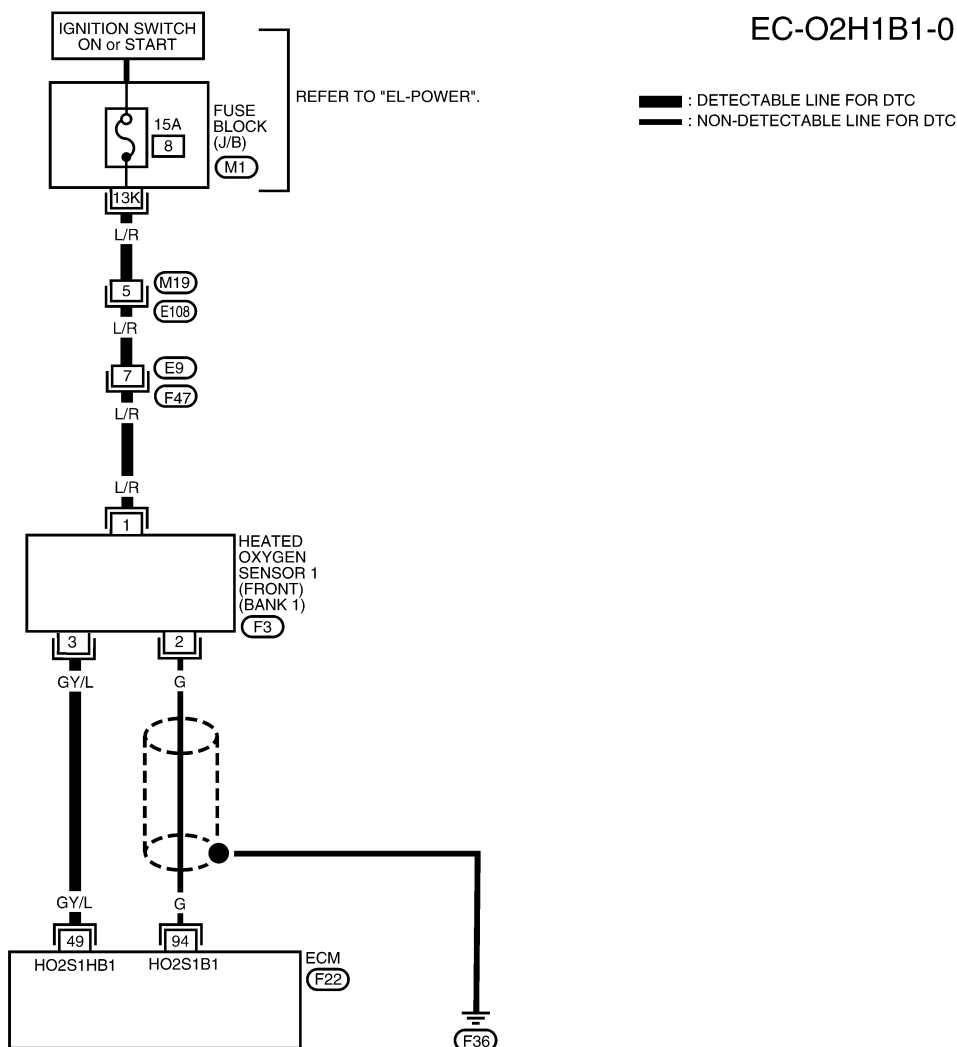
Wiring Diagram

NIEC0141

NIEC0141S03

BANK 1

EC-O2H1B1-01



WEC880

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
49	GY/L	HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)	ENGINE RUNNING BELOW 3,600 RPM	0 - 1.0V
			ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE

WEC897

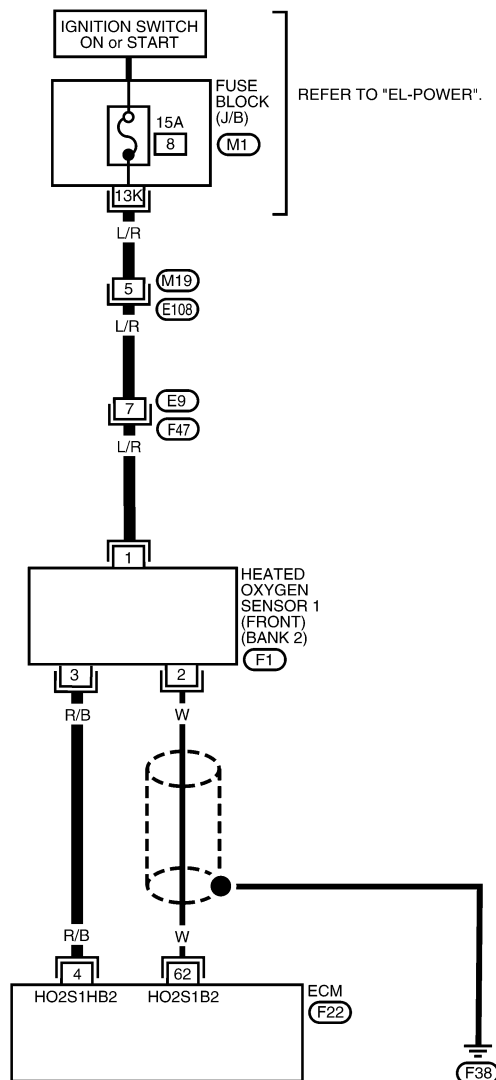
DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

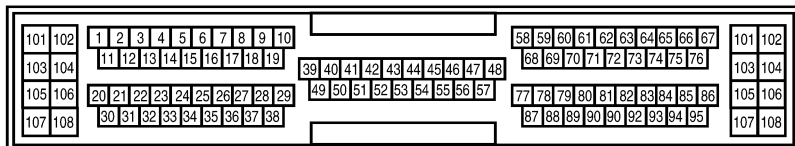
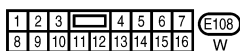
Wiring Diagram (Cont'd)

BANK 2

NIEC0141S04



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WEC879

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
4	R/B	HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 2)	ENGINE RUNNING BELOW 3,600 RPM	0 - 1.0V
			ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE

WEC896

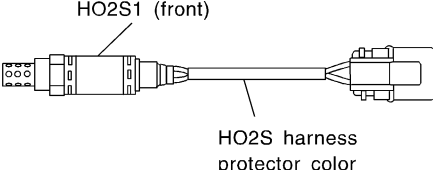
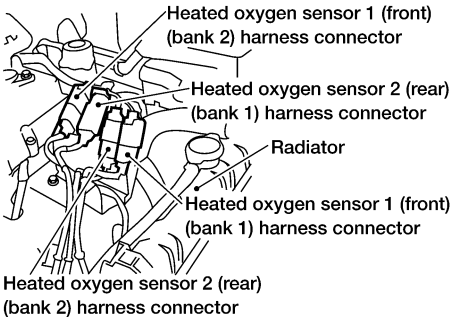
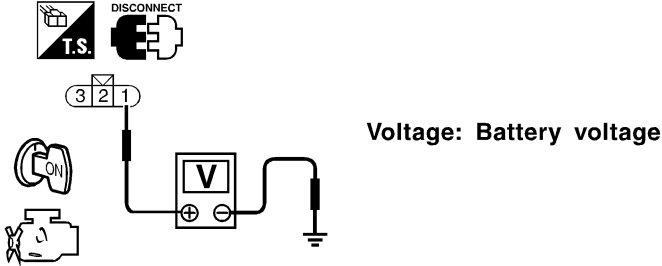
DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0142

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Check the HO2S1 (front) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) harness connector.</p> <div style="text-align: center;">  <p>HO2S1 (front)</p> <p>HO2S harness protector color</p> </div> <div style="text-align: center; margin-top: 20px;"> <p>HO2S1 (front) (bank 1): Black HO2S1 (front) (bank 2): Blue</p> </div> <div style="text-align: center; margin-top: 20px;">  <p>Heated oxygen sensor 1 (front) (bank 2) harness connector</p> <p>Heated oxygen sensor 2 (rear) (bank 1) harness connector</p> <p>Radiator</p> <p>Heated oxygen sensor 1 (front) (bank 1) harness connector</p> <p>Heated oxygen sensor 2 (rear) (bank 2) harness connector</p> </div> <p style="text-align: right; margin-right: 20px;">LEC646</p> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between HO2S1 (front) terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center; margin-top: 20px;">  <p>DISCONNECT</p> <p>Voltage: Battery voltage</p> </div> <p style="text-align: right; margin-right: 20px;">WEC835</p> <p style="text-align: center; margin-top: 20px;">OK or NG</p> <p style="text-align: right; margin-right: 20px;">SEF934X</p>
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors M19, E108 ● 15A fuse ● Harness for open or short between heated oxygen sensor 1 (front) and fuse <p style="text-align: center; margin-top: 10px;">▶ Repair harness or connectors.</p>
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DTC P0135, P0155 HEATED OXYGEN SENSOR 1 HEATER (FRONT) (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK OUTPUT SIGNAL CIRCUIT															
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal and HO2S1 (front) as follows. Refer to "Wiring Diagram", EC-256.</p>																
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">DTC</th> <th colspan="2">Terminals</th> <th rowspan="2">Bank</th> </tr> <tr> <th>ECM</th> <th>Sensor</th> </tr> </thead> <tbody> <tr> <td>P0135</td> <td style="text-align: center;">4</td> <td style="text-align: center;">3</td> <td style="text-align: center;">2</td> </tr> <tr> <td>P0155</td> <td style="text-align: center;">49</td> <td style="text-align: center;">3</td> <td style="text-align: center;">1</td> </tr> </tbody> </table>			DTC	Terminals		Bank	ECM	Sensor	P0135	4	3	2	P0155	49	3	1
DTC	Terminals			Bank												
	ECM	Sensor														
P0135	4	3	2													
P0155	49	3	1													
WEC898																
<p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>																
OK	▶	GO TO 4.														
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.														

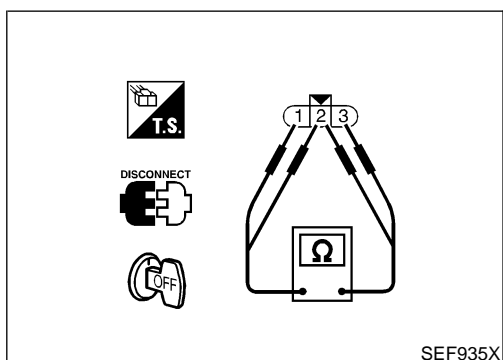
GI
MA
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LC
EC

4	CHECK HEATED OXYGEN SENSOR 1 HEATER	
Refer to "Component Inspection", EC-259.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace corresponding heated oxygen sensor 1 (front).

CL
MT
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5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

AX
SU



Component Inspection HEATED OXYGEN SENSOR 1 HEATER (FRONT)

NIEC0143
NIEC0143S01

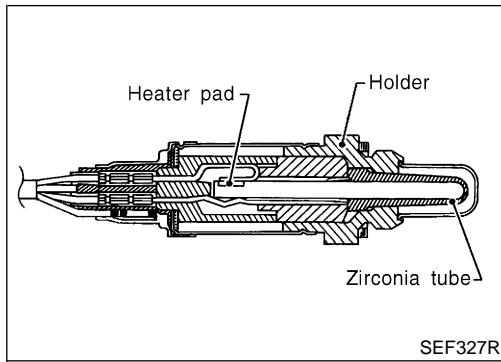
- Check resistance between terminals 3 and 1.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
- Check continuity between terminals 2 and 1, 3 and 2.
Continuity should not exist.
- If NG, replace the heated oxygen sensor 1 (front).

- CAUTION:**
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
 - Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0144

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the rear heated oxygen sensor.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

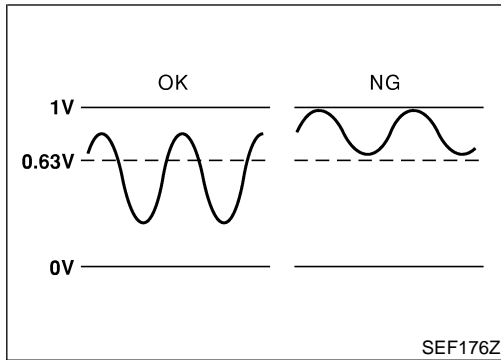
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0145

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)/(B2)	● Engine: After warming up	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)/(B2)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0147

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0137	● The minimum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors
P0157		

DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

NIEC0148

6

HO2S (B1) P0137

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF659Y

8

HO2S (B1) P0137

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm 2300 rpm 2800 rpm

SEF660Y

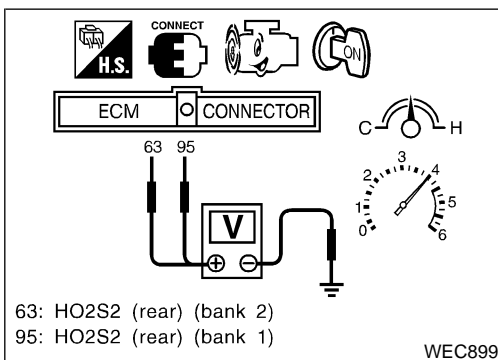
8

HO2S (B1) P0137

COMPLETED

SELF-DIAG RESULTS

SEF661Y



DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1)/(B2) P0137 (P0157)" of "HO2S2 (B1)/(B2)" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-264.
If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0149

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.43V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage.
Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.43V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-264.

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DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Wiring Diagram

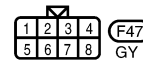
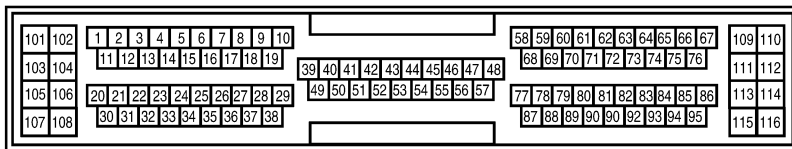
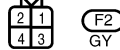
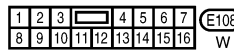
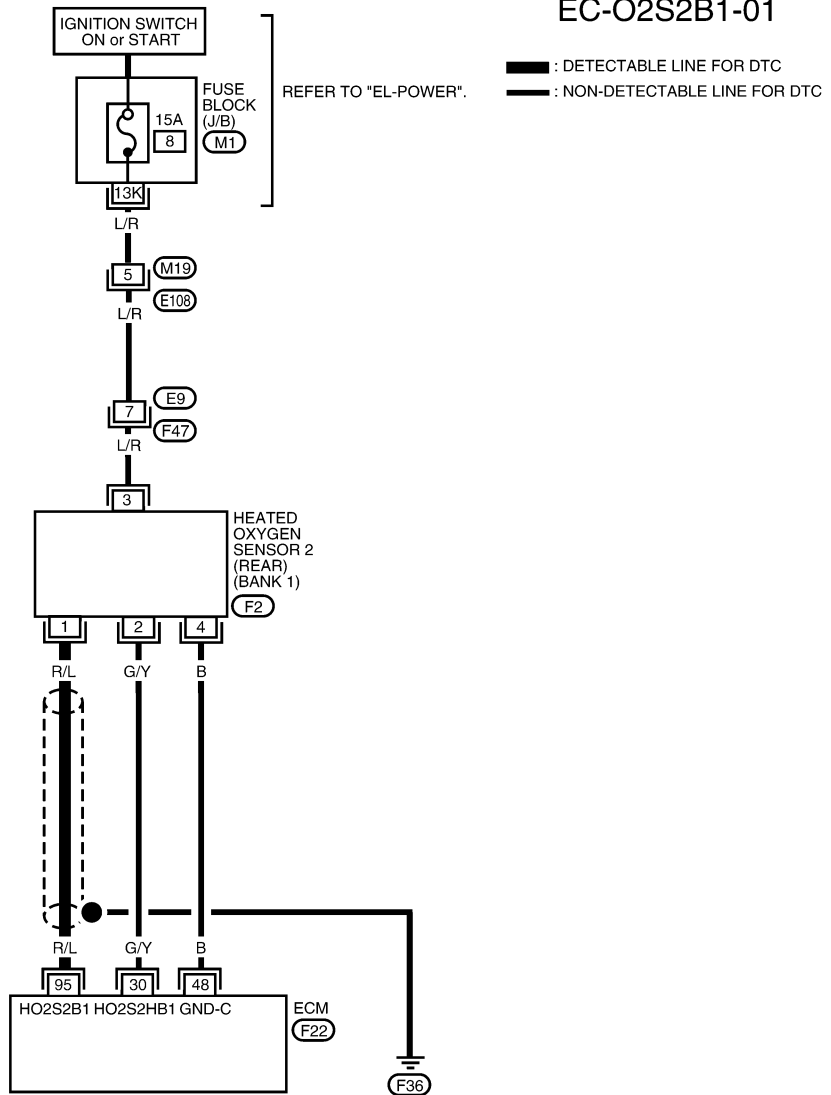
Wiring Diagram

NIEC0150

NIEC0150S03

BANK 1

EC-O2S2B1-01



WEC882

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	R/L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC914

DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING)

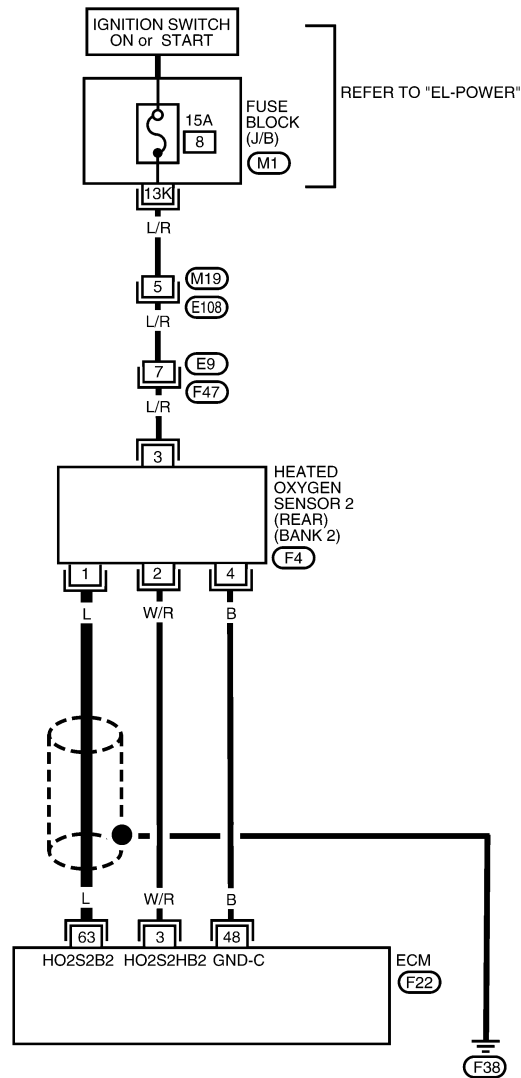
QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

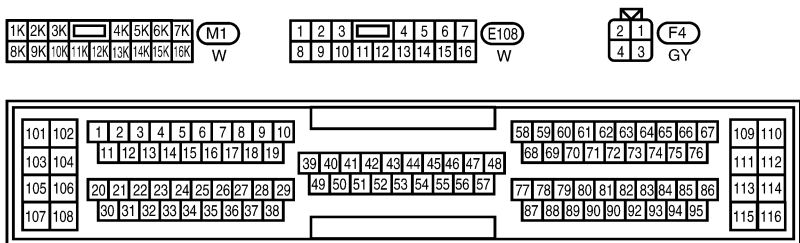
BANK 2

NIEC0150S04

EC-O2S2B2-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC881

WEC900

DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure

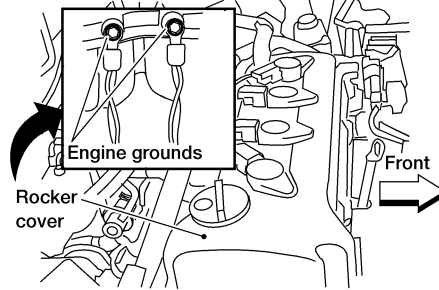
Diagnostic Procedure

NIEC0151

1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249



GO TO 2.

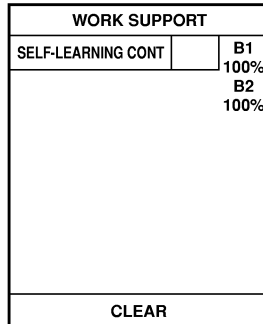
DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

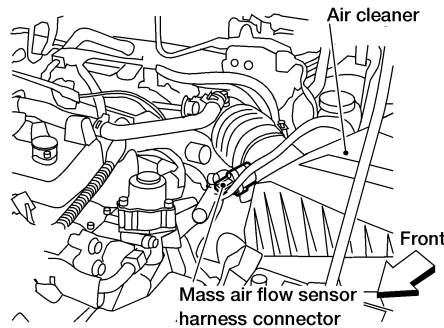


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 or P0175 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



WEC250

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 or P0175 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172 or P0175. Refer to EC-310.
No	▶	GO TO 3.

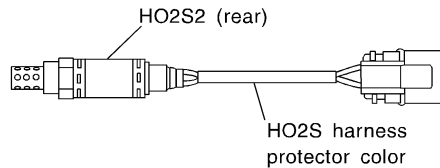
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DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

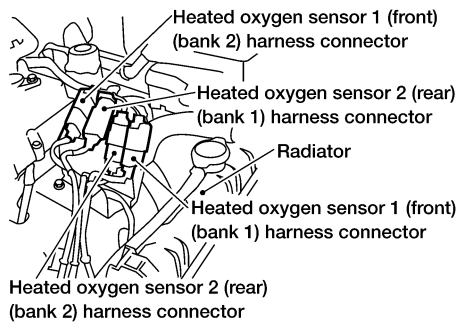
3 CHECK INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Check the HO2S2 (rear) harness protector color, and disconnect the corresponding heated oxygen sensor 2 (rear) harness connector and ECM harness connector.



HO2S2 (rear) (bank 1): White or Gray
 HO2S2 (rear) (bank 2): Red or Reddish brown

SEF471Y



WEC835

3. Check harness continuity between ECM terminal and HO2S2 (rear) terminal as follows. Refer to "Wiring Diagram", EC-262.

DTC	Terminals		Bank
	ECM	Sensor	
P0137	63	1	2
P0157	95	1	1

WEC901

Continuity should exist.

4. Check harness continuity between ECM terminal or HO2S2 (rear) and ground as follows. Refer to "Wiring Diagram", EC-262.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0137	63 or 1	Ground	2
P0157	95 or 1	Ground	1

WEC902

Continuity should not exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK GROUND CIRCUIT	
1. Check harness continuity between HO2S2 (rear) terminal 4 and body ground. Refer to "Wiring Diagram", EC-262. Continuity should exist.		
2. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-267.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
		▶ INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection

HEATED OXYGEN SENSOR 2 (REAR)

NIEC0152

NIEC0152S01

Ⓜ With CONSULT-II

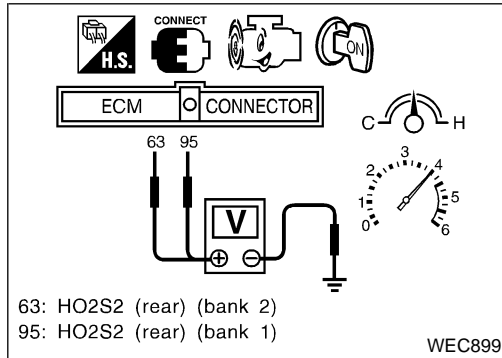
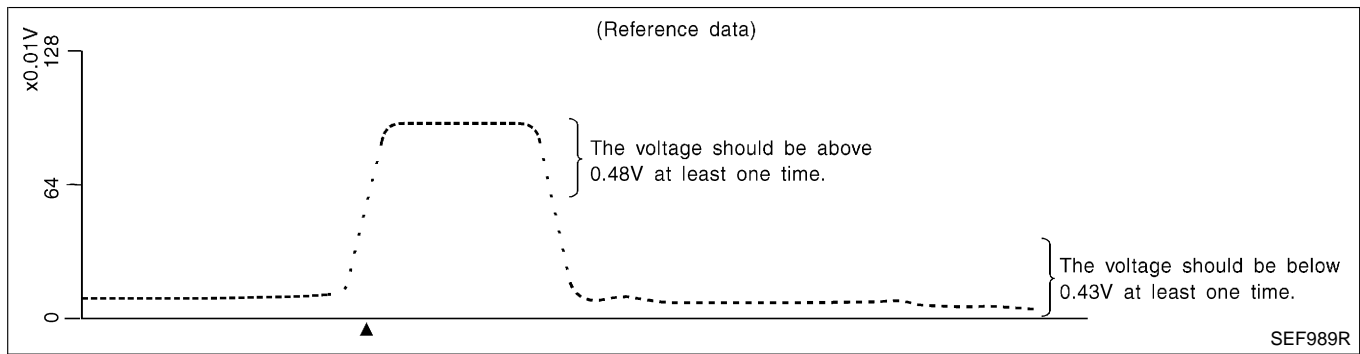
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.
 "HO2S2 (B1)/(B2)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)/(B2)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0137, P0157 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MIN. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

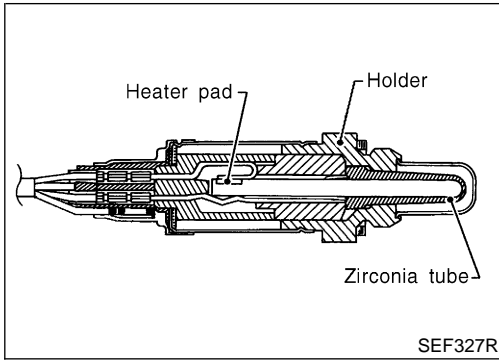
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0153

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the rear heated oxygen sensor.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

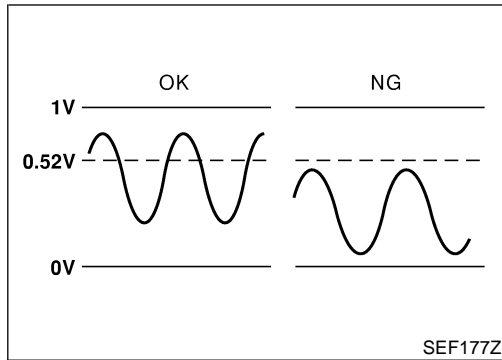
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0154

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)/(B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)/(B2)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0156

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of rear heated oxygen sensor, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0138	● The maximum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks
P0158		

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

6
HO2S2 (B1) P0138

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF663Y

8
HO2S2 (B1) P0138

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm 2300 rpm 2800 rpm

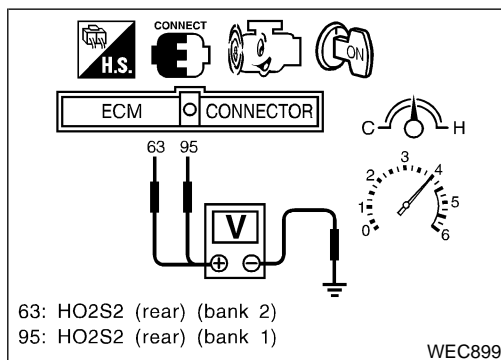
SEF664Y

8
HO2S2 (B1) P0138

COMPLETED

SELF-DIAG RESULTS

SEF665Y



DTC Confirmation Procedure

NIEC0157

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1)/(B2) P0138 (P0158)" of "REAR O2 SENSOR" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-273.
If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0158

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage.
Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be above 0.48V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-273.

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

BANK 1

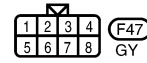
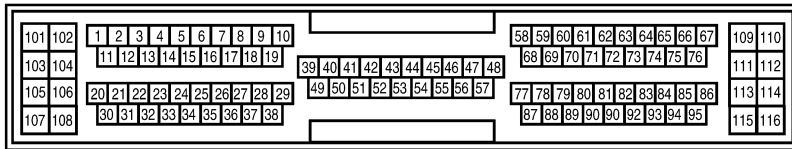
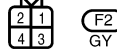
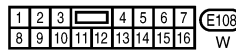
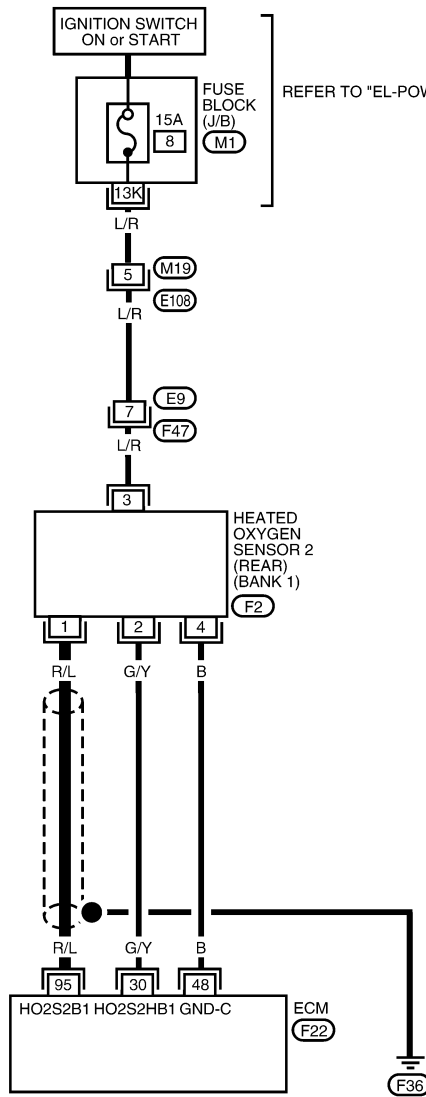
NIEC0159

NIEC0159S03

EC-O2S2B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

REFER TO "EL-POWER".



WEC882

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	R/L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC914

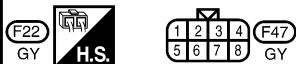
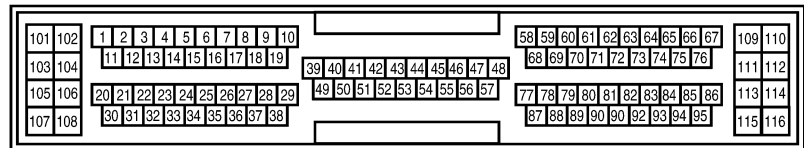
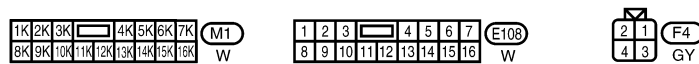
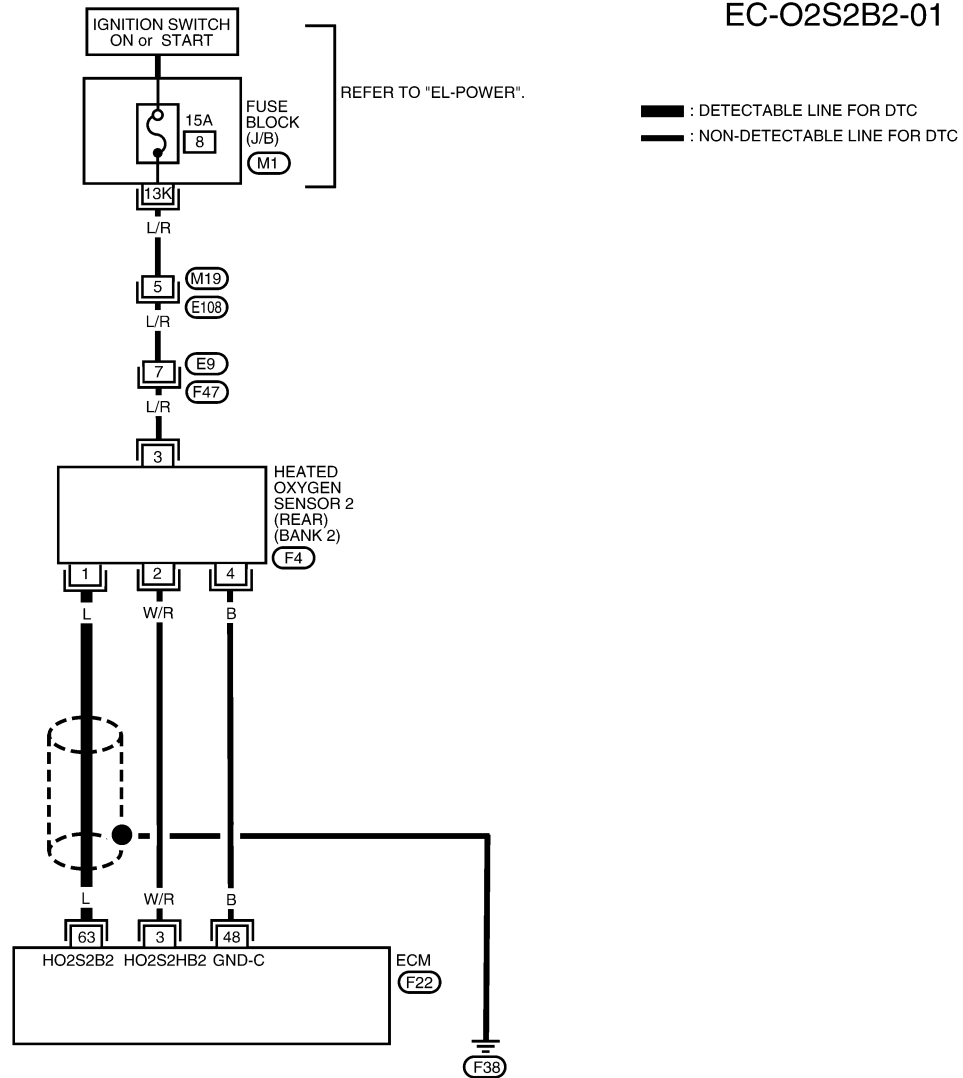
DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

BANK 2

NIEC0159S04

EC-O2S2B2-01



WEC881

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

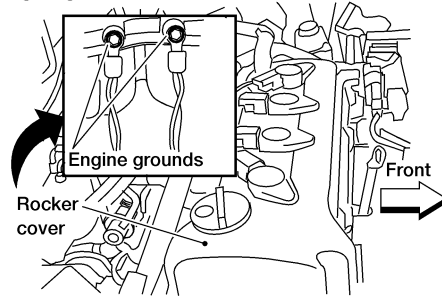
WEC900

**DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2)
(MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)**

Diagnostic Procedure

Diagnostic Procedure

NIEC0160

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine grounds on back of intake manifold collector</p>  <p style="text-align: right;">WEC249</p>	
▶	GO TO 2.

- GI
- MA
- EM
- LC
- EC**
- FE
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- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA
----------	-------------------------------------

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

WORK SUPPORT	
SELF-LEARNING CONT	B1 100%
	B2 100%
CLEAR	

SEF652Y

4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0174 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.

WEC250

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0174 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0174. Refer to EC-301.
No	▶	GO TO 3.

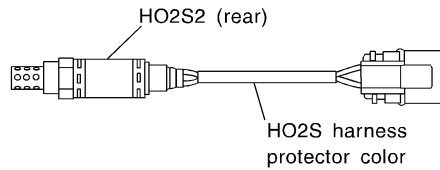
DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

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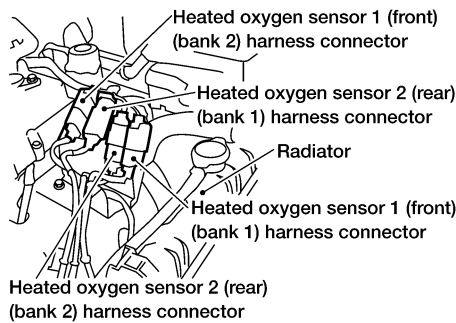
3 CHECK INPUT SIGNAL CIRCUIT

- Turn ignition switch "OFF".
- Check the HO2S2 (rear) harness protector color, and disconnect the corresponding heated oxygen sensor 2 (rear) harness connector and ECM harness connector.



HO2S2 (rear) (bank 1): White or Gray
HO2S2 (rear) (bank 2): Red or Reddish brown

SEF471Y



WEC835

- Check harness continuity between ECM terminal and HO2S2 (rear) terminal as follows. Refer to "Wiring Diagram", EC-271.

DTC	Terminals		Bank
	ECM	Sensor	
P0138	63	1	2
P0158	95	1	1

WEC903

Continuity should exist.

- Check harness continuity between ECM terminal or HO2S2 (rear) and ground as follows. Refer to "Wiring Diagram", EC-271.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0138	63 or 1	Ground	2
P0158	95 or 1	Ground	1

WEC904

Continuity should not exist.

- Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK GROUND CIRCUIT	
1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to "Wiring Diagram", EC-271. Continuity should exist.		
2. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-276.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection

HEATED OXYGEN SENSOR 2 (REAR)

NIEC0161

NIEC0161S01

④ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.
 "HO2S2 (B1)/(B2)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

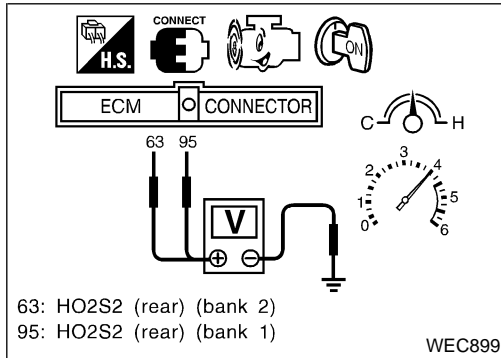
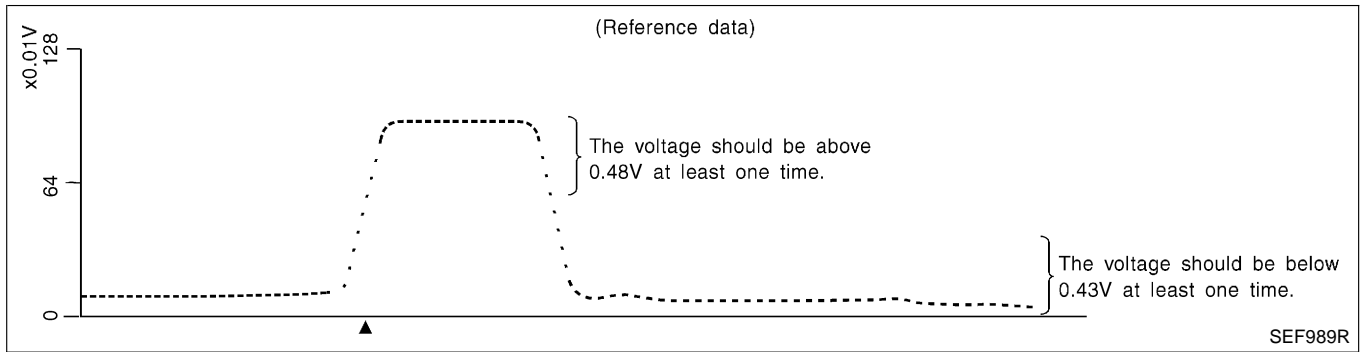
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0138, P0158 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (MAX. VOLTAGE MONITORING)

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.43V at least once.

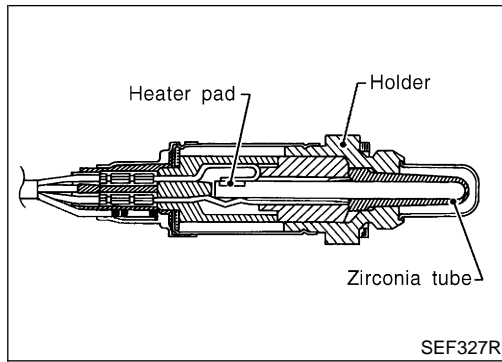
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0162

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the rear heated oxygen sensor.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

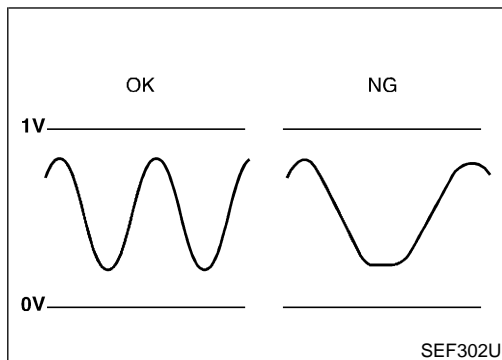
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0163

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)/(B2)	● Engine: After warming up	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)/(B2)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0165

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of rear heated oxygen sensor, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0139	● It takes more than the specified time for the sensor to respond between rich and lean.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic (Cont'd)

6

HO2S2 (B1) P0139

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF666Y

8

HO2S2 (B1) P0139

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm 2300 rpm 2800 rpm

SEF667Y

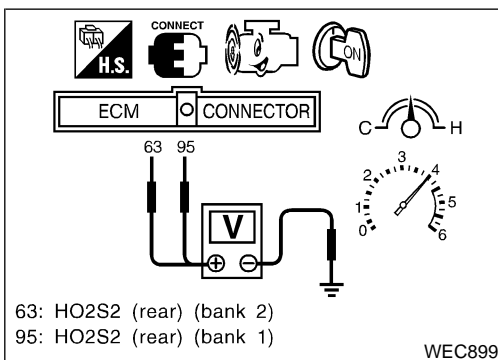
8

HO2S2 (B1) P0139

COMPLETED

SELF-DIAG RESULTS

SEF668Y



DTC Confirmation Procedure

NIEC0166

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1)/(B2) P0139 (P0159)" of "REAR O2 SENSOR" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-282.
If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0167

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Ⓜ With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should change at more than 0.06V for 1 second during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-282.

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DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

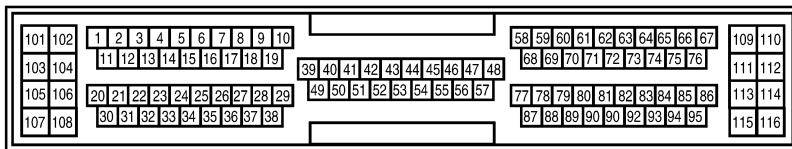
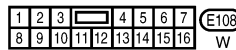
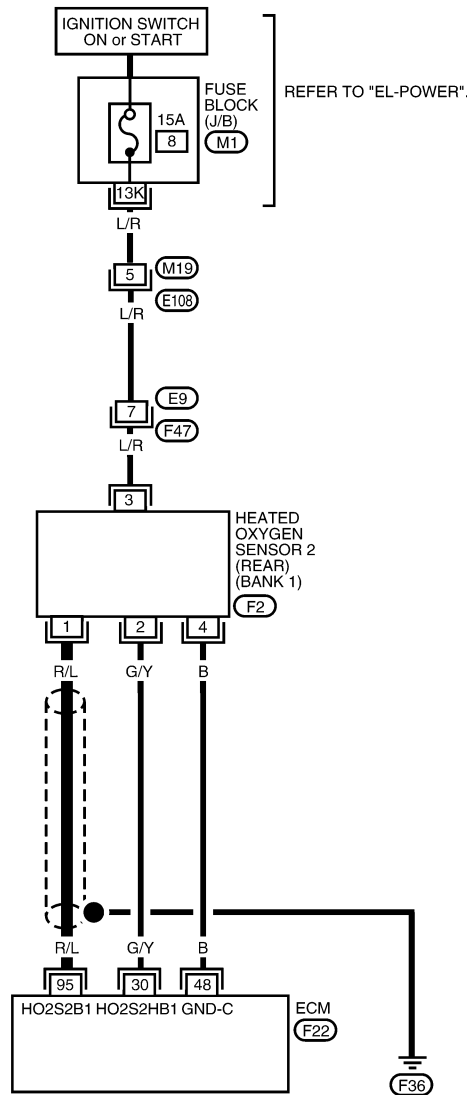
NIEC0168

NIEC0168S03

BANK 1

EC-O2S2B1-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC882

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	R/L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC914

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

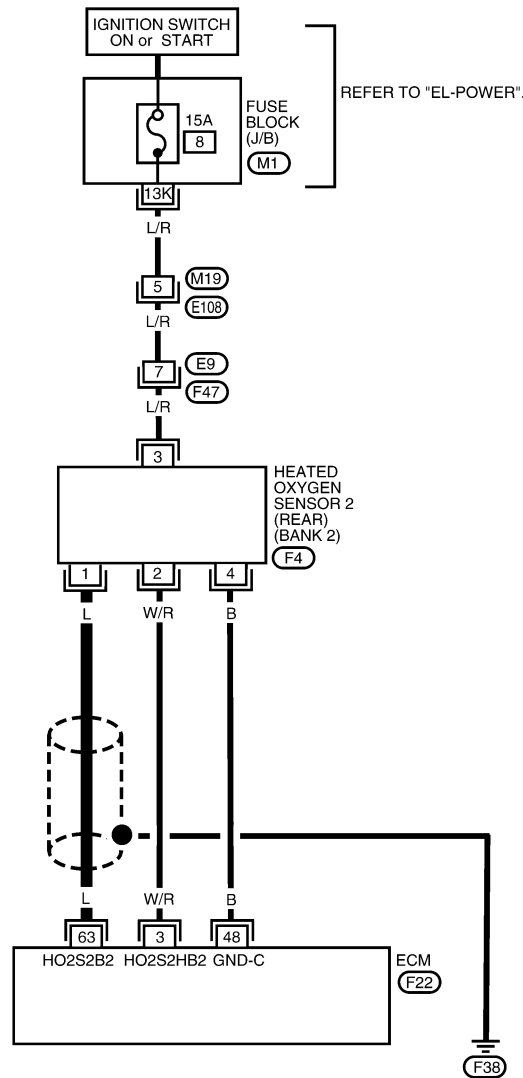
QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

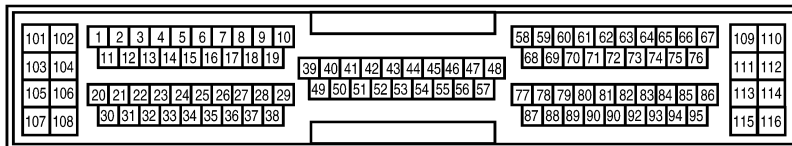
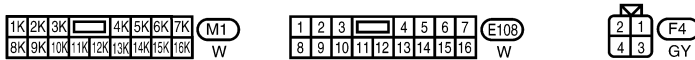
BANK 2

NIEC0168S04

EC-O2S2B2-01



— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



WEC881

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC900

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure

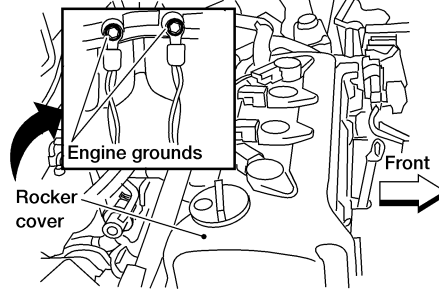
Diagnostic Procedure

NIEC0169

1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249



GO TO 2.

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

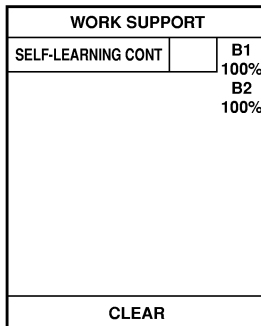
Diagnostic Procedure (Cont'd)

GI
MA
EM
LC
EC
FE
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MT
AT
AX
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HA
SC
EL
IDX

2 CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".



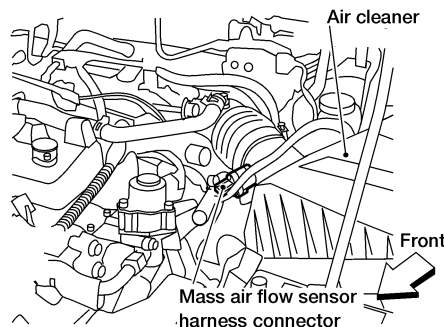
SEF652Y

4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174, P0175 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



WEC250

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-98.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171, P0172, P0174, P0175 detected? Is it difficult to start engine?

Yes or No

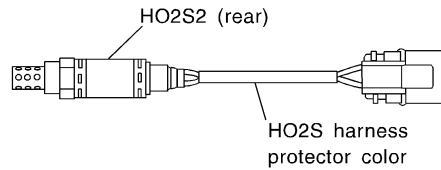
Yes	▶	Perform trouble diagnosis for DTC P0171, P0172, P0174, P0175. Refer to EC-301.
No	▶	GO TO 3.

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

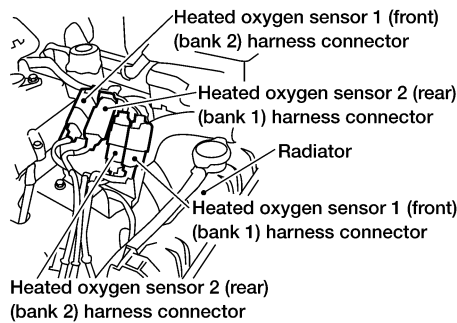
3 CHECK INPUT SIGNAL CIRCUIT

1. Turn ignition switch "OFF".
2. Check the HO2S2 (rear) harness protector color, and disconnect the corresponding heated oxygen sensor 2 (rear) harness connector and ECM harness connector.



HO2S2 (rear) (bank 1): White or Gray
 HO2S2 (rear) (bank 2): Red or Reddish brown

SEF471Y



WEC835

3. Check harness continuity between ECM terminal and HO2S2 (rear) terminal as follows. Refer to "Wiring Diagram", EC-280.

DTC	Terminals		Bank
	ECM	Sensor	
P0139	63	1	2
P0159	95	1	1

WEC905

Continuity should exist.

4. Check harness continuity between ECM terminal HO2S2 (rear) and ground as follows. Refer to "Wiring Diagram", EC-280.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0139	63 or 1	Ground	2
P0159	95 or 1	Ground	1

WEC906

Continuity should not exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK GROUND CIRCUIT	
1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to "Wiring Diagram", EC-280. Continuity should exist.		
2. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA
EM
LC

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-285.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 2 (rear).

EC
FE

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

CL
MT

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0170

NIEC0170S01

Ⓜ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.
 "HO2S2 (B1)/(B2)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

AT
AX
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CAUTION:

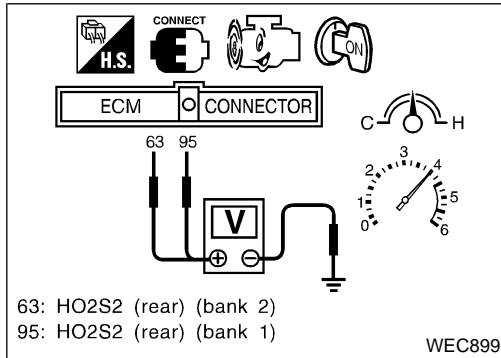
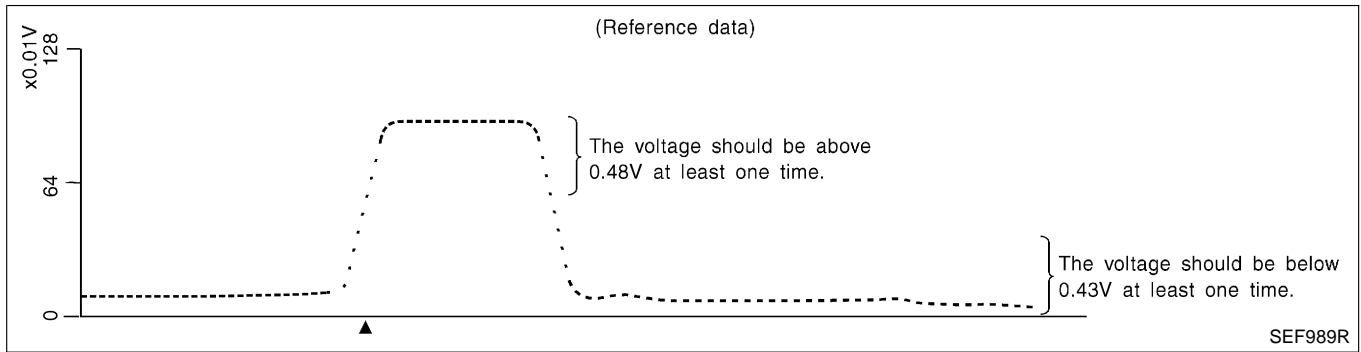
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

BT
HA
SC

EL
IDX

DTC P0139, P0159 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (RESPONSE MONITORING) QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.43V at least once.

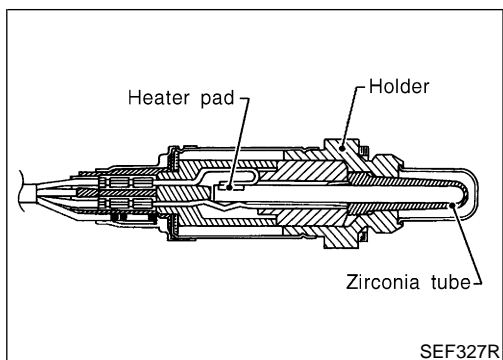
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0171

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the rear heated oxygen sensor.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

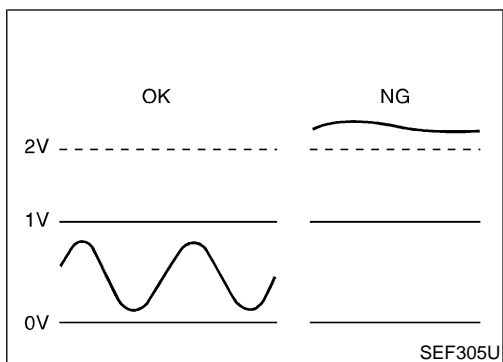
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0172

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)/(B2)	● Engine: After warming up	Revvng engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)/(B2)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0174

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of rear heated oxygen sensor, ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0140	● An excessively high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear)

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

DTC Confirmation Procedure

NIEC0175

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h

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DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE) QG18DE (EXC CALIF CA)

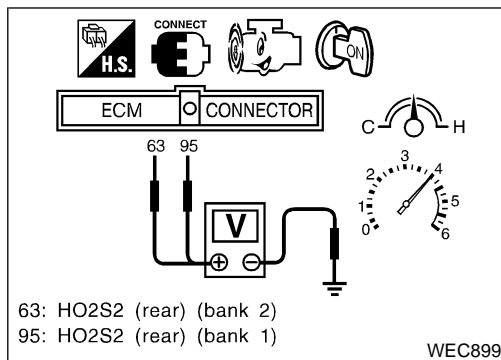
DTC Confirmation Procedure (Cont'd)

(43 MPH) for 2 consecutive minutes.

- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,000 - 3,000 rpm (A/T) 1,000 - 3,600 rpm (M/T)
VHCL SPEED SE	68 - 130 km/h (42 - 81 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec (A/T) 2.0 - 10.0 msec (M/T)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-291.



Overall Function Check

NIEC0176

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage after revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 2V during this procedure.
- 5) If NG, go to "Diagnostic Procedure", EC-291.

DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

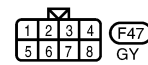
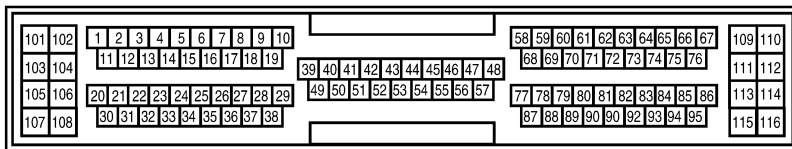
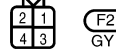
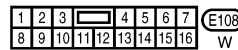
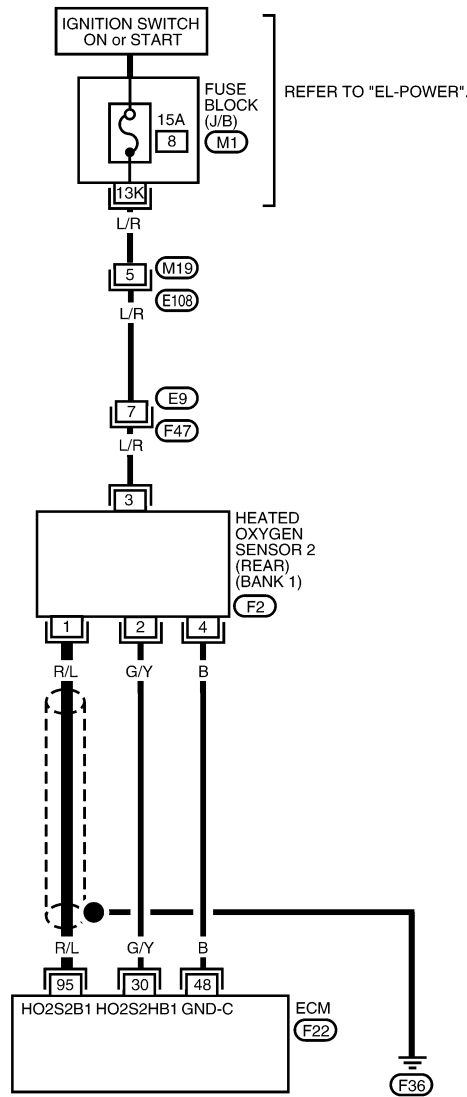
BANK 1

NIEC0177

NIEC0177S03

EC-O2S2B1-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



WEC882

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	R/L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC914

DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

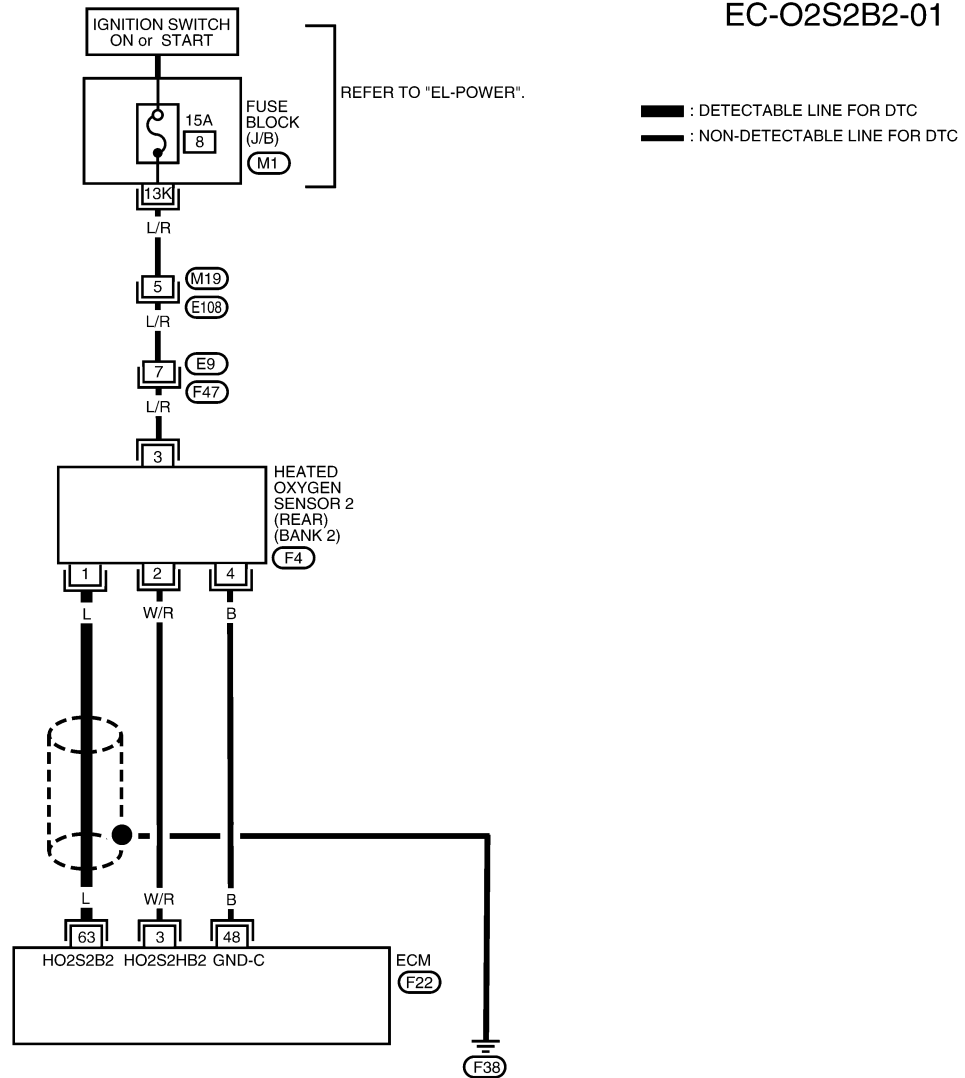
QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

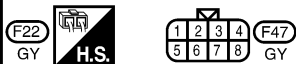
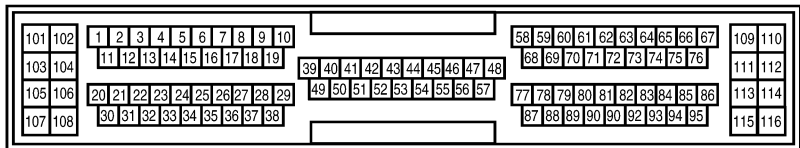
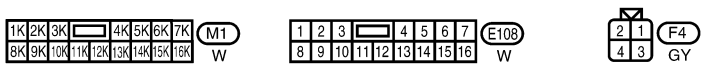
BANK 2

NIEC0177S04

EC-O2S2B2-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC881

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

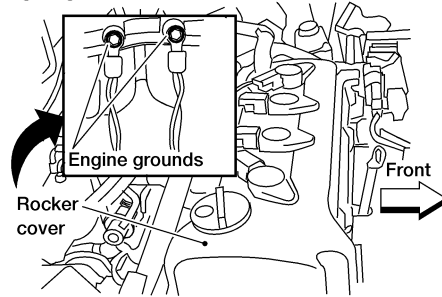
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR) (BANK 2)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

WEC900

Diagnostic Procedure

NIEC0178

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine grounds on back of intake manifold collector</p>  <p style="text-align: right;">WEC249</p>	
▶	GO TO 2.

- GI
- MA
- EM
- LC
- EC**
- FE
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- IDX

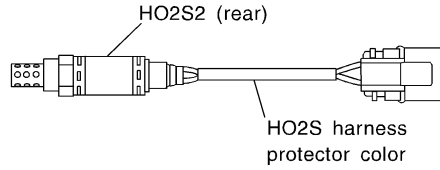
DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

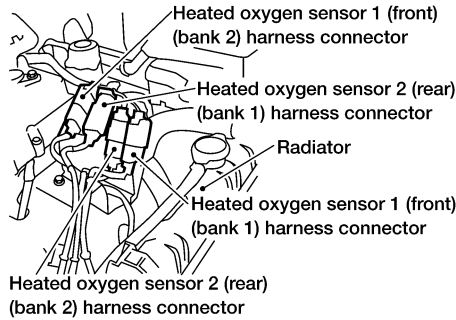
2 CHECK INPUT SIGNAL CIRCUIT

1. Check the HO2S2 harness protector color, and disconnect the corresponding heated oxygen sensor HO2S2 (rear) harness connector and ECM harness connector.



HO2S2 (rear) (bank 1): White or Gray
 HO2S2 (rear) (bank 2): Red or Reddish brown

SEF471Y



WEC835

2. Check harness continuity between ECM terminal HO2S2 (rear) terminal as follows. Refer to "Wiring Diagram", EC-289.

DTC	Terminals		Bank
	ECM	Sensor	
P0140	63	1	2
P0160	95	1	1

WEC907

Continuity should exist.

3. Check harness continuity between ECM terminal HO2S2 (rear) and ground as follows. Refer to "Wiring Diagram", EC-289.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0140	63 or 1	Ground	2
P0160	95 or 1	Ground	1

WEC908

Continuity should not exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	
1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to "Wiring Diagram", EC-289. Continuity should exist.		
2. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK HARNESS CONNECTOR	
Check heated oxygen sensor 2 (rear) harness connector for water. Water should not exist.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace harness connector.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-293.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0179

NIEC0179S01

④ With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)/(B2)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)/(B2)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.
 "HO2S2 (B1)/(B2)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.
 "HO2S2 (B1)/(B2)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and

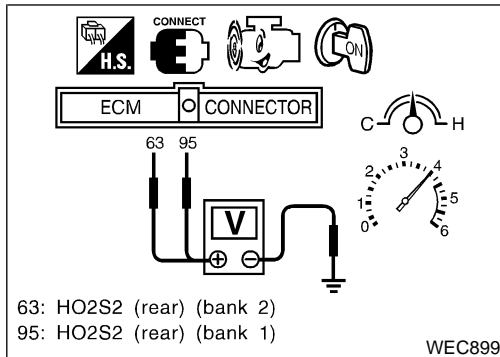
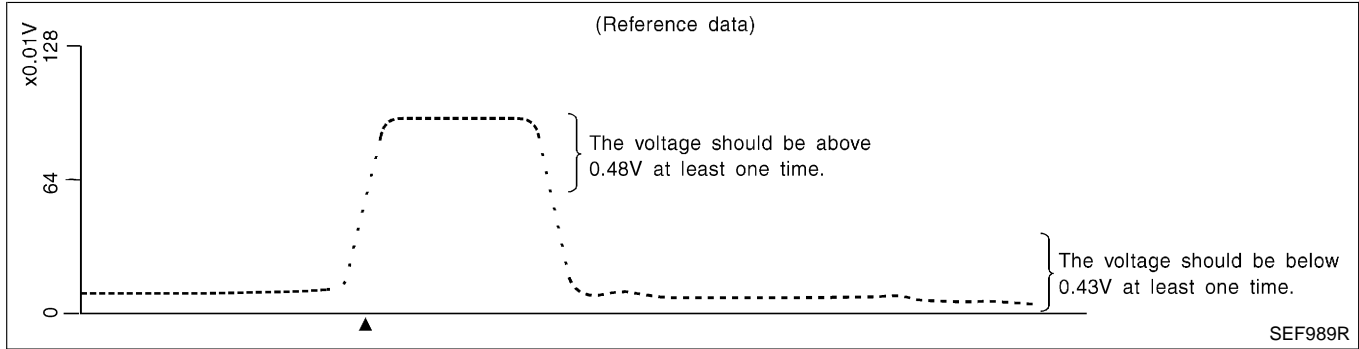
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DTC P0140, P0160 HEATED OXYGEN SENSOR 2 (REAR) (BANK 1)/(BANK 2) (HIGH VOLTAGE)

QG18DE (EXC CALIF CA)

Component Inspection (Cont'd)

approved anti-seize lubricant.



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 (HO2S2 bank 2) or 95 (HO2S2 bank 1) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1/ (BANK 2)

QG18DE (EXC CALIF CA)

Description

Description

NIEC0180

SYSTEM DESCRIPTION

NIEC0180S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)
Crankshaft position sensor (POS)			

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater (rear) corresponding to the engine speed.

OPERATION

NIEC0180S02

Engine speed rpm	Heated oxygen sensor 2 heater (rear)
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NIEC0181

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)/ (B2)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 	OFF
	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 	ON

On Board Diagnosis Logic

NIEC0183

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0141 P0161	<ul style="list-style-type: none"> ● The current amperage in the heated oxygen sensor 2 heater (rear) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 2 heater (rear).] 	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 2 heater (rear) circuit is open or shorted.) ● Heated oxygen sensor 2 heater (rear)

DTC Confirmation Procedure

NIEC0184

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

DTC P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1)/ (BANK 2)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	THRTL POS SEN	XXX V

SEF179Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-299.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-299.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

DTC P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1)/ (BANK 2)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

BANK 1

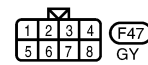
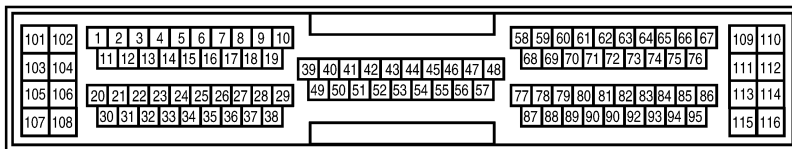
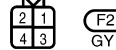
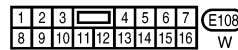
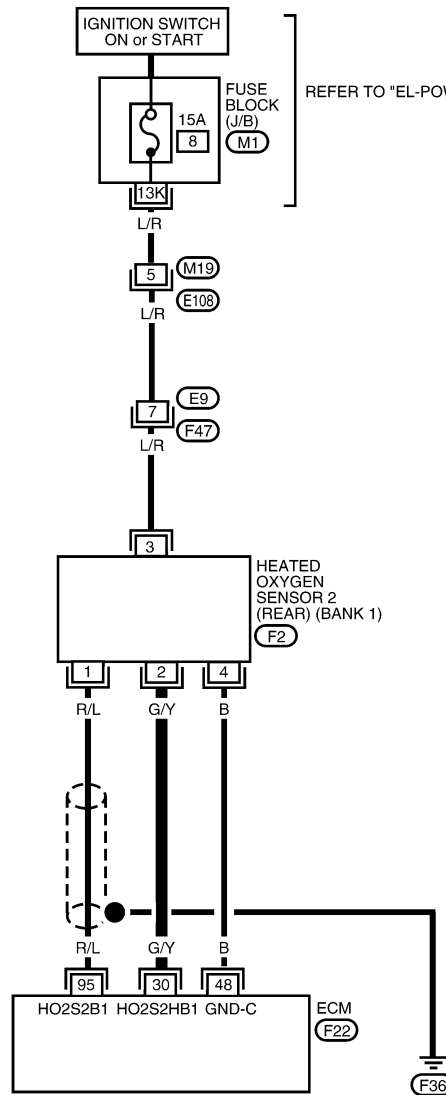
NIEC0185

NIEC0185S03

EC-O2H2B1-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "EL-POWER".



WEC884

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
30	G/Y	HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

WEC915

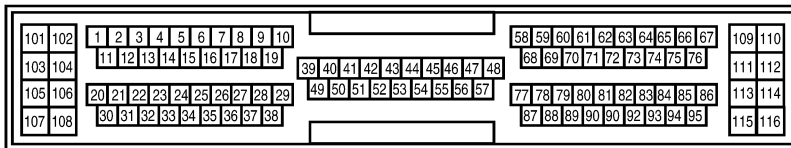
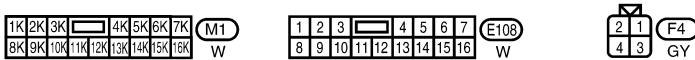
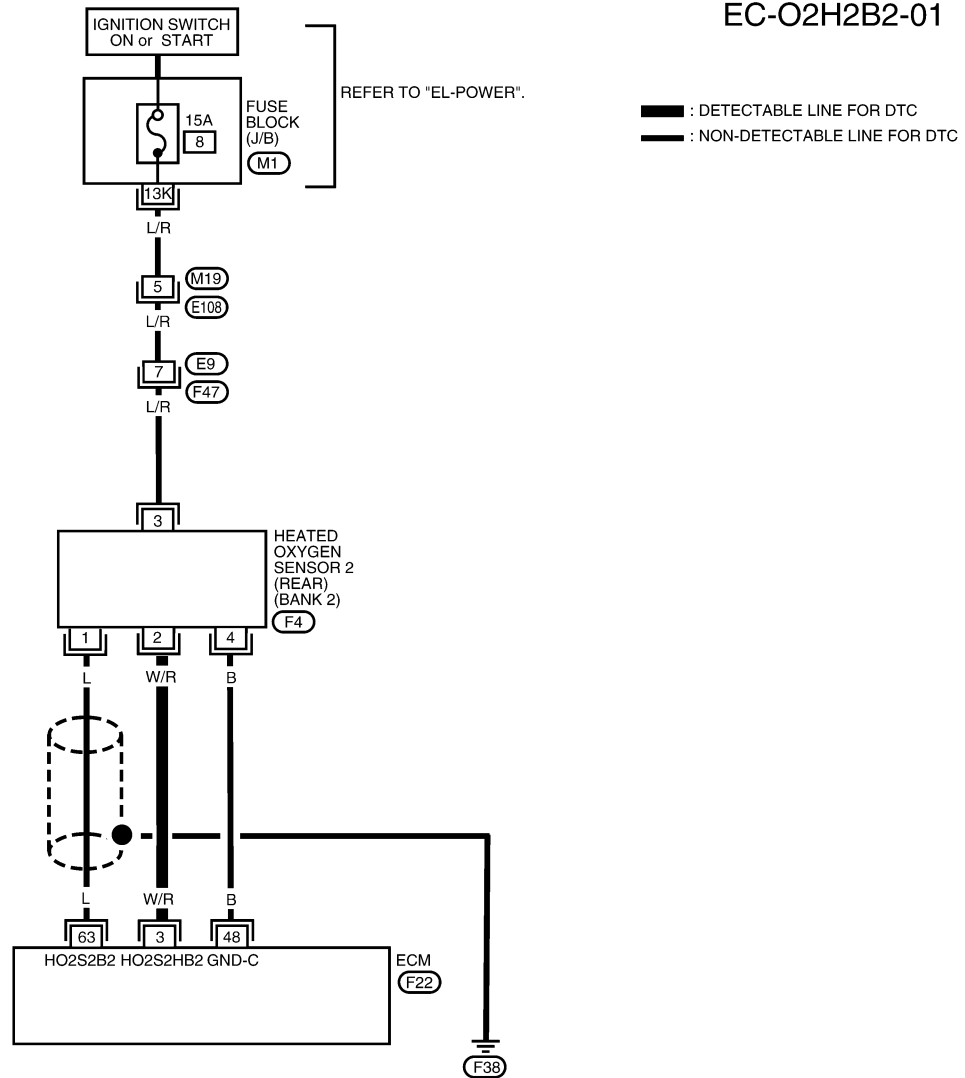
DTC P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1)/ (BANK 2) QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

BANK 2

NIEC0185S04

EC-O2H2B2-01



WEC883

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	W/R	HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 2)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

WEC909

Diagnostic Procedure

NIEC0186

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check the HO2S2 (rear) harness protector color, and disconnect the corresponding heated oxygen sensor harness connector.</p>	
		<p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between rear HO2S terminal 3 and ground.</p>	WEC835
		OK or NG	SEF314X
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M19, E108 ● Harness connectors E9, F47 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between heated oxygen sensor 2 (rear) and fuse 	
		▶	Repair harness or connectors.

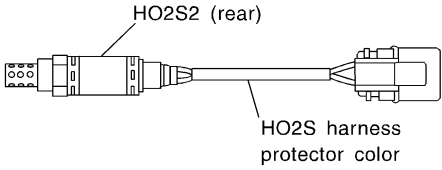
3	CHECK OUTPUT SIGNAL CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between HO2S2 (rear) terminal 2 and ECM terminal 3. Refer to "Wiring Diagram", EC-297. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>	
		OK or NG	
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

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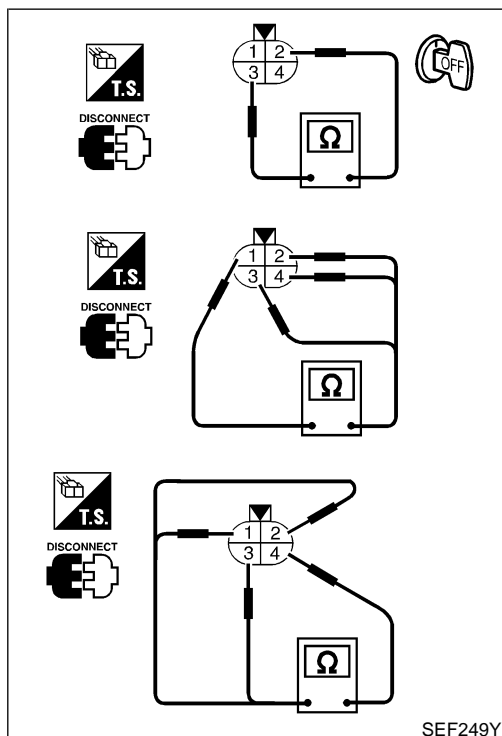
DTC P0141, P0161 HEATED OXYGEN SENSOR 2 HEATER (REAR) (BANK 1/ (BANK 2)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)
<p>1. Turn ignition switch "OFF". 2. Check the HO2S2 (rear) harness protector color, and disconnect the corresponding HO2S1 (rear) harness connector.</p>	
	
<p>HO2S2 (rear) (bank 1): White or Gray HO2S2 (rear) (bank 2): Red or Reddish brown</p>	
SEF471Y	
3. Check HO2S2 heater (rear), refer to EC-300.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace corresponding heated oxygen sensor 2 (rear).

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END



Component Inspection

HEATED OXYGEN SENSOR 2 HEATER (REAR)

NIEC0187
NIEC0187S01

Check the following.

1. Check resistance between terminals 2 and 3.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
2. Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

If NG, replace the heated oxygen sensor 2 (rear).

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

On Board Diagnosis Logic

NIEC0188

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front) (bank 1)/(bank 2). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as a fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1 (front) (bank 1)/(bank 2)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0171	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) 	<ul style="list-style-type: none"> Intake air leaks Heated oxygen sensor 1 (front) (bank 1)/(bank 2) Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor
P0174		

4

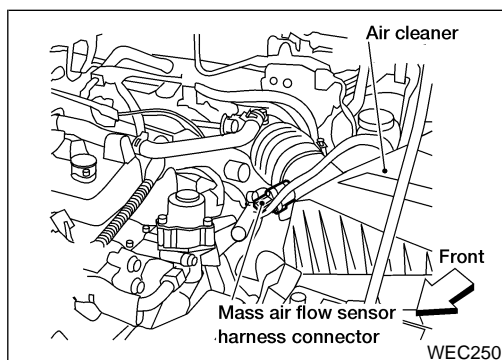
WORK SUPPORT	
SELF-LEARNING CONT	B1 100% B2 100%
CLEAR	

SEF652Y

6

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



DTC Confirmation Procedure

NIEC0189

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 (P0174) should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-305.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-305. If engine does not start, visually check for exhaust and intake air leak.

Ⓜ With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0171 (P0174) should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-305.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-305. If engine does not start, visually check for exhaust and intake air leak.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

Wiring Diagram

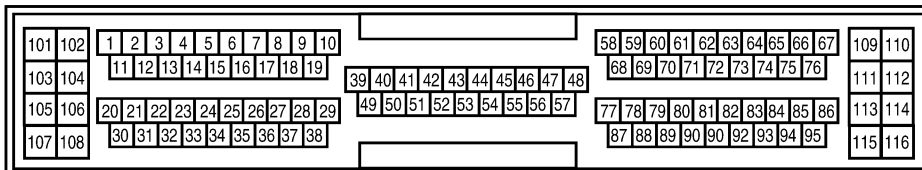
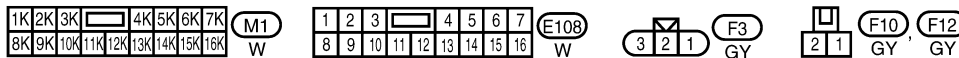
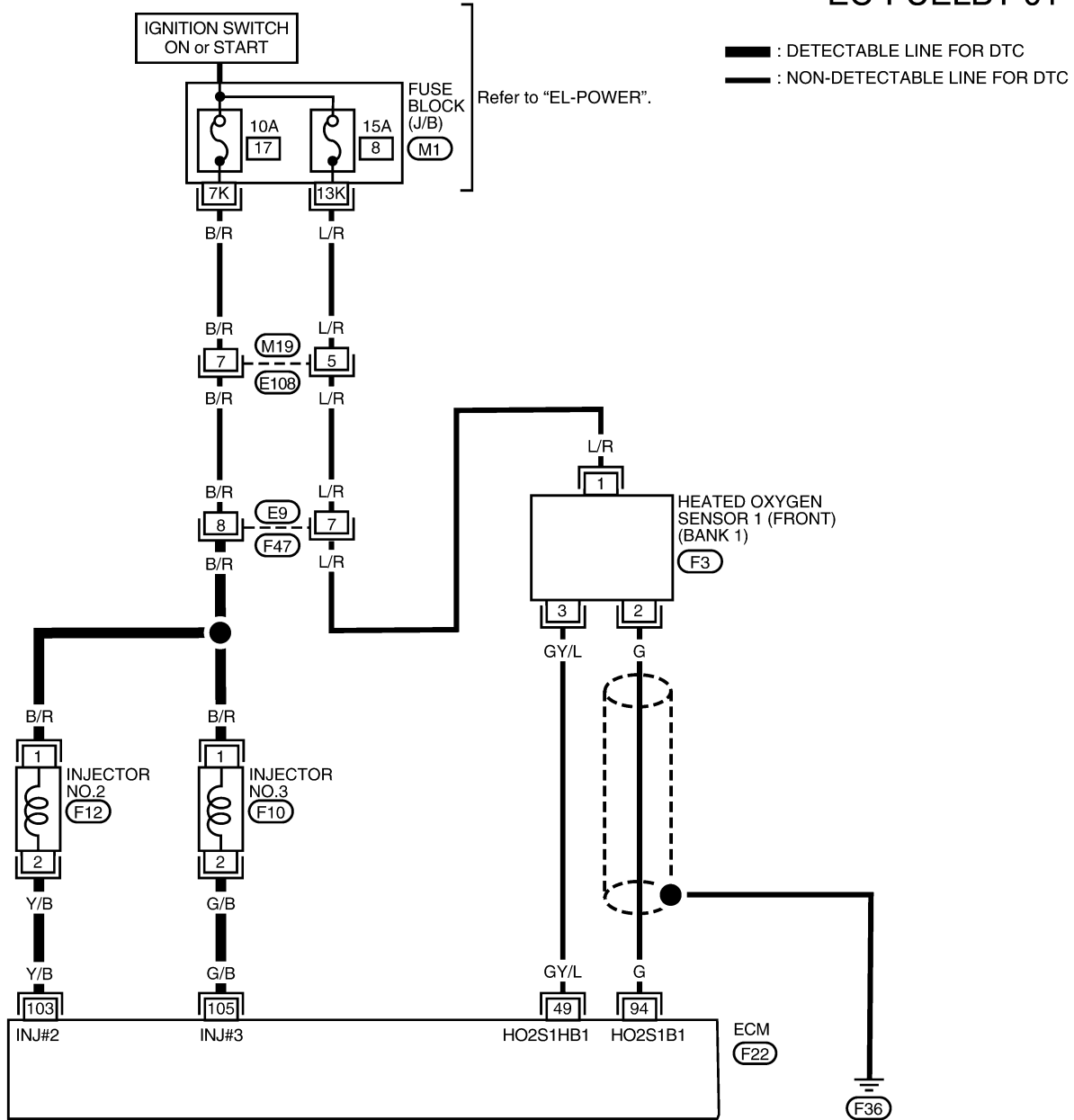
Wiring Diagram

BANK 1

NIEC0190

NIEC0190S03

EC-FUELB1-01



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WEC886

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

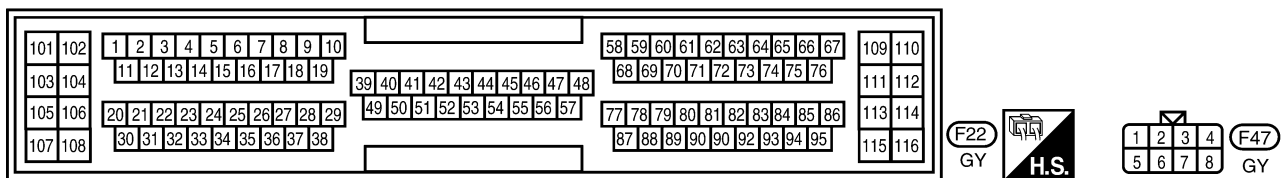
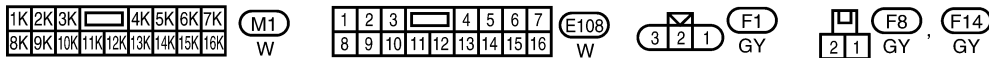
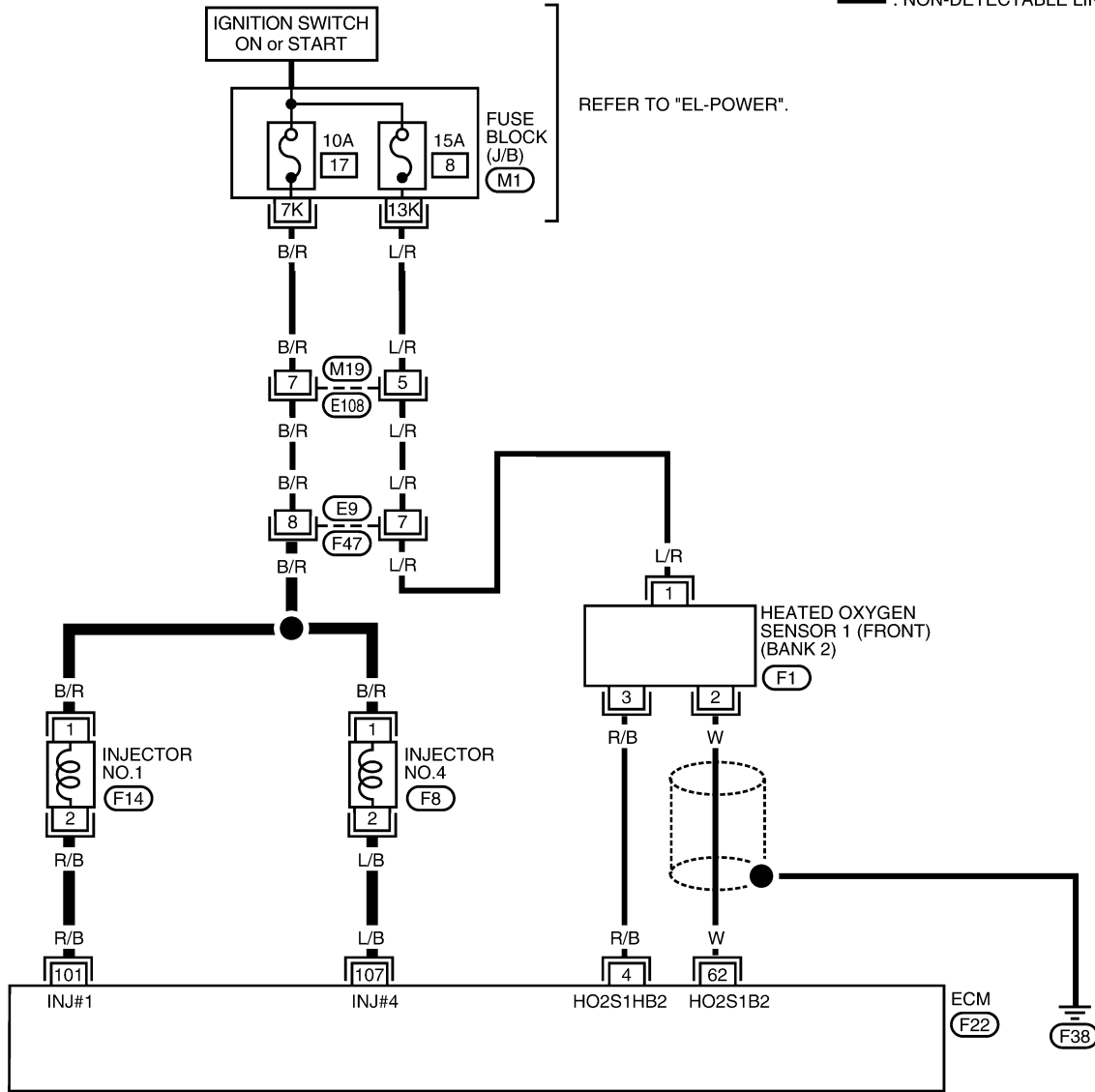
Wiring Diagram (Cont'd)

BANK 2

NIEC0190S04

EC-FUEL B2-01

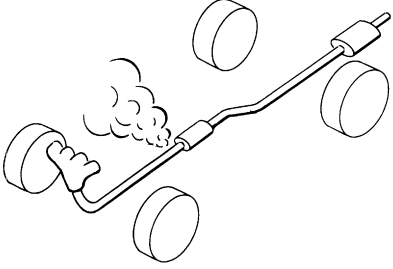
: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC885

Diagnostic Procedure

NIEC0191

1	CHECK EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before three way catalyst.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK FOR INTAKE AIR LEAK	
Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

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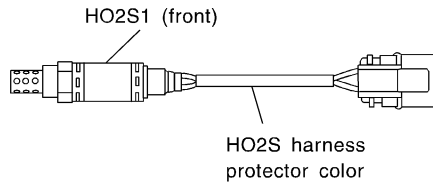
DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

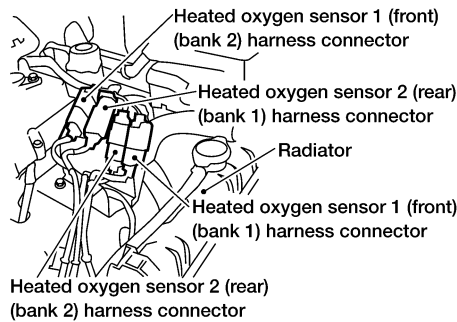
3 CHECK HEATED OXYGEN SENSOR 1 (FRONT) (BANK 1)/(BANK 2) CIRCUITS

1. Turn ignition switch "OFF".
2. Check the HO2S1 (front) (bank 1)/(bank 2) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) (bank 1)/(bank 2) harness connector and ECM harness connector.



HO2S1 (front) (bank 1): Black
HO2S1 (front) (bank 2): Blue

LEC646



WEC835

3. Check harness continuity between ECM terminal and HO2S1 (front) (bank 1)/(bank 2) terminal as follows. Refer to "Wiring Diagram", EC-303.

DTC	Terminals		Bank
	ECM	Sensor	
P0171	62	2	2
P0174	94	2	1

WEC910

Continuity should exist.

4. Check harness continuity between ECM terminal or HO2S1 (front) (bank 1)/(bank 2) and ground as follows. Refer to "Wiring Diagram", EC-303.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0171	62 or 2	Ground	2
P0174	94 or 2	Ground	1

WEC911

Continuity should not exist.

5. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)



4	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-67.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="padding-left: 20px;">At idling:</p> <p style="padding-left: 40px;">When fuel pressure regulator vacuum hose is connected. 235 kPa (2.4 kg/cm², 34 psi)</p> <p style="padding-left: 40px;">When fuel pressure regulator vacuum hose is disconnected. 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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LC

EC

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to EC-673. ● Fuel pressure regulator Refer to EC-68. ● Fuel lines. Refer to MA-19, "Checking Fuel Lines". ● Fuel filter for clogging 		
	▶	Repair or replace.

FE
CL
MT

6	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="padding-left: 20px;">at idling: 1.4 - 4.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="padding-left: 20px;">at idling: 1.4 - 4.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 5.0 - 10.0 g-m/sec</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-174.

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DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7 CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

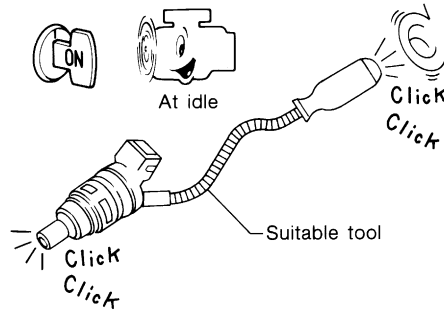
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 8.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-664.

8 REMOVE INJECTOR

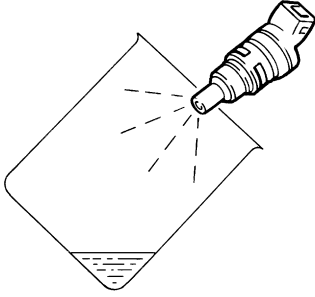
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector with fuel tube assembly. Refer to EC-68.
Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.

	▶	GO TO 9.
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DTC P0171, P0174 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (LEAN SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK INJECTOR	
<p>1. Disconnect all ignition wires. 2. Place pans or saucers under each injector. 3. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.</p>		
		
SEF595Q		
Fuel should be sprayed evenly for each cylinder.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace injectors from which fuel does not spray out. Always replace O-ring with new one.

10	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶ INSPECTION END		

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DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

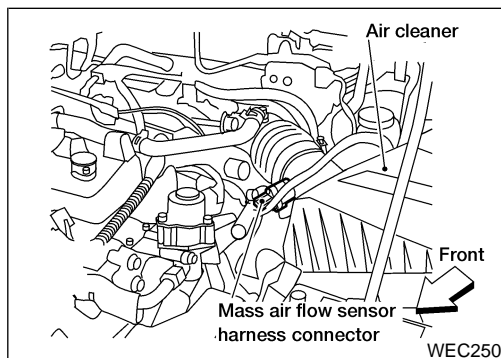
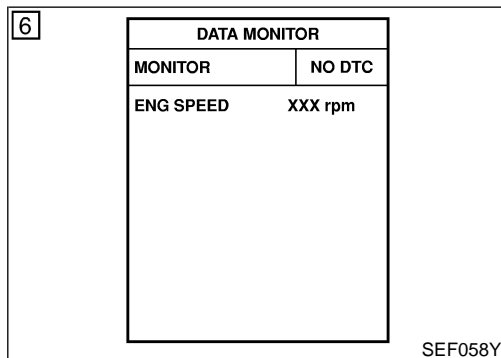
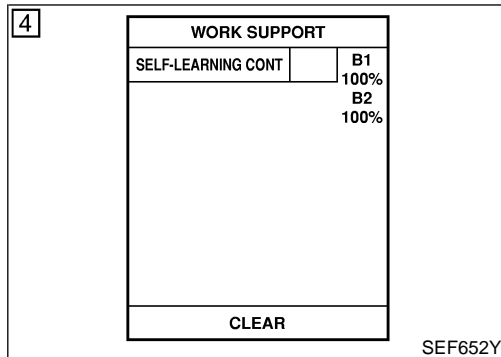
NIEC0192

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front) (bank 1)/(bank 2). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1 (front) (bank 1)/(bank 2)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0172	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) (bank 1)/(bank 2) Injectors Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor
P0175		



DTC Confirmation Procedure

NIEC0193

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- 4) Clear the self-learning control coefficient by touching "CLEAR" or "START".
- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 (P0175) should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-314.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- 8) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-314. If engine does not start, remove ignition plugs and check for fouling, etc.

Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- 4) Stop engine and reconnect mass air flow sensor harness connector.
- 5) Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- 6) Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0172 (P0175) should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-314.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-314. If engine does not start, remove ignition plugs and check for fouling, etc.

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DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

Wiring Diagram

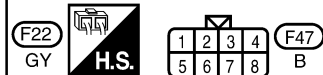
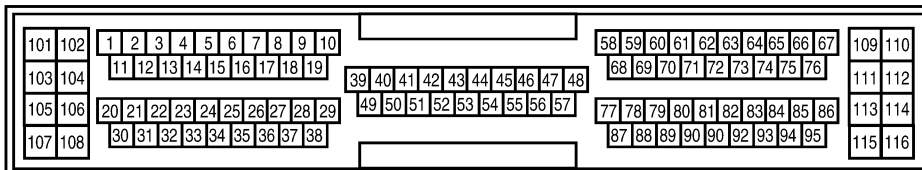
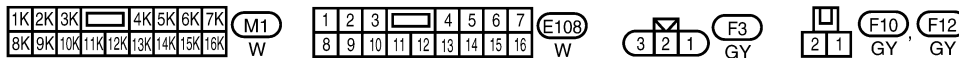
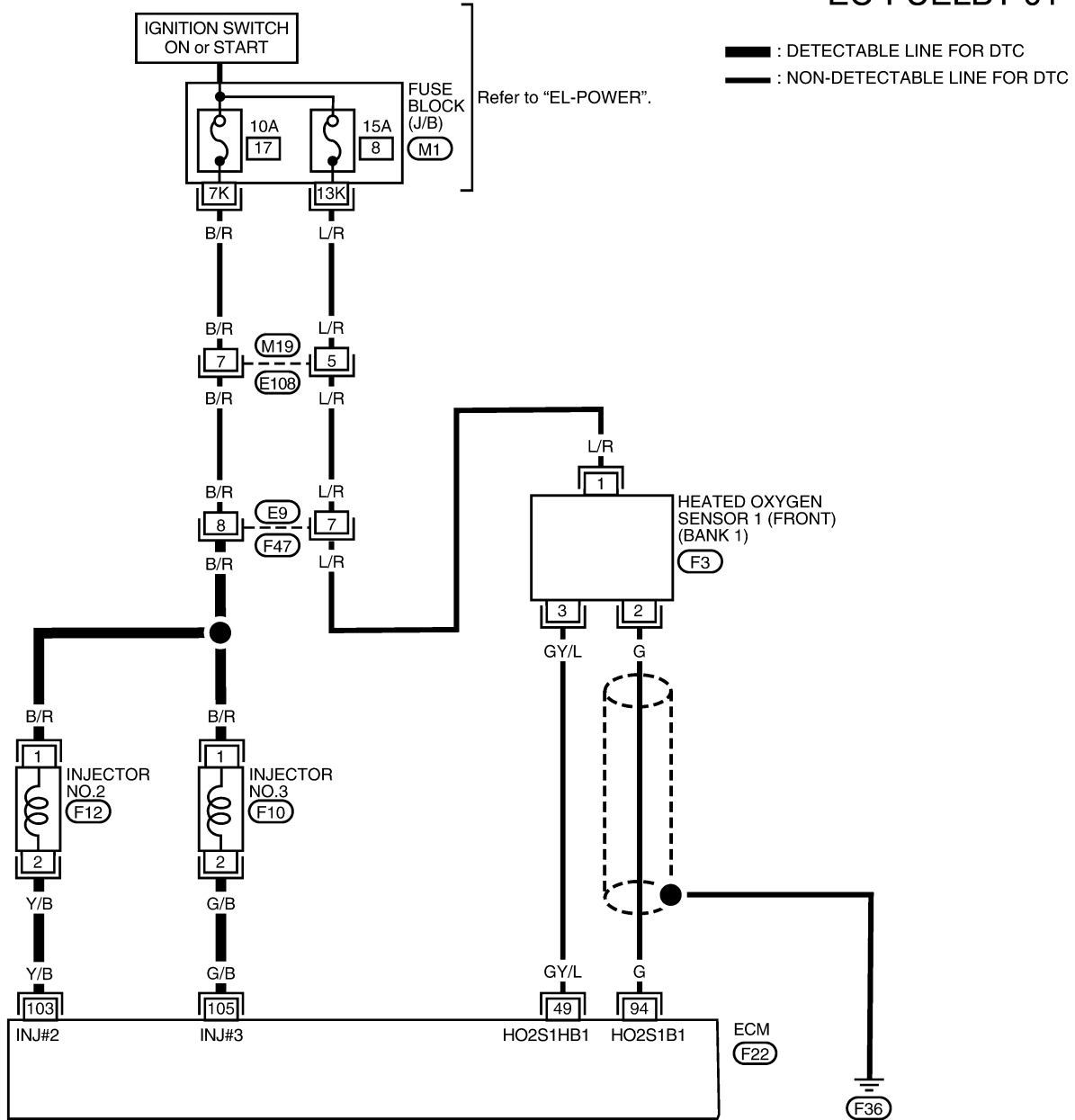
Wiring Diagram

NIEC0194

NIEC0194S03

BANK 1

EC-FUELB1-01



WEC886

DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

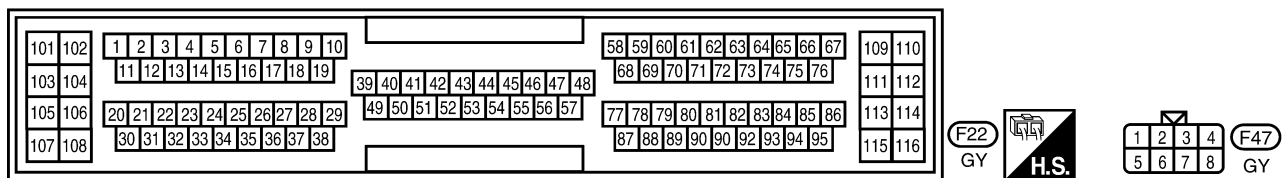
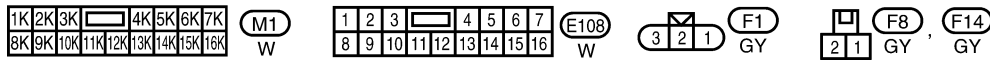
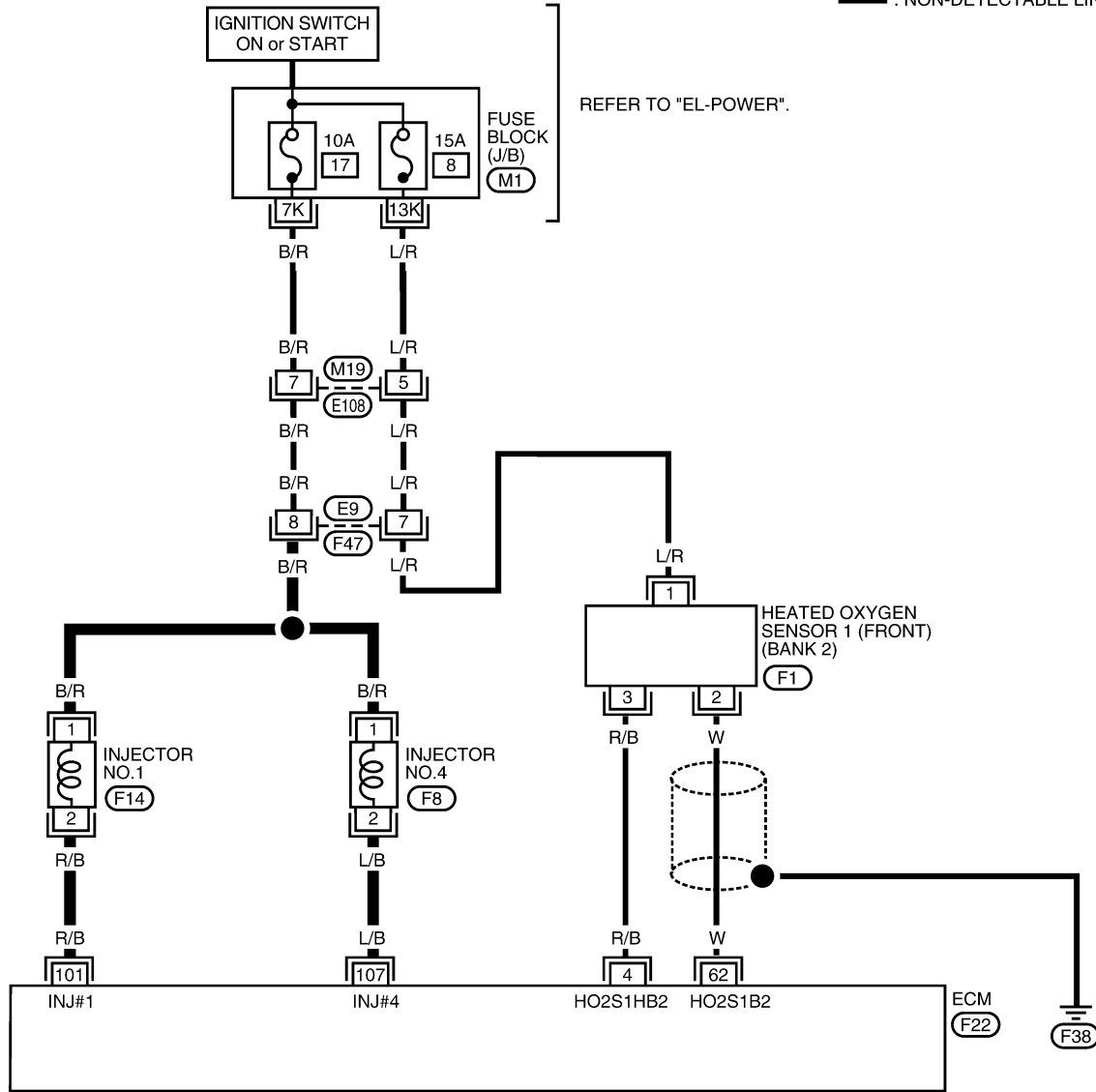
Wiring Diagram (Cont'd)

BANK 2

NIEC0194S04

EC-FUEL2-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



WEC885

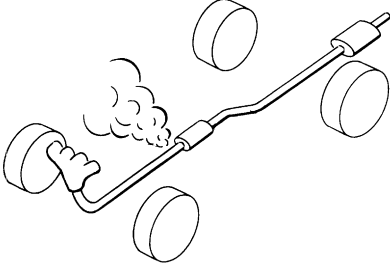
DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0195

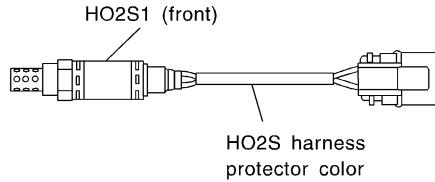
1	CHECK FOR EXHAUST AIR LEAK	
<ol style="list-style-type: none">1. Start engine and run it at idle.2. Listen for an exhaust air leak before the three way catalyst.		
 A line drawing of an exhaust manifold with four circular ports. A hand is shown pointing to a cloud of smoke or steam emerging from one of the ports, indicating an air leak. The manifold is connected to a pipe that leads to a three-way catalyst.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

SEF099P

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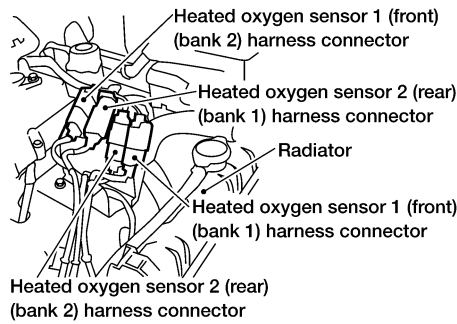
2 CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT

- Turn ignition switch "OFF".
- Check the HO2S1 (front) (bank 1)/(bank 2) harness protector color, and disconnect the corresponding heated oxygen sensor 1 (front) (bank 1)/(bank 2) harness connector and ECM harness connector.



HO2S1 (front) (bank 1): Black
 HO2S1 (front) (bank 2): Blue

LEC646



WEC835

- Check harness continuity between ECM terminal and HO2S1 (front) (bank 1)/(bank 2) terminal as follows. Refer to "Wiring Diagram", EC-312.

DTC	Terminals		Bank
	ECM	Sensor	
P0172	62	2	2
P0175	94	2	1

WEC912

Continuity should exist.

- Check harness continuity between ECM terminal or HO2S1 (front) (bank 1)/(bank 2) and ground as follows. Refer to "Wiring Diagram", EC-312.

DTC	Terminals		Bank
	ECM or Sensor	Ground	
P0172	62 or 2	Ground	2
P0175	94 or 2	Ground	1

WEC913

Continuity should not exist.

- Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.



DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2) (RICH SIDE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-67.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="margin-left: 20px;">At idling:</p> <p style="margin-left: 40px;">When fuel pressure regulator vacuum hose is connected. Approximately 235 kPa (2.4 kg/cm², 34 psi)</p> <p style="margin-left: 40px;">When fuel pressure regulator vacuum hose is disconnected. Approximately 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-673.) ● Fuel pressure regulator (Refer to EC-68.) 		
▶		Repair or replace.

5	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="margin-left: 20px;">at idling: 1.4 - 4.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="margin-left: 20px;">at idling: 1.4 - 4.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 5.0 - 10.0 g-m/sec</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-174.

6 CHECK FUNCTION OF INJECTORS

With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

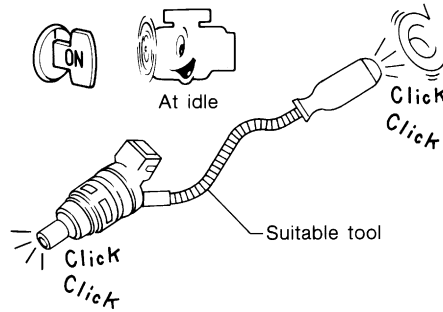
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK ► GO TO 7.

NG ► Perform trouble diagnosis for "INJECTORS", EC-664.

7 REMOVE INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector assembly. Refer to EC-68.
Keep fuel hose and all injectors connected to injector gallery.

► GO TO 8.

8 CHECK INJECTOR

1. Disconnect all injector harness connectors.
2. Disconnect all ignition coil harness connectors.
3. Prepare pans or saucers under each injectors.
4. Crank engine for about 3 seconds.
Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip) ► GO TO 9.

NG (Drips) ► Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

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**DTC P0172, P0175 FUEL INJECTION SYSTEM FUNCTION (BANK 1)/(BANK 2)
(RICH SIDE)**

QG18DE (EXC CALIF CA)

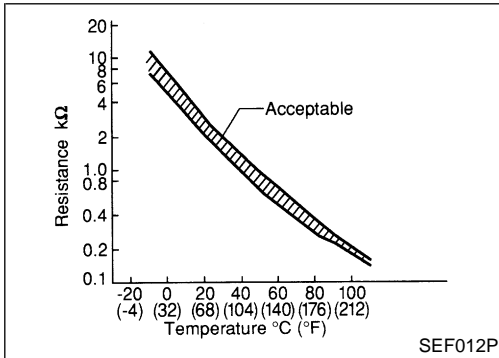
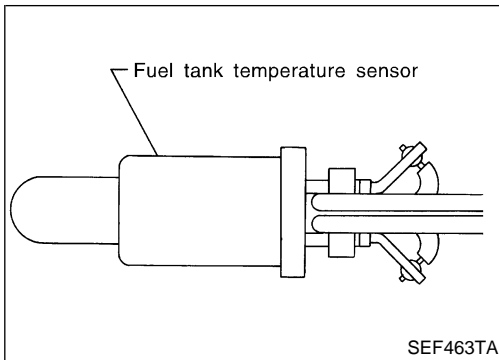
Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

*: These data are reference values and are measured between ECM terminal 82 (Fuel tank temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead to ECM's transistor damage. Use ground other than ECM, such as engine ground.

On Board Diagnosis Logic

NIEC0197

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0180	<ul style="list-style-type: none"> An excessively high or low voltage is sent to ECM. Rationally incorrect voltage is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Fuel tank temperature sensor

3

DATA MONITOR	
MONITOR	DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
INT/A TEMP/S	XXX °C

SEF475Y

DTC Confirmation Procedure

NIEC0198

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-322.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

If the result is OK, go to following step.

- 4) Check "COOLAN TEMP/S" signal.
If the signal is less than 50°C (122°F), the result will be OK.
If the signal is above 50°C (122°F), go to the following step.
- 5) Cool engine down until "COOLAN TEMP/S" signal is less than 50°C (122°F).
- 6) Wait at least 10 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-322.



With GST

Follow the procedure "With CONSULT-II" above.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

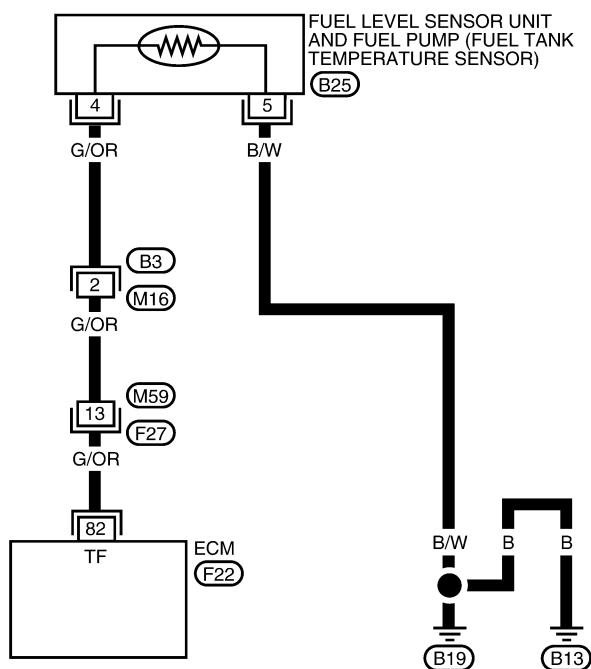
Wiring Diagram

Wiring Diagram

NIEC0199

EC-FTTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



1	2	3	4	5	6	7	8	9	(B3)		
10	11	12	13	14	15	16	17	18	19	20	W

5	4	3	2	1	(B25)	GY
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101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																						115	116



1	2	3	4	5	6	7	(F27)		
8	9	10	11	12	13	14	15	16	BR

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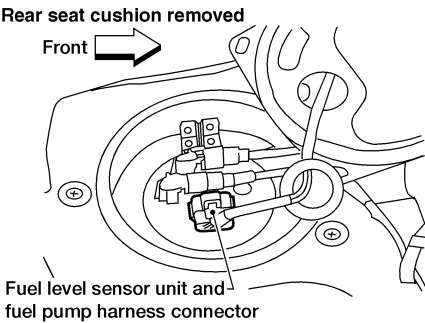
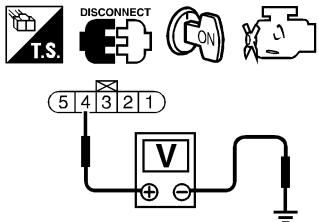
DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0200

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect fuel level sensor unit and fuel pump harness connector.</p> <div style="text-align: center;">  <p>Rear seat cushion removed Front → Fuel level sensor unit and fuel pump harness connector</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: center;">OK or NG</p>	<p>WEC265</p> <p style="text-align: right;">SEF586X</p>
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M59, F27 ● Harness connectors B3, M16 ● Harness for open or short between ECM and fuel level sensor unit and fuel pump <p style="text-align: center;">▶ Repair harness or connector.</p>	
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3	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to "Wiring Diagram", EC-321. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to power in harness or connectors.	

DTC P0180 FUEL TANK TEMPERATURE SENSOR

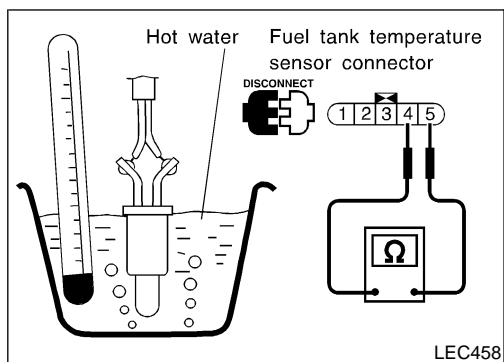
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK FUEL TANK TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-323.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel tank temperature sensor.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

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Component Inspection

FUEL TANK TEMPERATURE SENSOR

NIEC0201

NIEC0201S01

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel tank temperature sensor.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

System Description

System Description

NIEC0505

COOLING FAN CONTROL

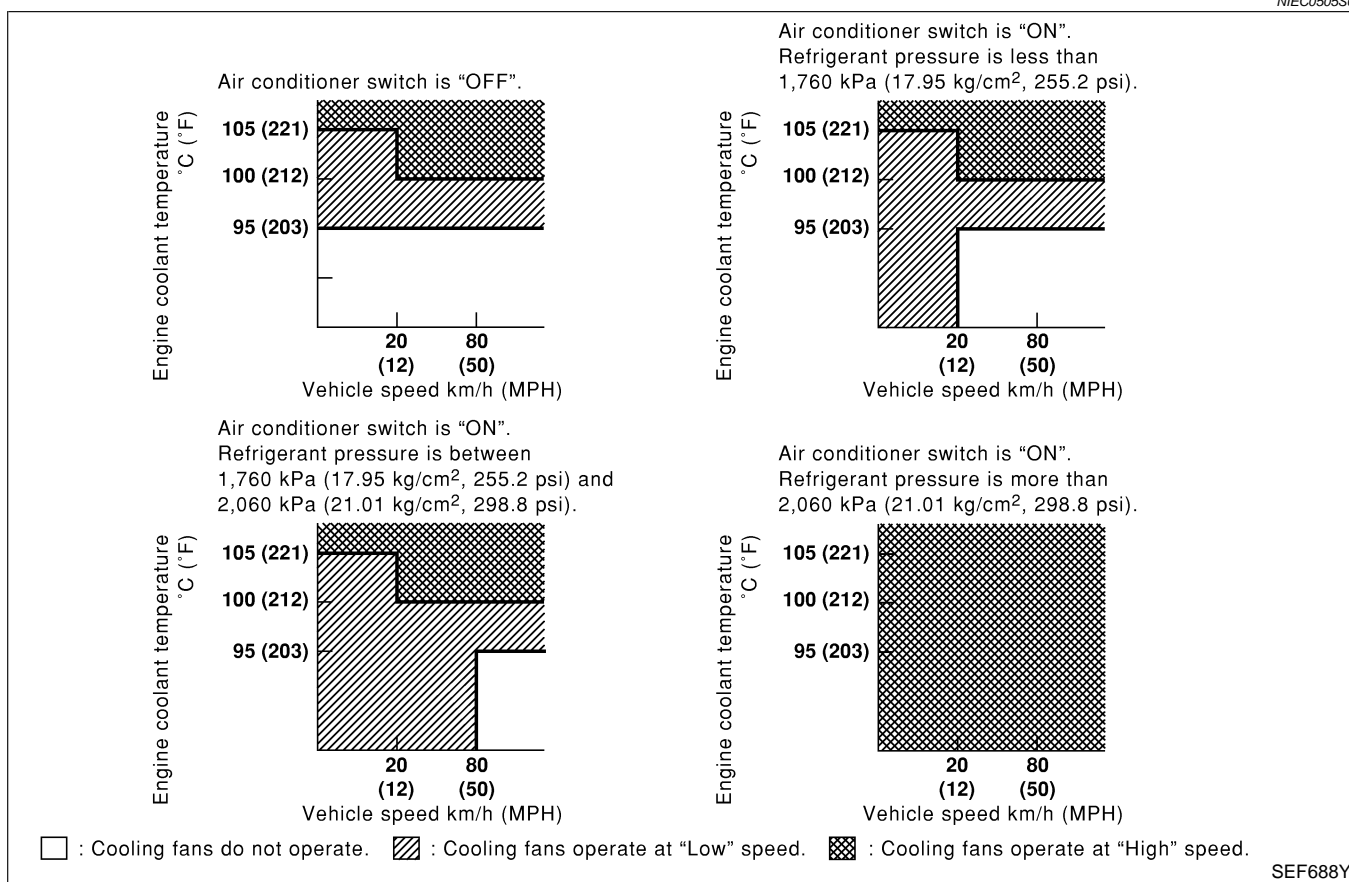
NIEC0505S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC0505S02



SEF688Y

CONSULT-II Reference Value in Data Monitor Mode

NIEC0506

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF OFF
	Air conditioner switch: ON (Compressor operates)	ON

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION		
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF	GI
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	MA
		Engine coolant temperature is 105°C (221°F) or more	HIGH	EM

GI
MA
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LC

On Board Diagnosis Logic

NIEC0507

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy.

When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip.

Malfunction is detected when engine coolant temperature is excessively high under normal engine speed.

EC
FE
CL

Possible Cause

NIEC0508

- Harness or connectors (The cooling fan circuit is open or shorted)
- Cooling fan
- Thermostat
- Improper ignition timing
- Engine coolant temperature sensor
- Blocked radiator
- Blocked front end (Improper fitting of nose mask)
- Crushed vehicle frontal area (Vehicle damaged from a collision but not repaired)
- Blocked air passage by improper installation of front fog lamp or fog lamps.
- Improper mixture ratio of coolant
- Damaged bumper

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For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-342.

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-17, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-20, "Changing Engine Oil".

BT
HA

- 1) **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-15, "Anti-freeze Coolant Mixture Ratio".**
- 2) **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

SC
EL
IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Overall Function Check

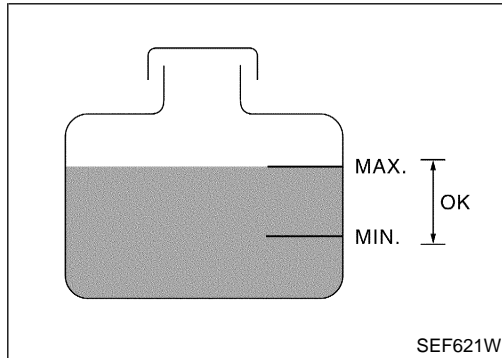
Overall Function Check

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed. NIEC0509

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.



WITH CONSULT-II

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NIEC0509S01

Allow engine to cool before checking coolant level and mixture ratio.

- If the coolant level in the reservoir and/or radiator is below the proper range, go to “Diagnostic Procedure”, EC-331.
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, “Changing Engine Coolant”.
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, “Anti-freeze Coolant Mixture Ratio”.
 - b) After refilling coolant, run engine to ensure that no water-flow noise is emitted.
 - c) After checking or replacing coolant, go to step 3 below.
- 2) Ask the customer if engine coolant has been added. If it has been added, go to “Diagnostic Procedure”, EC-331. After repair, go to the next step.
 - 3) Start engine and let it idle.
 - 4) Make sure that A/C switch is “OFF” and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-21**, “TROUBLE DIAGNOSES”. After repair, go to the next step.
 - 5) Perform “ENG COOLANT TEMP” in “ACTIVE TEST” mode with CONSULT-II at idle.
 - a) Set “ENG COOLANT TEMP” to 95°C (203°F) and make sure that cooling fan operates at low speed. If NG, go to “Diagnostic Procedure”, EC-331.
 - b) Set “ENG COOLANT TEMP” to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to “Diagnostic Procedure”, EC-331. After repair, go to the next step.
 - 6) Check for blocked coolant passage.
 - a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows. If NG, go to “Diagnostic Procedure”, EC-331. After repair, go to the next step.

Be extremely careful not to touch any moving or adjacent parts.
 - 7) Check for blocked radiator air passage.
 - a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
 - b) Check the front end for clogging caused by insects or debris.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step. GI
- 8) Check function of ECT sensor.
Refer to step 7 of "Diagnostic Procedure", EC-331.
If NG, replace ECT sensor and go to the next step. MA
- 9) Check ignition timing. Refer to "Basic Inspection", EC-127.
Make sure that ignition timing is $9^{\circ}\pm 2^{\circ}$ at idle.
If NG, refer to "Basic Inspection", EC-127, and then recheck. EM

WITH GST

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NIEC0509S02 LC

Allow engine to cool before checking coolant level and mixture ratio. EC

- If the coolant level in the reservoir and/or radiator is below the proper range, and go to "Diagnostic Procedure", EC-331. FE
- If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, "Changing Engine Coolant". CL
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, "Anti-freeze Coolant Mixture Ratio". MT
- b) After refilling coolant, run engine to ensure that no water-flow noise is emitted. AT
- c) After checking or replacing coolant, go to step 3 below.
- 2) Ask the customer if engine coolant has been added. If it has been added, go to "Diagnostic Procedure", EC-331. After repair, go to the next step. AX
- 3) Start engine and let it idle. SU
- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-21**, "TROUBLE DIAGNOSES". After repair, go to the next step. BR
- 5) Turn ignition switch "OFF". ST
- 6) Disconnect engine coolant temperature sensor harness connector. RS
- 7) Connect 150Ω resistor to engine coolant temperature sensor.
- 8) Start engine and make sure that cooling fan operates.
Be careful not to overheat engine. BT
If NG, go to "Diagnostic Procedure", EC-331. After repair, go to the next step.
- 9) Check for blocked coolant passage. HA
- a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.
If NG, go to "Diagnostic Procedure", EC-331. After repair, go to the next step. SC
- Be extremely careful not to touch any moving or adjacent parts.** EL
- 10) Check for blocked radiator air passage. IDX
- a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
- b) Check the front end for clogging caused by insects or debris.
- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step.

EC-327

**DTC P0217 COOLANT OVERTEMPERATURE
ENRICHMENT PROTECTION**

QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

- 11) Check function of ECT sensor.
Refer to step 6 of "Diagnostic Procedure", EC-331.
If NG, replace ECT sensor and go to the next step.
- 12) Check ignition timing. Refer to "Basic Inspection", EC-127.
Make sure that ignition timing is $9^{\circ}\pm 2^{\circ}$ at idle.
If NG, refer to "Basic Inspection", EC-127, and then recheck.

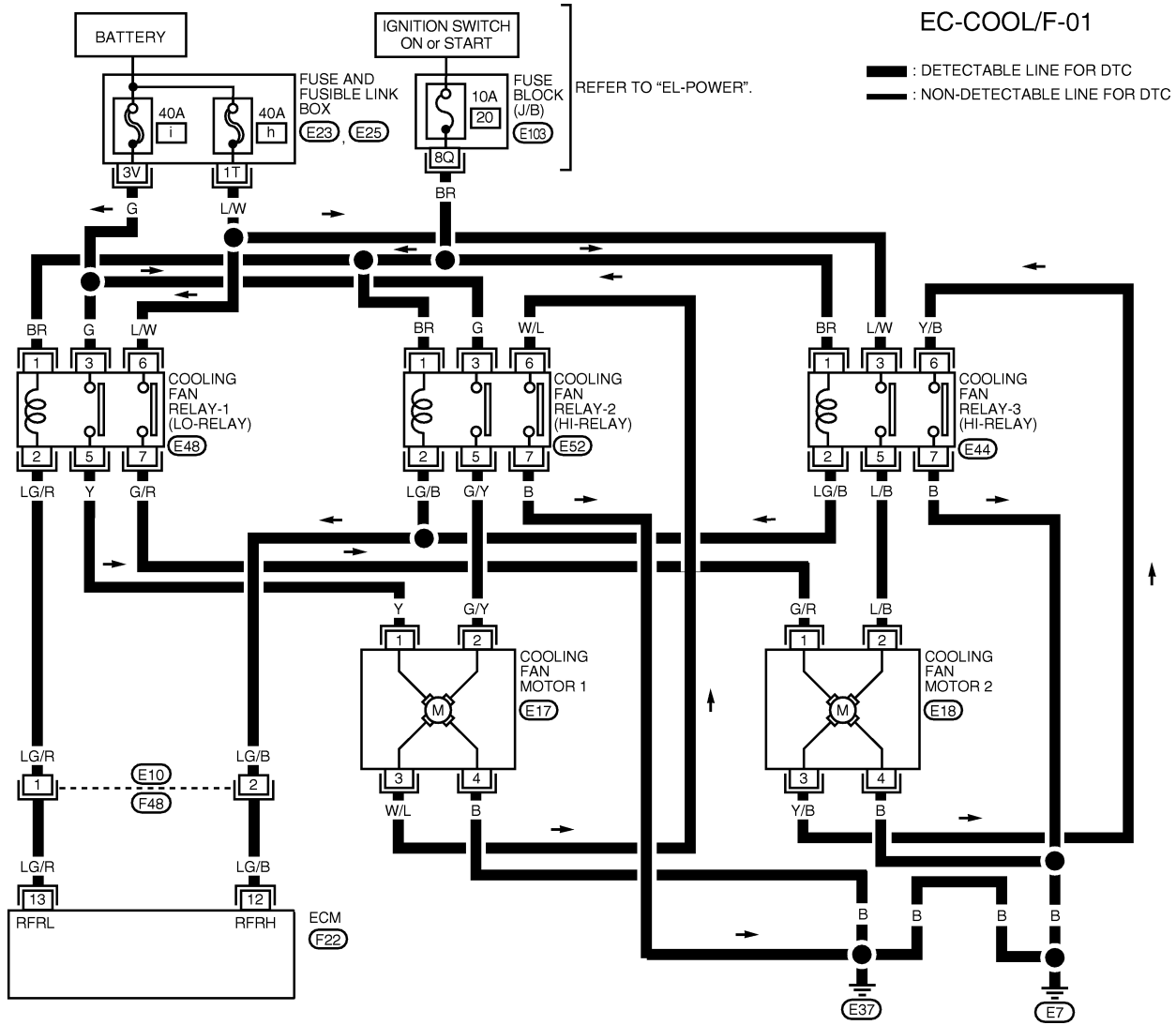
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

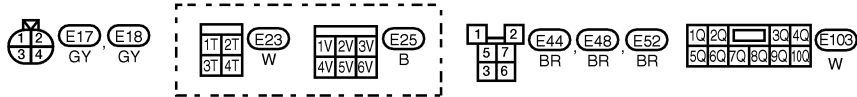
Wiring Diagram — Early Production

Wiring Diagram — Early Production

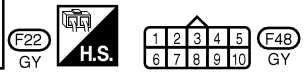
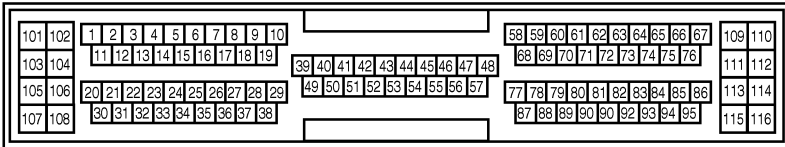
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LEC222

HA

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SC

EL

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SEF571Y

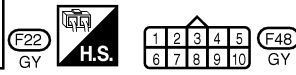
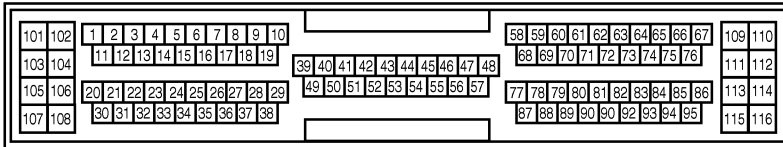
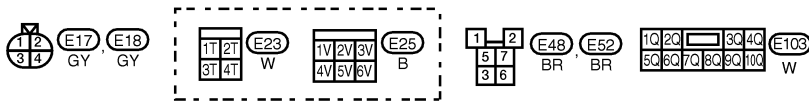
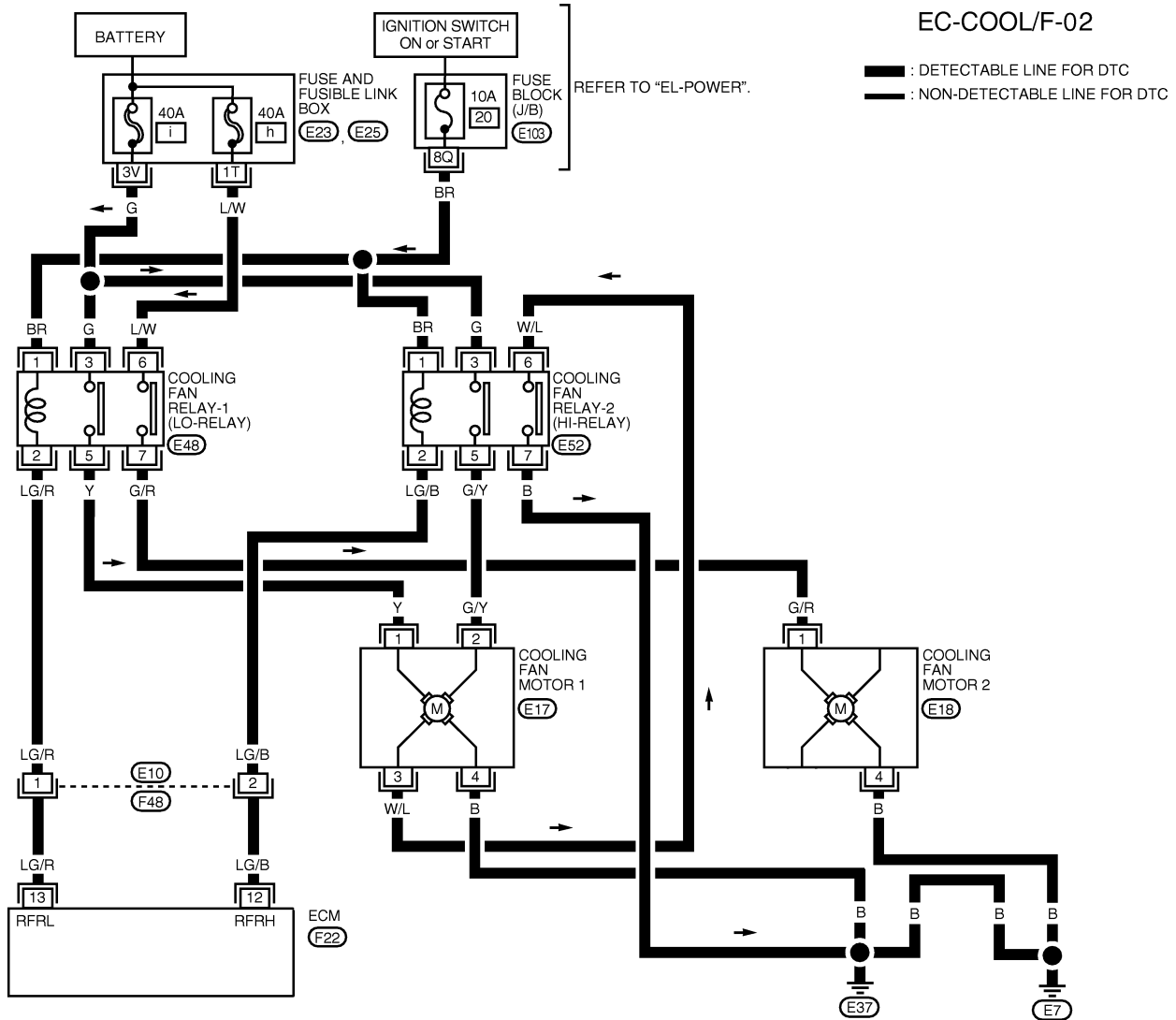
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Wiring Diagram — Late Production

Wiring Diagram — Late Production

NIEC1732



WEC129A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SEF571Y

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0511

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

GI
MA
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2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p>📖 With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3 (early production).</p> <div style="text-align: center;"> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <th style="text-align: center;">COOLING FAN</th> <th style="text-align: center;">OFF</th> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <th style="text-align: center;">COOLAN TEMP/S</th> <th style="text-align: center;">XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	OFF																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-337.)																								

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																									
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Disconnect cooling fan relay-1. 4. Turn ignition switch "ON". 5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
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6. Make sure that cooling fans-1 and -2 (early production) operate at higher speed than low speed.																										
OK or NG																										
OK	▶	GO TO 6.																								
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-340.)																								

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

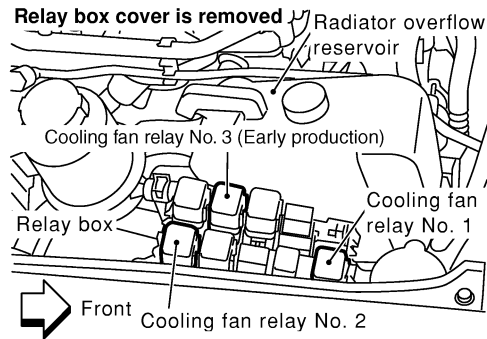
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

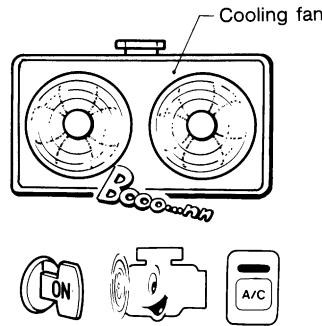
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3 (early production).



2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.

LEC130A



SEC163BA

OK or NG

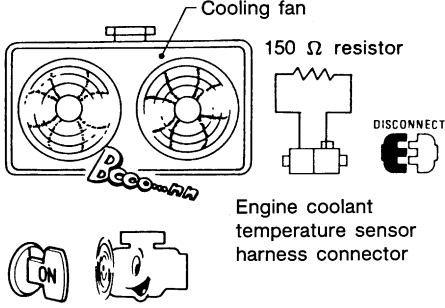
OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-337.)

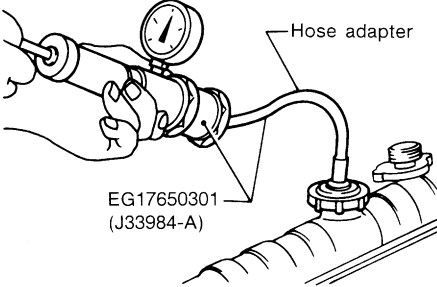
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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Disconnect cooling fan relay-1. 4. Turn air conditioner switch and blower fan switch "OFF". 5. Disconnect engine coolant temperature sensor harness connector. 6. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 7. Restart engine and make sure that cooling fans-1 and -2 (early production) operate at higher speed than low speed. 	
 <p style="text-align: right;">MEF613EA</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-340.)

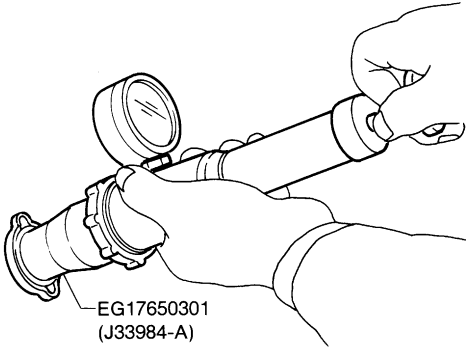
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
 <p style="text-align: right;">SLC754A</p>	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
<p>Check the following for leaks.</p> <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump (Refer to LC-13, "Water Pump".) 	
▶	Repair or replace.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK RADIATOR CAP		
Apply pressure to cap with a tester and check radiator cap relief pressure.			
			
<p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p> <p style="text-align: right;">SLC755A</p>			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace radiator cap.	

GI

MA

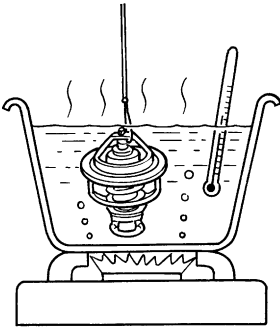
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CL

9	CHECK THERMOSTAT		
<ol style="list-style-type: none"> 1. Remove thermostat. 2. Check valve seating condition at normal room temperatures. It should seat tightly. 3. Check valve opening temperature and valve lift. 			
			
<p>Valve opening temperature: 76.5°C (170°F) [standard]</p> <p>Valve lift: More than 9 mm/90°C (0.35 in/194°F)</p> <p style="text-align: right;">SLC343</p>			
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-13 , "Thermostat".			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Replace thermostat	

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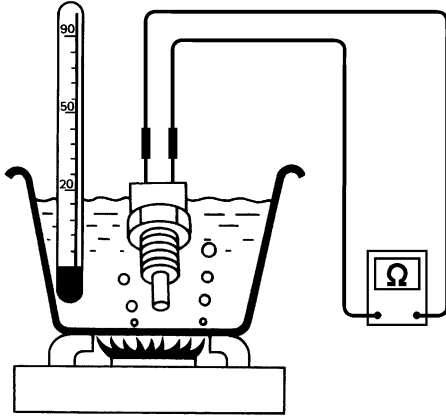
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

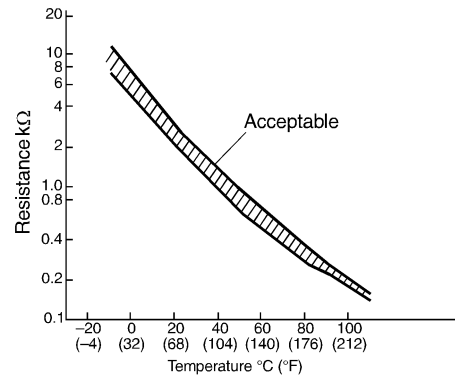
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

- | | | |
|----|---|--|
| OK | ▶ | GO TO 11. |
| NG | ▶ | Replace engine coolant temperature sensor. |

11 CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-342.

▶ **INSPECTION END**

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC0511S01

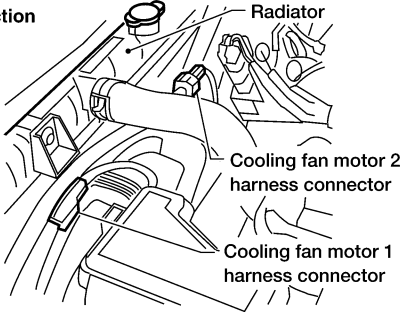
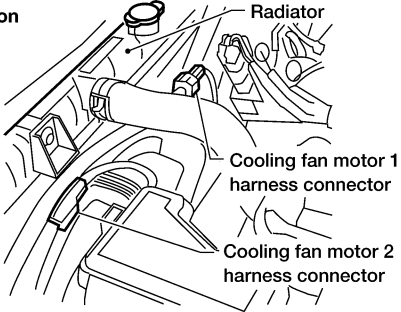
1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"> </div> <p style="color: blue; margin-top: 10px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	GI MA EM LC EC FE CL MT						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>		OK	▶	GO TO 3.	NG	▶	GO TO 2.		
OK	▶	GO TO 3.							
NG	▶	GO TO 2.							

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible links ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 	AT AX SU BR ST RS BT HA SC EL IDX
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Early production</p>  </div> <div style="text-align: center;"> <p>Late production</p>  </div> </div>		
WEC131A		
<p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-329 or "Wiring Diagram — Late Production", EC-330. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-329 or "Wiring Diagram — Late Production", EC-330. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

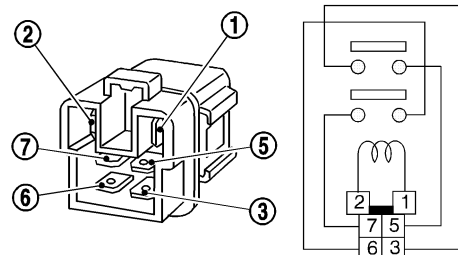
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram — Early Production", EC-329 or "Wiring Diagram — Late Production", EC-330. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

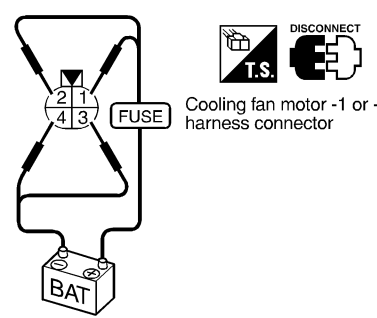
5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness for open or short between cooling fan relay-1 and ECM 		
OK or NG		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN RELAY-1								
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity								
12V direct current supply between terminals 1 and 2	Yes								
No current supply	No								
		SEF591X							
OK or NG									
OK	▶	GO TO 7.							
NG	▶	Replace cooling fan relay.							

7	CHECK COOLING FAN MOTORS-1 AND -2																			
Supply battery voltage between the following terminals and check operation.																				
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2 (Early production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Cooling fan motor -2 (Late production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2 (Early production)	Low	1	4	High	1, 2	3, 4	Cooling fan motor -2 (Late production)	Low	1	4
	Speed	Terminals																		
		(+)	(-)																	
Cooling fan motor -1 or -2 (Early production)	Low	1	4																	
	High	1, 2	3, 4																	
Cooling fan motor -2 (Late production)	Low	1	4																	
		LEC132A																		
OK or NG																				
OK	▶	GO TO 8.																		
NG	▶	Replace cooling fan motors.																		

8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.			
		▶	INSPECTION END

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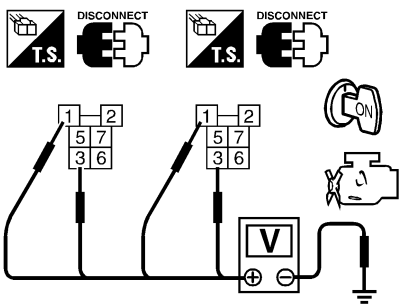
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC0511S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT		
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3 (early production). 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 (early production) terminals 1, 3 and ground with CONSULT-II or tester.</p>			
			
Voltage: Battery voltage			
SEF593X			
OK or NG			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fuse ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fusible link 			
		▶	Repair harness or connectors.

3	CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT		
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-329 or "Wiring Diagram — Late Production", EC-330. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power. 5. For early production models, check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-329. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK		▶	GO TO 4.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

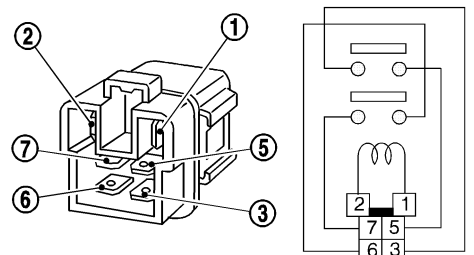
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

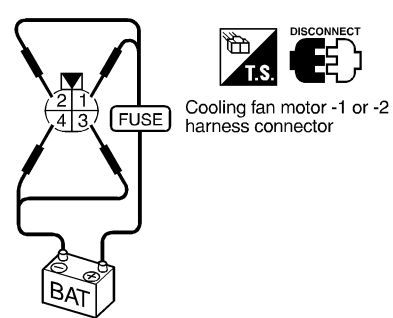
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 (early production) terminal 2. Refer to "Wiring Diagram — Early Production", EC-329 or "Wiring Diagram — Late Production", EC-330. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness for open or short between cooling fan relays-2 and -3 (early production) and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK COOLING FAN RELAYS-2 AND -3 (EARLY PRODUCTION)	
<p>Check continuity between cooling fan relay-2, -3 (early production) terminals 3 and 5, 6 and 7 under the following conditions.</p>		
		
SEF591X		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.

7	CHECK COOLING FAN MOTORS-1 AND -2	
<p>Supply battery voltage between the following terminals and check operation.</p>		
		
LEC132A		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	INSPECTION END

Main 12 Causes of Overheating

NIEC0512

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-10 , "System Check".
ON*2	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-10 , "System Check".
ON*2	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-13 , "Thermostat" and LC-15 , "Radiator".
ON*1	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for DTC P0217 (EC-324).
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight edge, feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-110 , "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-132 , "Inspection".

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to **LC-19**, "OVERHEATING CAUSE ANALYSIS".

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0202

When a misfire occurs, engine speed will fluctuate (vary). If the engine speed fluctuates enough to cause the crankshaft position sensor (POS) signal to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the crankshaft position sensor (POS) signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will turn off.

If another misfire condition occurs that can damage the TWC on a second trip, the MIL will blink.

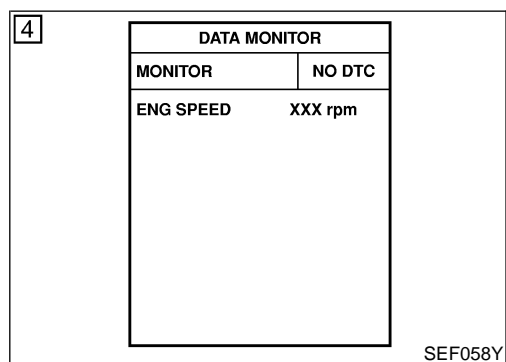
When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on.

If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not cause damage to the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the crankshaft position sensor (POS) signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0300	<ul style="list-style-type: none"> ● Multiple cylinders misfire. 	<ul style="list-style-type: none"> ● Improper spark plug ● Insufficient compression ● Incorrect fuel pressure ● EGR volume control valve ● The injector circuit is open or shorted ● Injectors ● Intake air leak ● The ignition secondary circuit is open or shorted ● Lack of fuel ● Drive plate/Flywheel ● Heated oxygen sensor 1 (front)
P0301	<ul style="list-style-type: none"> ● No. 1 cylinder misfires. 	
P0302	<ul style="list-style-type: none"> ● No. 2 cylinder misfires. 	
P0303	<ul style="list-style-type: none"> ● No. 3 cylinder misfires. 	
P0304	<ul style="list-style-type: none"> ● No. 4 cylinder misfires. 	



DTC Confirmation Procedure

NIEC0203

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
Hold the accelerator pedal as steady as possible.

NOTE:

Refer to the freeze frame data for the test driving conditions.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-344.

With GST

Follow the procedure "With CONSULT-II" above.

**DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE,
MULTIPLE CYLINDER MISFIRE**

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0204

1	CHECK FOR INTAKE AIR LEAK
1. Start engine and run it at idle speed. 2. Listen for the sound of the intake air leak.	
OK or NG	
OK	▶ GO TO 2.
NG	▶ Discover air leak location and repair.

2	CHECK FOR EXHAUST SYSTEM CLOGGING
Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace it.

3	CHECK EGR FUNCTION
Perform DTC Confirmation Procedure for DTC P1402 EGR FUNCTION (OPEN). Refer to EC-570.	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair EGR system.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

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4 PERFORM POWER BALANCE TEST

With CONSULT-II

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

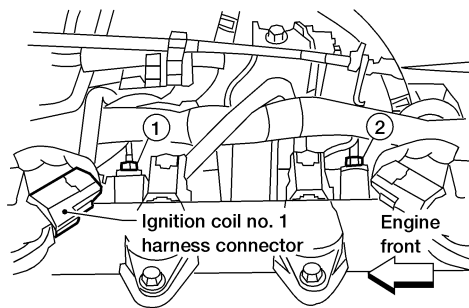
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

2. Is there any cylinder which does not produce a momentary engine speed drop?

Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



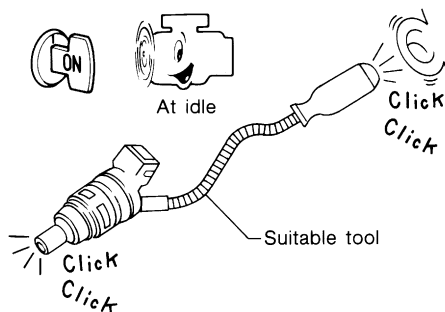
LEC242

Yes or No

- | | | |
|-----|---|----------|
| Yes | ▶ | GO TO 5. |
| No | ▶ | GO TO 8. |

5 CHECK INJECTOR

Does each injector make an operating sound at idle?



MEC703B

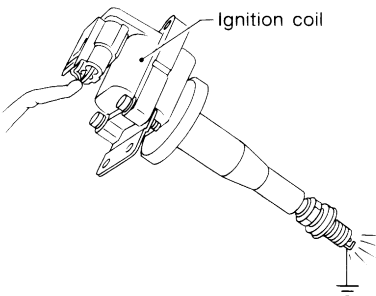
Yes or No

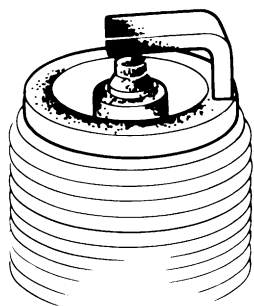
- | | | |
|-----|---|--|
| Yes | ▶ | GO TO 6. |
| No | ▶ | Check injector(s) and circuit(s). Refer to EC-664. |

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SPARK	
<p>1. Turn Ignition switch "OFF". 2. Disconnect ignition wire from spark plug. 3. Connect a known-good spark plug to the ignition wire. 4. Place end of spark plug against a suitable ground and crank engine. 5. Check for spark.</p>		
		
SEF575Q		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

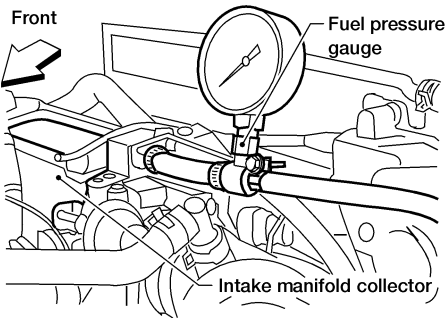
7	CHECK SPARK PLUGS	
Remove the spark plugs and check for fouling, etc.		
		
SEF156I		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-16 , "ENGINE MAINTENANCE".

8	CHECK COMPRESSION PRESSURE	
Refer to EM-66 , "Measurement of Compression Pressure".		
<ul style="list-style-type: none"> ● Check compression pressure. <ul style="list-style-type: none"> Standard: 1,324 kPa (13.5 kg/cm², 192 psi)/300 rpm Minimum: 1,157 kPa (11.8 kg/cm², 168 psi)/300 rpm Difference between each cylinder: 98 kPa (1.0 kg/cm², 14 psi)/300 rpm 		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK FUEL PRESSURE		
<p>1. Install any parts removed.</p> <p>2. Release fuel pressure to zero. Refer to EC-67.</p> <p>3. Install fuel pressure gauge and check fuel pressure.</p>			
			
<p>At idle: Approx. 235 kPa (2.4 kg/cm², 34 psi)</p>			
OK or NG			
OK		▶	GO TO 11.
NG		▶	GO TO 10.

LEC314

10	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to EC-673. ● Fuel pressure regulator Refer to EC-68. ● Fuel lines. Refer to MA-19, "Checking Fuel Lines". ● Fuel filter for clogging 			
		▶	Repair or replace.

11	CHECK IGNITION TIMING		
<p>Perform "Basic Inspection", EC-127.</p>			
OK or NG			
OK		▶	GO TO 12.
NG		▶	Adjust ignition timing.

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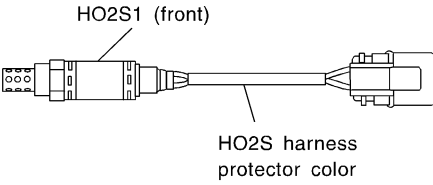
EL



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DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

12	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
<p>1. Turn ignition switch "OFF".</p> <p>2. Check the HO2S1 (front) harness protector color, and disconnect the corresponding HO2S1 (front) harness connector.</p>		
 <p style="text-align: center;">HO2S1 (front)</p> <p style="text-align: center;">HO2S harness protector color</p>		
<p>HO2S1 (front) (bank 1): Blue HO2S1 (front) (bank 2): Black</p>		
LEC426		
<p>3. Check HO2S1 heater (front), refer to EC-259.</p>		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace heated oxygen sensor 1 (front).

13	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>		
<p> With GST Check mass air flow sensor signal in MODE 1 with GST. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>		
OK or NG		
OK	▶	GO TO 15.
NG	▶	GO TO 14.

14	CHECK CONNECTORS	
<p>Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-174.</p>		
OK or NG		
NG	▶	Repair or replace it.

15	CHECK SYMPTOM MATRIX CHART	
<p>Check items on the rough idle symptom in "Symptom Matrix Chart", EC-145.</p>		
OK or NG		
OK	▶	GO TO 16.
NG	▶	Repair or replace.

16	ERASE THE 1ST TRIP DTC	
<p>Some tests may cause a 1st trip DTC to be set. Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-98.</p>		
OK or NG		
	▶	GO TO 17.

**DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE,
MULTIPLE CYLINDER MISFIRE**

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

17	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

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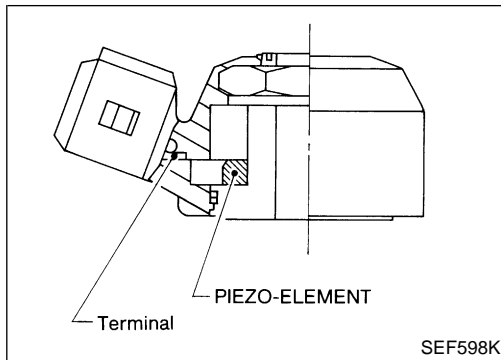
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DTC P0325 KNOCK SENSOR (KS) QG18DE (EXC CALIF CA)

Component Description



Component Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM. NIEC0206

Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction. The knock sensor has one trip detection logic.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NIEC0209

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 5 seconds at idle speed.
- 3) If DTC is detected, go to "Diagnostic Procedure", EC-352.

With GST

Follow the procedure "With CONSULT-II" above.

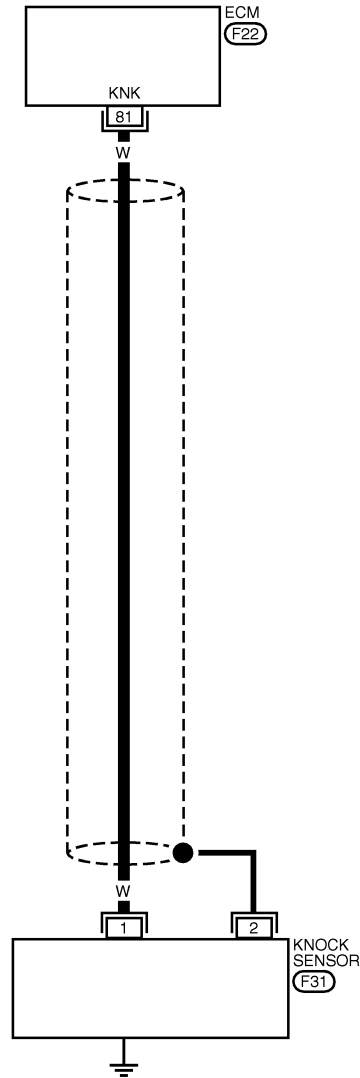
DTC P0325 KNOCK SENSOR (KS) [QG18DE (EXC CALIF CA)]

Wiring Diagram

Wiring Diagram

NIEC0210

EC-KS-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC

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101	102	1	2	3	4	5	6	7	8	9	10					58	59	60	61	62	63	64	65	66	67	109	110
103	104	11	12	13	14	15	16	17	18	19					39	40	41	42	43	44	45	46	47	48		111	112
105	106	20	21	22	23	24	25	26	27	28	29				49	50	51	52	53	54	55	56	57		113	114	
107	108	30	31	32	33	34	35	36	37	38															115	116	



WEC386

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
81	W	KNOCK SENSOR	ENGINE RUNNING AT IDLE SPEED	APPROX. 2.5V

SEF572Y

Diagnostic Procedure

NIEC0211

1	RETIGHTEN GROUND SCREWS
Loosen and retighten engine ground screws.	
WEC249	
▶	GO TO 2.

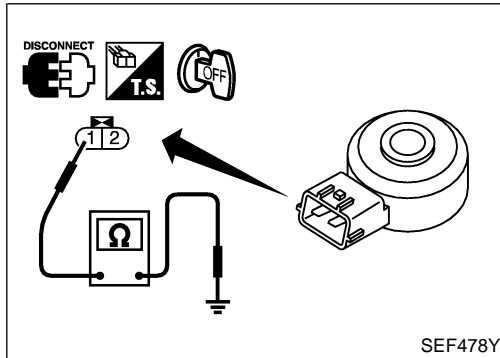
2	CHECK INPUT SIGNAL CIRCUIT-1
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and knock sensor harness connector.</p>	
SEF729Y	
<p>3. Check harness continuity between knock sensor terminal 1 and ECM terminal 81. Refer to "Wiring Diagram", EC-351. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	DETECT MALFUNCTIONING PART
Check the harness for open or short between knock sensor and ECM.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK KNOCK SENSOR
Knock sensor Refer to "Component Inspection", EC-353.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace knock sensor.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

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Component Inspection
KNOCK SENSOR

NIEC0212

NIEC0212S01

- Use an ohmmeter which can measure more than 10 MΩ.

1. Disconnect knock sensor harness connector.
2. Check resistance between terminal 1 and ground.

Resistance: 500 - 620 kΩ [at 20°C (68°F)]

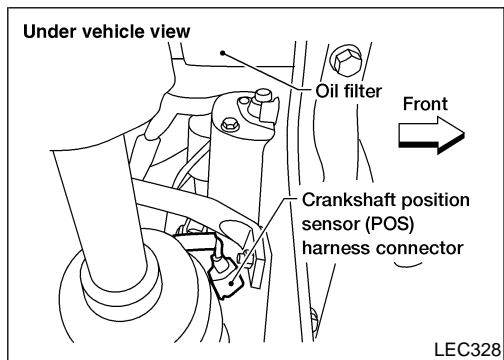
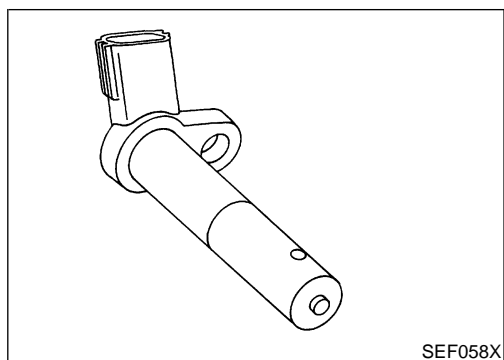
CAUTION:

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of the crankshaft. It detects the fluctuation of the engine revolution. NIEC0213

The sensor consists of a permanent magnet and hall IC. When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

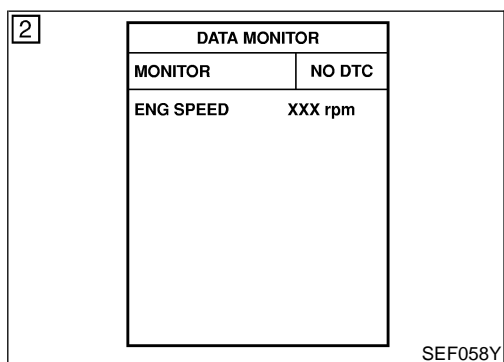
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

On Board Diagnosis Logic

NIEC0215

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0335	<ul style="list-style-type: none"> The crankshaft position sensor signal is not detected by the ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors (The crankshaft position sensor (POS) circuit is open.) Crankshaft position sensor (POS)



DTC Confirmation Procedure

NIEC0216

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that the battery voltage is more than 10.5V and the ignition switch is "ON".

With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
- If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-356.

With GST

Follow the procedure "With CONSULT-II" above.

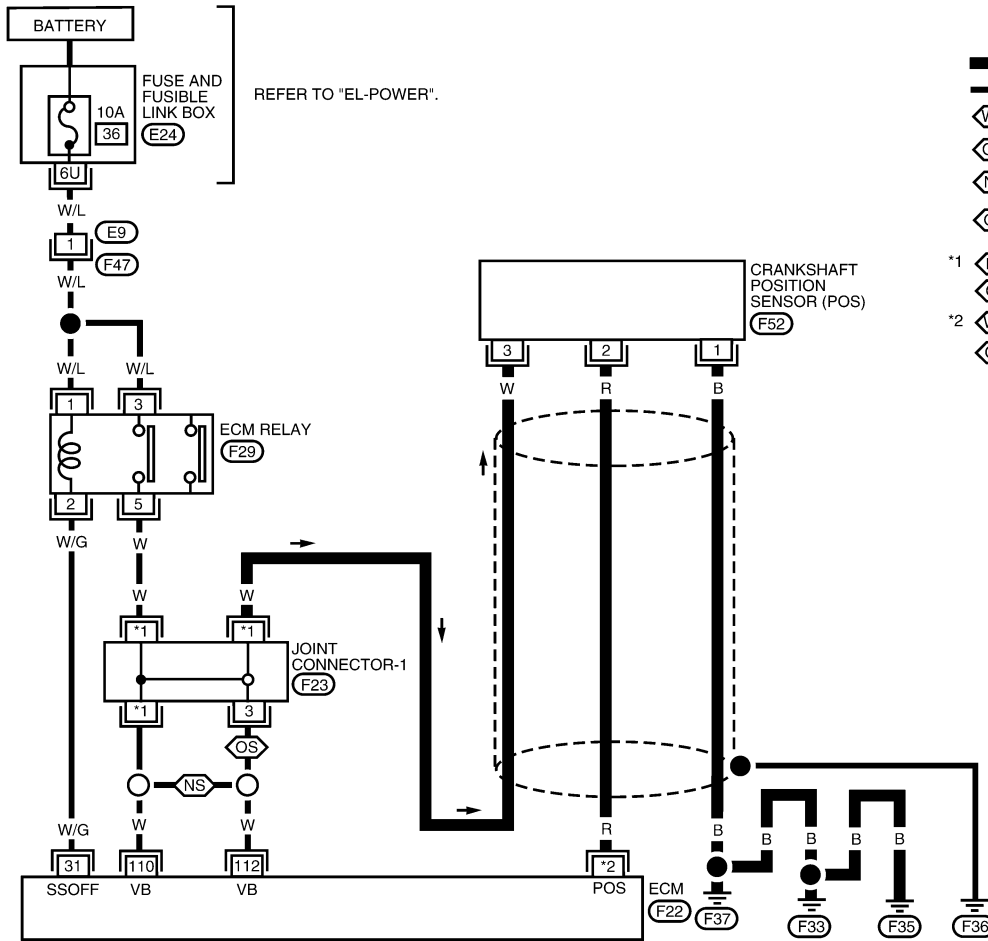
DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

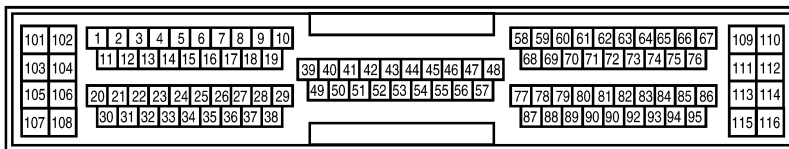
NIEC0217



EC-POS-01

- : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC
- WN : WITH NVIS (NATS)
- ON : WITHOUT NVIS (NATS)
- NS : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- OS : WITH OLD STYLE JOINT CONNECTOR LAYOUT
- *1 NS : 1
- *2 OS : 3
- WN : 85
- ON : 75

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REFER TO THE FOLLOWING.
F23 - JOINT CONNECTOR

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WEC941

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
75 WITHOUT NVIS (NATS)	R	CRANKSHAFT POSITION SENSOR (POS)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 3.0V - 4.0V
85 WITH NVIS (NATS)			ENGINE RUNNING AT 2,000 RPM	APPROX. 3.0V - 4.0V

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DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0218

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
WEC249	
▶ GO TO 2.	

2	CHECK POWER SUPPLY
<p>1. Disconnect crankshaft position sensor (POS) harness connector.</p>	
LEC328	
<p>2. Check voltage between harness connector terminal 3 and ground with CONSULT-II or tester.</p>	
SEF479Y	
<p>3. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between ECM relay and crankshaft position sensor (POS) 	
▶ Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL CIRCUIT										
<p>1. Check continuity between ECM terminal and crankshaft position sensor (POS) terminal as follows. Refer to "Wiring Diagram", EC-355.</p>											
<table border="1" style="margin: auto;"> <thead> <tr> <th style="width: 20%;"></th> <th style="width: 30%;">ECM terminal</th> <th style="width: 30%;">Sensor</th> </tr> </thead> <tbody> <tr> <td>Without NVIS</td> <td style="text-align: center;">75</td> <td style="text-align: center;">2</td> </tr> <tr> <td>With NVIS</td> <td style="text-align: center;">85</td> <td style="text-align: center;">2</td> </tr> </tbody> </table>				ECM terminal	Sensor	Without NVIS	75	2	With NVIS	85	2
	ECM terminal	Sensor									
Without NVIS	75	2									
With NVIS	85	2									
Continuity should exist.											
SEF887Z											
<p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>											
OK	▶	GO TO 6.									
NG	▶	GO TO 5.									

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5	DETECT MALFUNCTIONING PART	
<p>Check the harness for open or short between crankshaft position sensor (POS) and ECM.</p>		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

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6	CHECK GROUND CIRCUIT	
<p>1. Reconnect ECM harness connector.</p> <p>2. Check harness continuity between crankshaft position sensor (POS) terminal 1 and engine ground. Refer to the "Wiring Diagram", EC-355.</p> <p style="color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between crankshaft position sensor (POS) and ECM ● Harness for open or short between crankshaft position sensor (POS) and TCM (Transmission control module) 		
▶ Repair open circuit or short to power in harness or connectors.		

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8	CHECK CRANKSHAFT POSITION SENSOR (POS)	
<p>Refer to "Component Inspection", EC-358.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace crankshaft position sensor (POS).

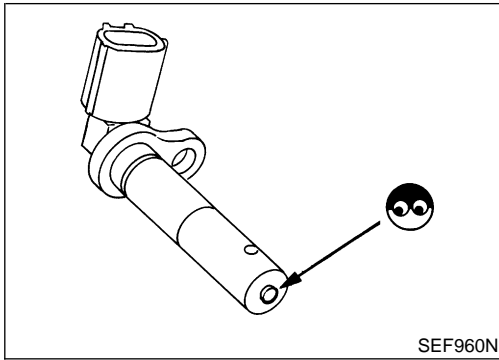
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9	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.</p>		
▶ INSPECTION END		

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (EXC CALIF CA)

Component Inspection

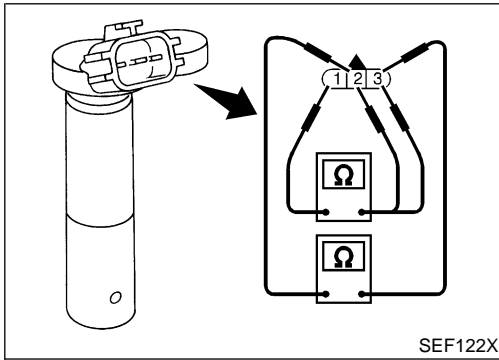


Component Inspection CRANKSHAFT POSITION SENSOR (POS)

NIEC0219

NIEC0219S01

1. Disconnect crankshaft position sensor (POS) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

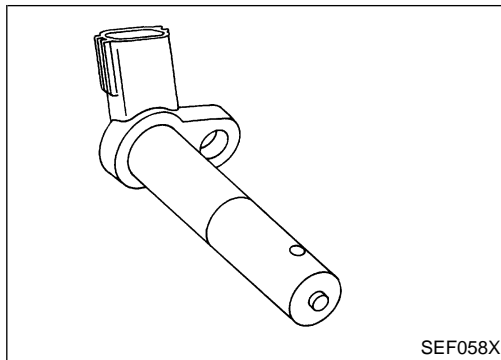
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
2 (+) - 1 (-)	
3 (+) - 2 (-)	

If NG, replace crankshaft position sensor (POS).

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The camshaft position sensor (PHASE) senses the protrusion provided with exhaust valve cam sprocket to identify a particular cylinder. The crankshaft position sensor (POS) senses the piston position.

When the crankshaft position sensor (POS) system becomes inoperative, the camshaft position sensor (PHASE) provides various controls of engine parts instead, utilizing timing of cylinder identification signals.

The sensor consists of a permanent magnet, core and coil.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

NIEC0220

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On Board Diagnosis Logic

NIEC0222

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0340	<ul style="list-style-type: none"> The cylinder No. signal is not entered to ECM for the first few seconds during engine cranking. The cylinder No. signal is not enter to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors (The camshaft position sensor (PHASE) circuit is open or shorted.) Camshaft position sensor (PHASE) Starter motor (Refer to SC-10.) Starting system circuit (Refer to SC-10.)

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DTC Confirmation Procedure

NIEC0223

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

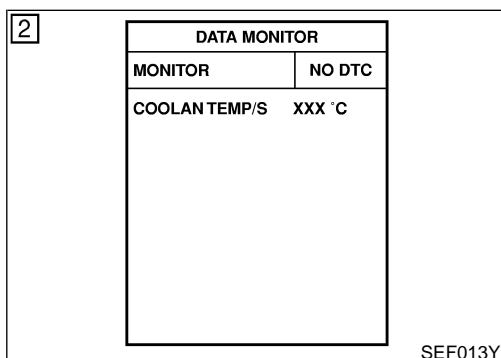
Before performing the following procedure, confirm that battery voltage is more than 10.5V.

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With CONSULT-II

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Crank engine for at least 2 seconds and run it for at least 5 seconds at idle speed.
- If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-361.

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With GST

Follow the procedure "With CONSULT-II" above.

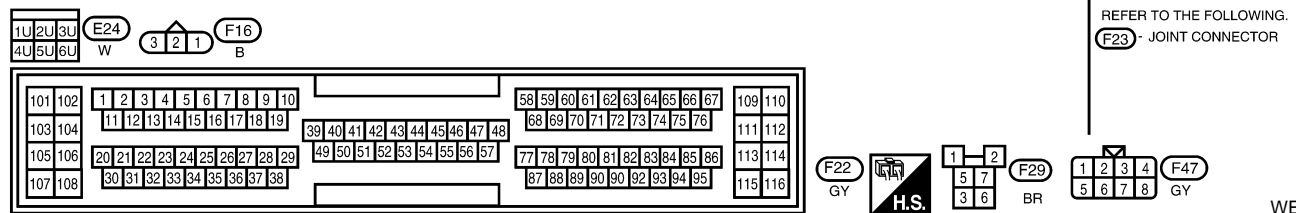
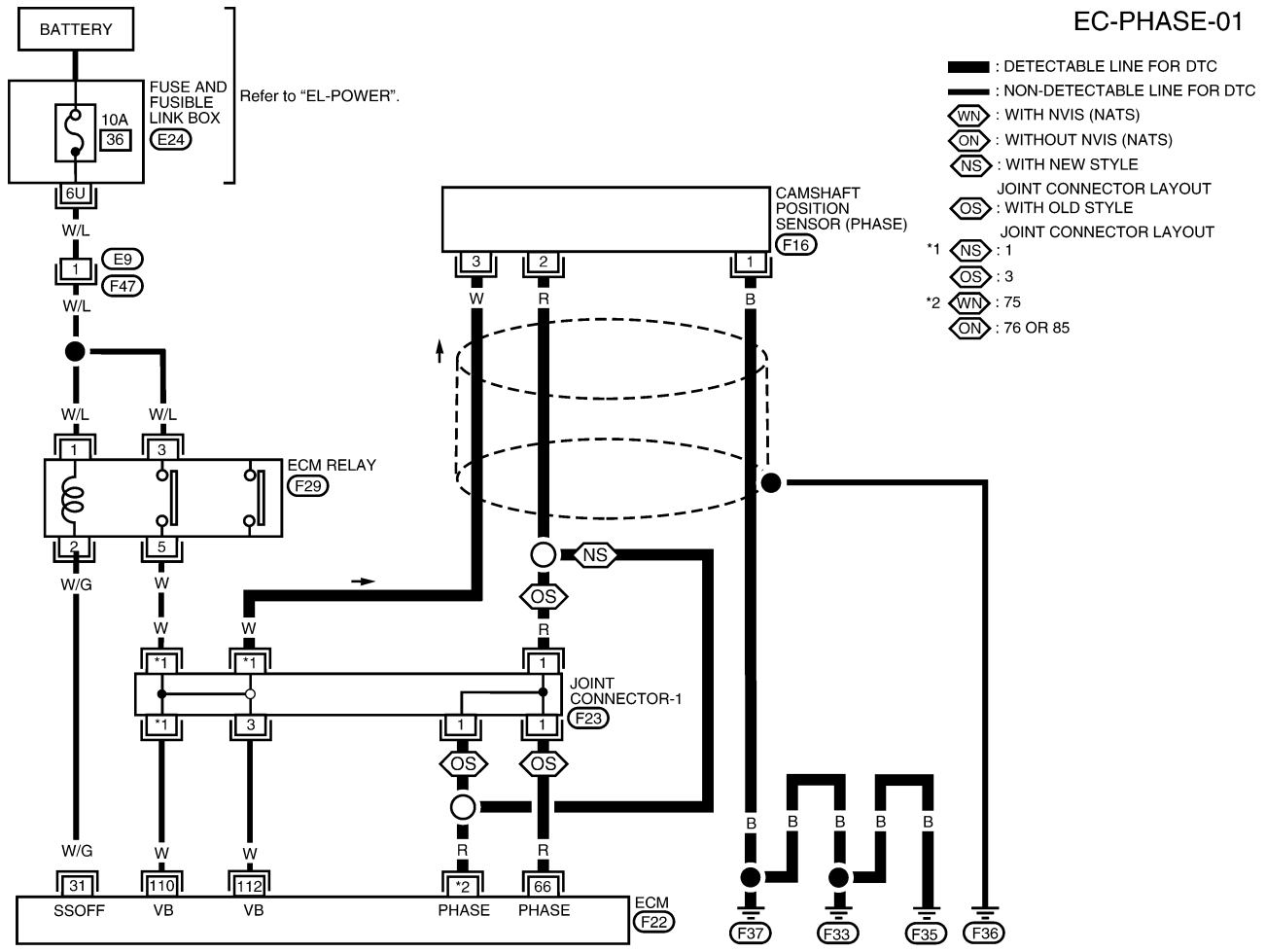
DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC0224



WEC918

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
76, 85 WITHOUT NVIS (NATS)	R	CAMSHAFT POSITION SENSOR (PHASE)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 3.0V - 4.0V (V)
66 OR 75 WITH NVIS (NATS)			ENGINE RUNNING AT 2,000 RPM	APPROX. 3.0V - 4.0V (V)

LEC919

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

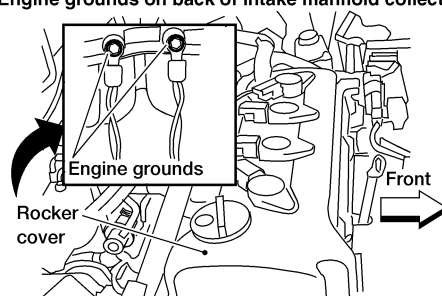
Diagnostic Procedure

Diagnostic Procedure

NIEC0225

1	CHECK STARTING SYSTEM	
Does the engine turn over? (Does the starter motor operate?)		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Check starting system. (Refer to SC-10 , "STARTING SYSTEM".)

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2	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
<small>WEC249</small>		
▶		GO TO 3.

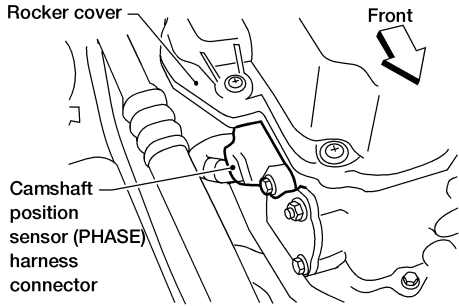
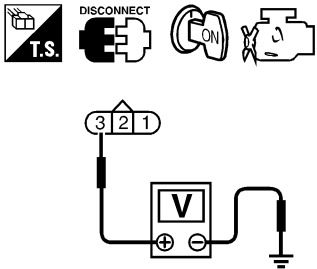
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DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK POWER SUPPLY	
<p>1. Disconnect camshaft position sensor (PHASE) harness connector.</p> <div style="text-align: center;">  </div>		
WEC253		
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between camshaft position sensor (PHASE) terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div>		
SEF481Y		
Voltage: Battery voltage		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between camshaft position sensor (PHASE) and ECM relay ● Harness for open or short between camshaft position sensor (PHASE) and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between camshaft position sensor (PHASE) terminal 2 and appropriate ECM terminal. Refer to "Wiring Diagram", EC-360.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between camshaft position sensor (PHASE) and ECM 		
▶	Repair open circuit or short to ground or short to power in harness or connectors.	

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7	CHECK GROUND CIRCUIT	
1. Turn ignition switch "OFF". 2. Check harness continuity between camshaft position sensor (PHASE) terminal 1 and engine ground. Refer to the "Wiring Diagram", EC-360. Continuity should exist. 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to power in harness or connectors.

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8	CHECK CAMSHAFT POSITION SENSOR (PHASE)	
Refer to "Component Inspection", EC-364.		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace camshaft position sensor (PHASE).

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9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶	INSPECTION END	

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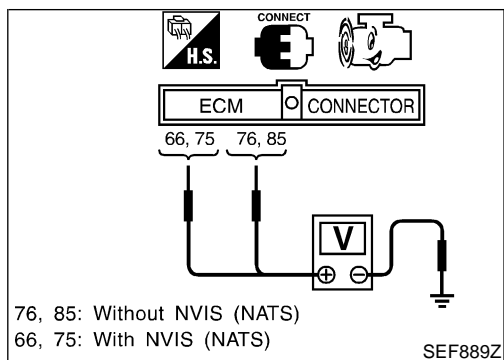
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DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (EXC CALIF CA)

Component Inspection



Component Inspection CAMSHAFT POSITION SENSOR (PHASE)

-NIEC0226

NIEC0226S01

1. Start engine and warm it up to normal operating temperature.
2. Check voltage between ECM terminals and engine ground as follows.

ECM Terminals	Application
76, 85	Without NVIS (NATS)
66, 75	With NVIS (NATS)

Condition	Idle	2,000 rpm
Voltage	Approximately 2.0 - 3.0V	Approximately 2.0 - 3.0V
Pulse signal	<p>SEF977W</p>	<p>SEF978W</p>

If NG, replace camshaft position sensor (PHASE).

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Description

Description SYSTEM DESCRIPTION

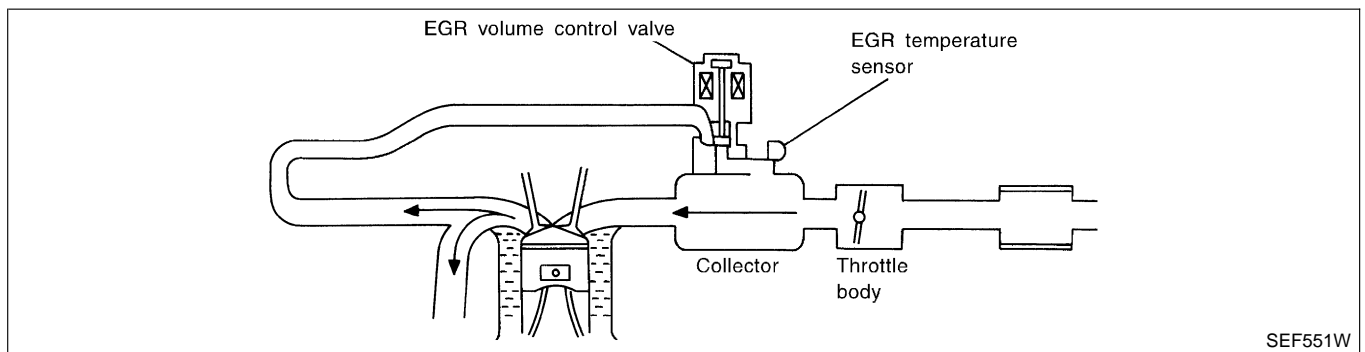
NIEC0513

NIEC0513S01

Sensor	Input Signal to ECM	ECM func-tion	Actuator
Crankshaft position sensor (POS)	Engine speed	EGR vol- ume control	EGR volume control valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission control module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR bypass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains closed under the following conditions.

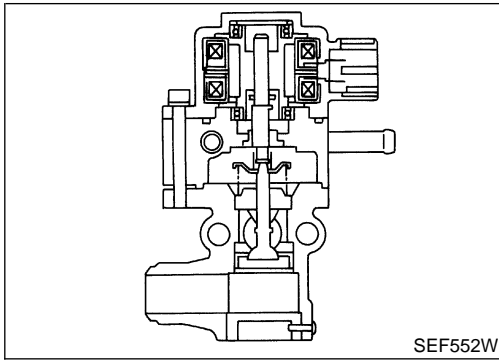
- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Description (Cont'd)



COMPONENT DESCRIPTION

EGR volume control valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC0513S02

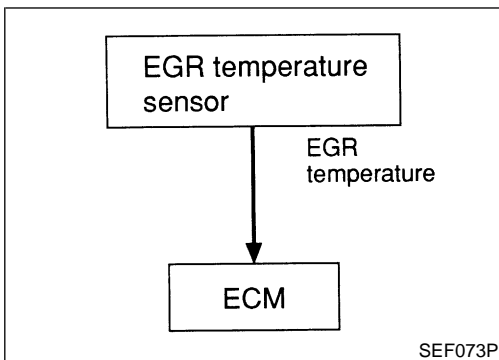
NIEC0513S0201

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC0514

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 steps



On Board Diagnosis Logic

If the absence of EGR flow is detected by EGR temperature sensor under the condition that calls for EGR, a low-flow malfunction is diagnosed.

Malfunction is detected when no EGR flow is detected under condition that calls for EGR.

NIEC0515

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve stuck closed
- Dead (Weak) battery
- EGR passage clogged
- EGR temperature sensor and circuit
- Exhaust gas leaks

NIEC0516

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S	XXX °C

SEF013Y

5	EGR SYSTEM P0400	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec	
THRTL POS SEN	XXX V	

SEF732Y

8	EGR SYSTEM P0400	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec	
THRTL POS SEN	XXX V	

SEF733Y

8	EGR SYSTEM P0400	
	COMPLETED	

SEF235Y

DTC Confirmation Procedure

NIEC0517

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 5 seconds before conducting the next test.
- P0400 will not be displayed at "SELF-DIAG RESULTS" mode with CONSULT-II even though DTC work support test result is NG.

TESTING CONDITION:

- Before performing the following procedure, confirm battery voltage is more than 10V at idle, then stop engine immediately.
- For best results, perform the test at a temperature of 5°C (41°F) or higher.

WITH CONSULT-II

NIEC0517S01

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON"
- 3) Check "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
Confirm COOLAN TEMP/S value is within the range listed below.

COOLAN TEMP/S: Less than 40°C (104°F)

If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the engine coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

- 4) Start engine and let it idle monitoring "COOLAN TEMP/S" value. When the "COOLAN TEMP/S" value reaches 70°C (158°F), immediately go to the next step.
- 5) Select "EGR SYSTEM P0400" of "EGR SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) Accelerate vehicle to a speed of 40 km/h (25 MPH) once and then stop vehicle with engine running.
If "COMPLETED" appears on CONSULT-II screen, go to step 9.
If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.
- 8) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 9) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions until "TESTING" changes to "COMPLETED". (It will take approximately 30 seconds or more.)

ENG SPEED	1,200 - 3,600 rpm
Vehicle speed	More than 10 km/h (6 MPH)
B/FUEL SCHDL	4.5 - 8.0 msec
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 10) Make sure that "OK" is displayed after touching "SELF-DIAG"

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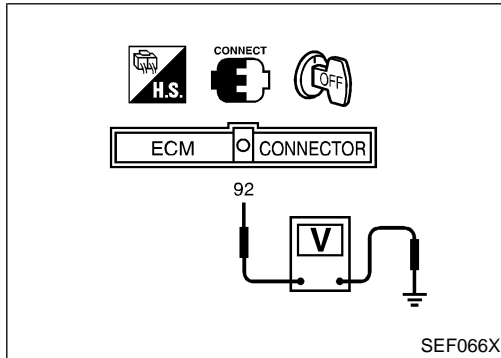
IDX

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-370.



WITH GST

NIEC0517S02

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 2) Turn ignition switch "ON".
 - 3) Check engine coolant temperature in MODE 1 with GST.
Engine coolant temperature: Less than 40°C (104°F)
If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
 - 4) Start engine and let it idle monitoring the value of "COOLAN TEMP/S". When the engine coolant temperature reaches 70°C (158°F), immediately go to the next step.
 - 5) Maintain the following conditions for at least 1 minute.
Engine speed: 1,800 - 2,800 rpm
Vehicle speed: More than 10 km/h (6 MPH)
Voltage between ECM terminal 92 and ground: 0.86 - 2.0V
Selector lever: Suitable position
 - 6) Stop vehicle.
 - 7) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
 - 8) Repeat steps 3 to 5.
 - 9) Select "MODE 3" with GST.
 - 10) If DTC is detected, go to "Diagnostic Procedure", EC-370.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

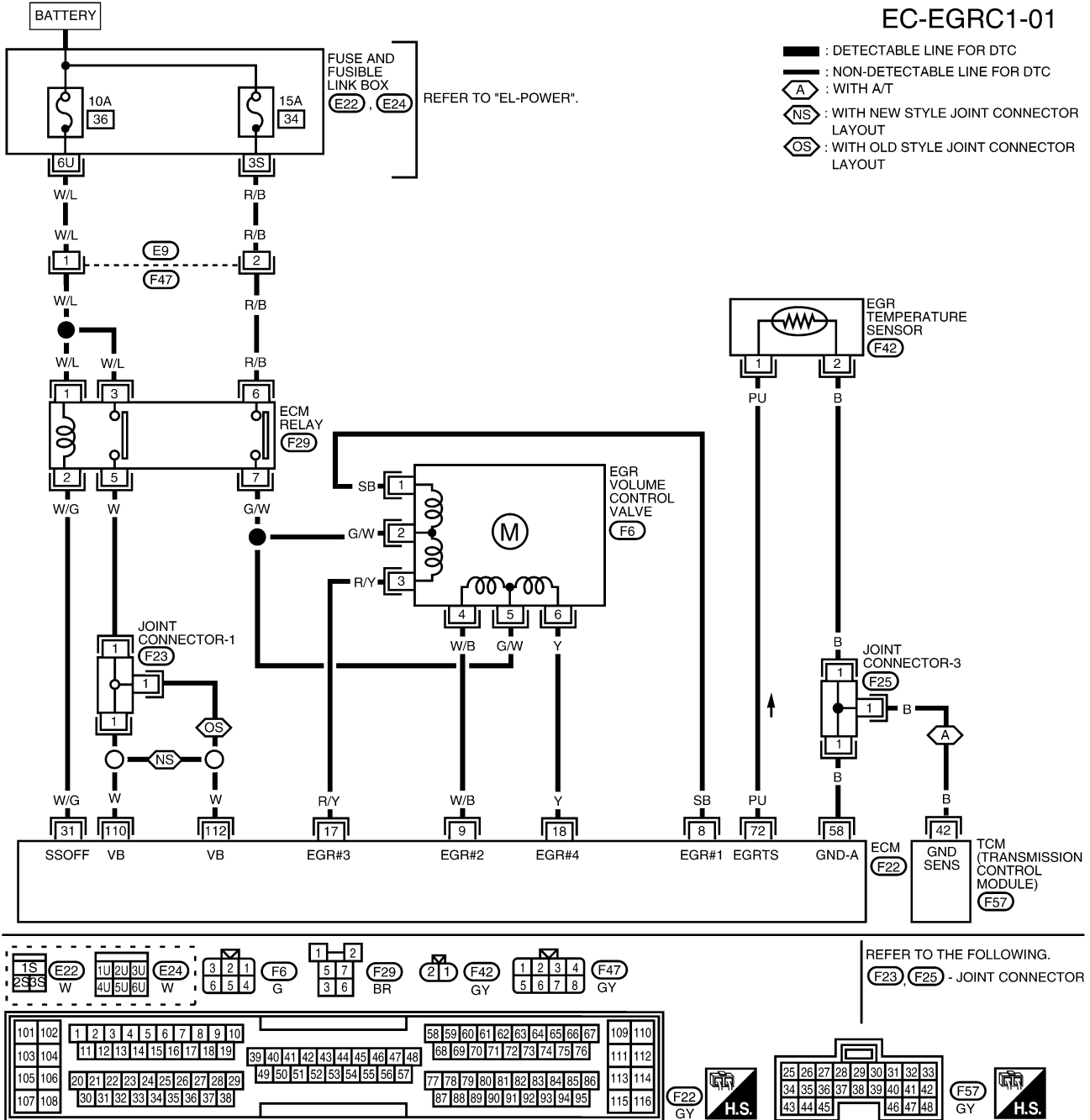
DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0518



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

WEC942

SEF180ZA

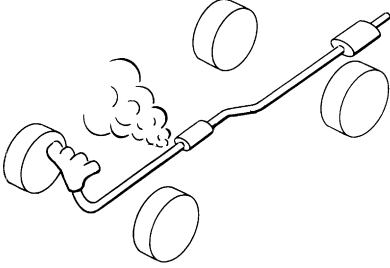
DTC P0400 EGR FUNCTION (CLOSE)

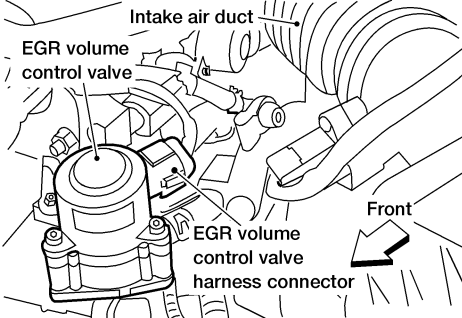
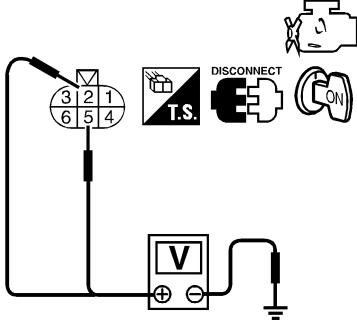
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0519

1	CHECK EXHAUST SYSTEM	
<p>1. Start engine. 2. Check exhaust pipes and muffler for leaks.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace exhaust system.

2	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT	
<p>1. Disconnect EGR volume control valve harness connector.</p>		
		
LEC333		
<p>2. Turn ignition switch "ON". 3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>		
		
Voltage: Battery voltage		
SEF327X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 15A fuse ● Harness connectors E9, F47 ● Harness for open or short between fuse and ECM relay ● ECM relay ● Harness for open or short between ECM relay and EGR volume control valve 	
▶	Repair harness or connectors, or replace fuse or ECM relay.

GI
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EM

4	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-369.</p>											
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">8</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">9</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">17</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">18</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve										
8	1										
9	4										
17	3										
18	6										
MTBL0570											
<p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>											
OK	▶ GO TO 5.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

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5	CHECK EGR PASSAGE
<p>Check EGR passage for clogging and cracks.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Repair or replace EGR passage.

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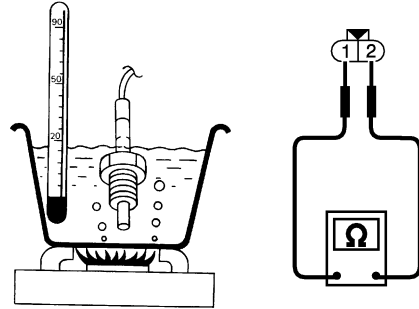
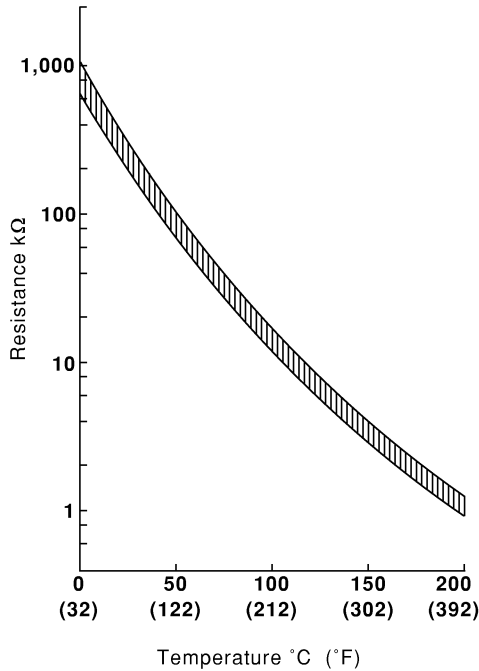
DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6 CHECK EGR TEMPERATURE SENSOR AND CIRCUIT

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

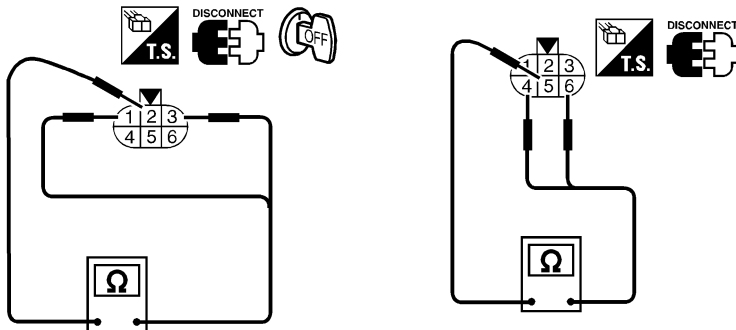
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR temperature sensor. |

7 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

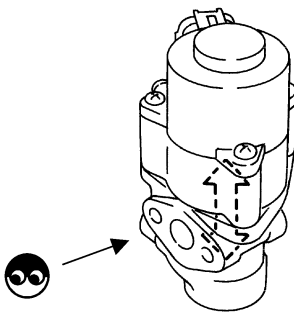
OK or NG

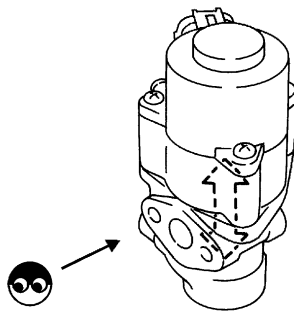
- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 8. |
| OK (Without CONSULT-II) | ▶ | GO TO 9. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK EGR VOLUME CONTROL VALVE-II																									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="margin: 10px auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;">  </div> <p style="text-align: right; margin-top: 10px;">SEF491Y</p>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
ACTIVE TEST																										
EGR VOL CONT/V	20 step																									
MONITOR																										
ENG SPEED	XXX rpm																									
EGR TEMP SEN	XXX V																									
OK or NG																										
OK	▶	GO TO 10.																								
NG	▶	Replace EGR volume control valve.																								

9	CHECK EGR VOLUME CONTROL VALVE-II	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
<div style="display: flex; justify-content: center; align-items: center; margin-top: 10px;">  </div> <p style="text-align: right; margin-top: 10px;">SEF560W</p>		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace EGR volume control valve.

10	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Description

Description SYSTEM DESCRIPTION

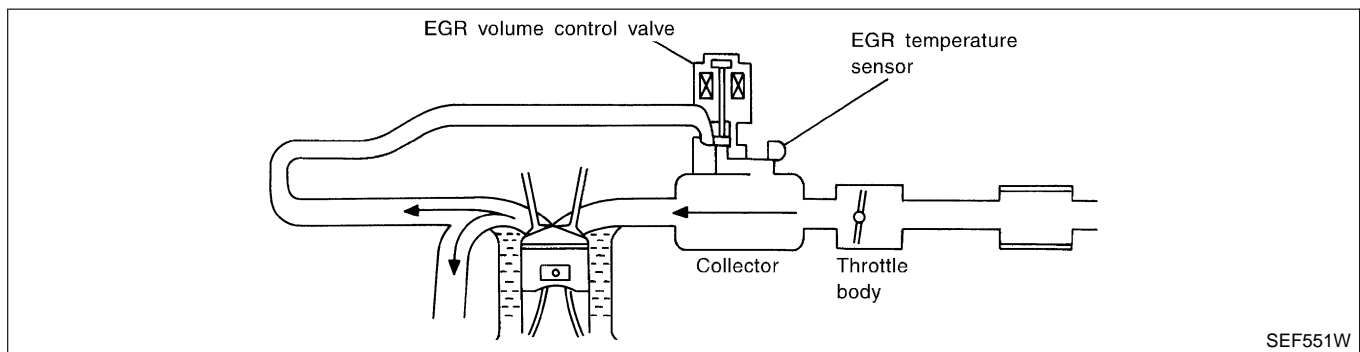
NIEC0520

NIEC0520S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and cylinder position	EGR volume control	EGR volume control valve
Crankshaft position sensor (POS)	Engine speed		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission control module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR bypass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains closed under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

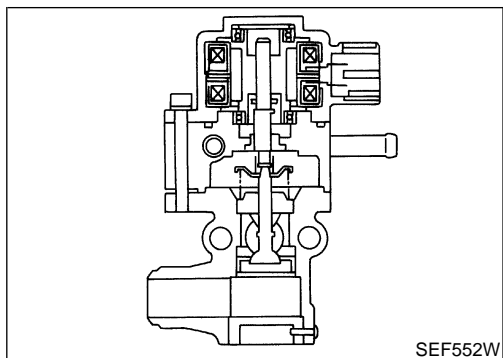


SEF551W

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Description (Cont'd)



SEF552W

COMPONENT DESCRIPTION

EGR volume control valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC0520S02

NIEC0520S0201

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CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC0521

EC

MONITOR ITEM	CONDITION	SPECIFICATION
EGR VOL CON/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle 0 step
	Revvng engine up to 3,000 rpm quickly	10 - 55 steps

FE

CL

MT

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

NIEC0522

AT

FAIL-SAFE MODE

When the ECM enters the fail-safe mode, the MIL illuminates.

NIEC0522S01

AX

Detected items	Engine operating condition in fail-safe mode
EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.

SU

BR

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve

NIEC0523

ST

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DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

NIEC0524

SC

EL

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

IDX

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

WITH CONSULT-II

NIEC0524S01

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Rev engine from idle to 2,000 rpm 10 times.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-378.

WITH GST

NIEC0524S02

Follow the procedure "With CONSULT-II" above.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

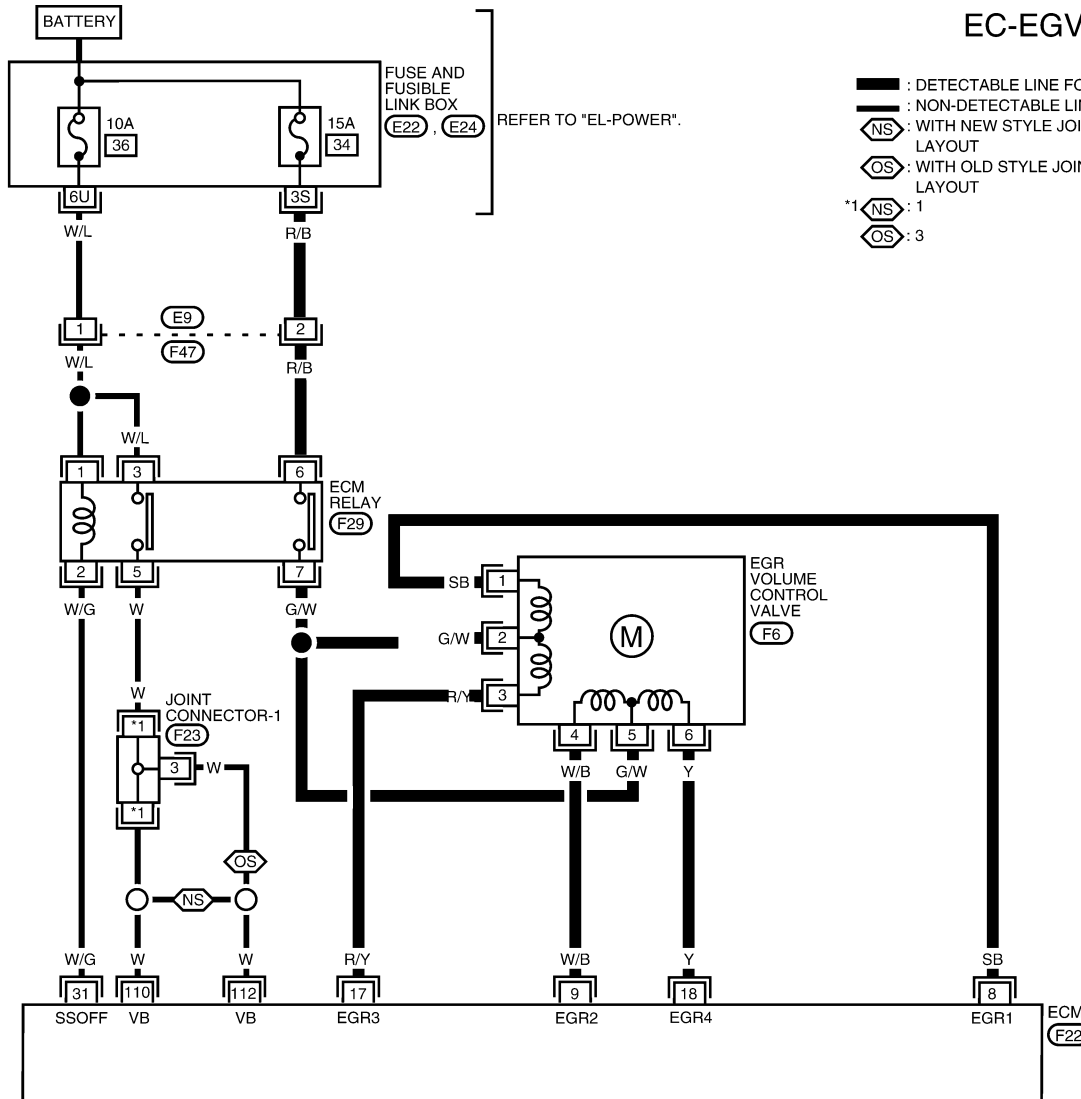
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

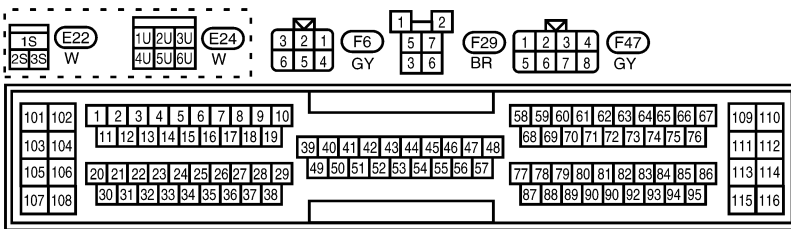
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EC-EGVC/V-01



- : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC
- ⊖NS : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- ⊖OS : WITH OLD STYLE JOINT CONNECTOR LAYOUT
- *1 ⊖NS : 1
- ⊖OS : 3

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WEC943

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

SEF181ZA

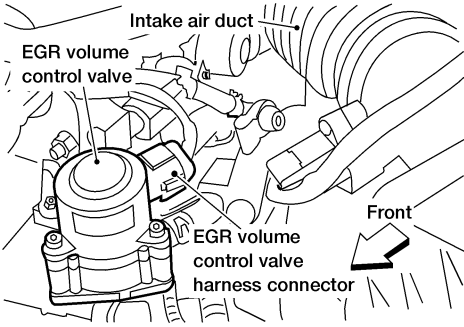
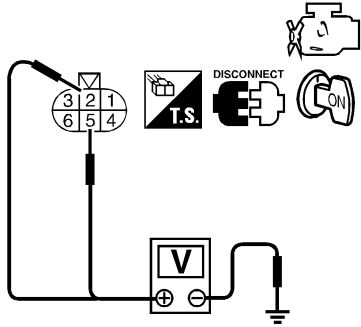
DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0526

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC333</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF327X</p> </div> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

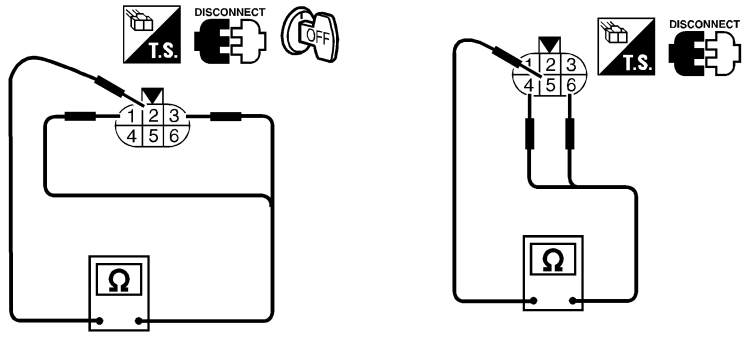
2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 15A fuse ● Harness connectors E9, F47 ● Harness open or short between fuse and ECM relay ● ECM relay ● Harness for open or short between ECM relay and EGR volume control valve 	
▶	Repair harness or connectors or replace fuse or ECM relay.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT											
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-377.</p>												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">8</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">9</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">17</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">18</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>			ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve											
8	1											
9	4											
17	3											
18	6											
MTBL0571												
<p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>												
OK	▶	GO TO 4.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

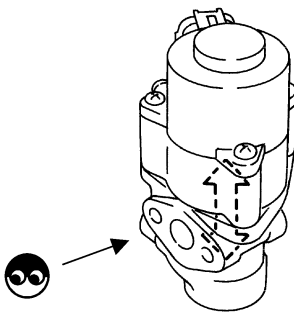
4	CHECK EGR VOLUME CONTROL VALVE-I	
<p>Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>		
		
<p>Resistance: 20.9 - 23.1 Ω [At 20°C (68°F)]</p>		
SEF588X		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 5.
OK (Without CONSULT-II)	▶	GO TO 6.
NG	▶	Replace EGR volume control valve.

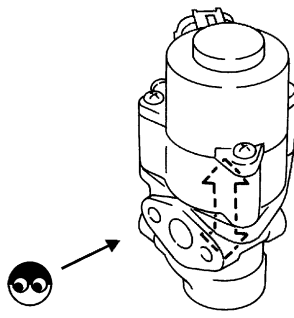
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DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK EGR VOLUME CONTROL VALVE-II																						
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																							
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EGR VOL CONT/V	20 step																						
MONITOR																							
ENG SPEED	XXX rpm																						
EGR TEMP SEN	XXX V																						
SEF491Y																							
OK or NG																							
OK	▶	GO TO 7.																					
NG	▶	Replace EGR volume control valve.																					

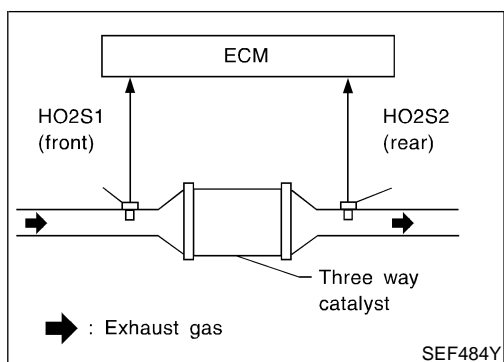
6	CHECK EGR VOLUME CONTROL VALVE-II	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
		
SEF560W		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace EGR volume control valve.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶ INSPECTION END	

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic



On Board Diagnosis Logic

NIEC0240

The ECM monitors the switching frequency ratio of sensor 1 and sensor 2 of heated oxygen sensors.

A three way catalyst with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2 (rear). As oxygen storage capacity decreases, the heated oxygen sensor 2 (rear) switching frequency will increase.

When the frequency ratio of sensor 1 and sensor 2 heated oxygen sensors approaches a specified limit value, the three way catalyst malfunction is diagnosed.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0420 P0430	<ul style="list-style-type: none"> Three way catalyst does not operate properly. Three way catalyst does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> Three way catalyst Exhaust tube Intake air leaks Injectors Injector leaks Spark plug Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF671Y

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF672Y

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF560X

DTC Confirmation Procedure

NIEC0241

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

NIEC0241S01

TESTING CONDITION:

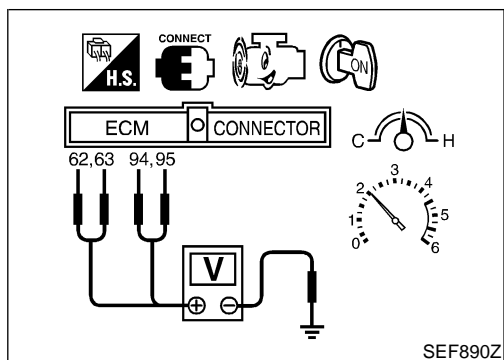
- Open engine hood before conducting the following procedure.
- Do not hold engine speed for more than the specified minutes below.

- Turn ignition switch "ON".
- Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
- Start engine.
- Rev engine up to 3,000 ± 500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely. If "INCMP" of CATALYST changes to "CMPLT", go to step 7).
- Wait 5 seconds at idle.
- Rev engine up to 2,500±500 rpm and maintain it until "INCMP" of CATALYST changes to "CMPLT" (It will take approximately 5 minutes). If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
- Select "SELF-DIAG RESULTS" mode with CONSULT-II.
- Confirm that the 1st trip DTC is not detected. If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-382.

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

QG18DE (EXC CALIF CA)

Overall Function Check



Overall Function Check

NIEC0242

Use this procedure to check the overall function of the three way catalyst. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeters probes between ECM terminals and engine ground as follows.

ECM terminal	Ground
HO2S1 (front) (B2) 62 HO2S2 (rear) (B2) 63	Ground
HO2S1 (front) (B1) 94 HO2S2 (rear) (B1) 95	Ground

- 4) Keep engine speed at 2,000 rpm constant under no load.
- 5) Make sure that the voltage switching frequency (high & low) between ECM terminal 94 (95) and engine ground is much less than that of ECM terminal 62 (63) and engine ground.

Switching frequency ratio = A/B

A: Rear heated oxygen sensor voltage switching frequency

B: Front heated oxygen sensor voltage switching frequency

This ratio should be less than 0.75.

If the ratio is greater than above, it means three way catalyst does not operate properly.

NOTE:

If the voltage at terminal 62 (63) does not switch periodically more than 5 times within 10 seconds at step 4, perform trouble diagnosis for DTC P0133 first. (See EC-235.)

Diagnostic Procedure

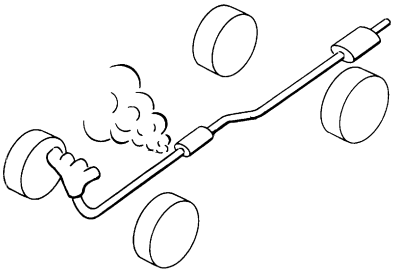
NIEC0243

1	CHECK EXHAUST SYSTEM	
Visually check exhaust tubes and muffler for dent.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

DTC P0420, P0430 THREE WAY CATALYST FUNCTION

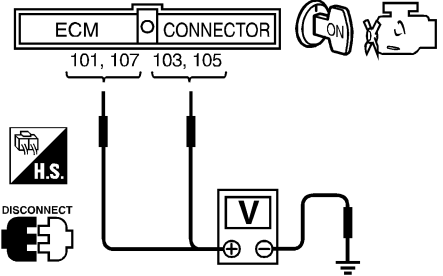
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before the three way catalyst.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

3	CHECK INTAKE AIR LEAK	
Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace.

4	CHECK IGNITION TIMING	
Check for ignition timing. Refer to "BASIC INSPECTION", EC-127.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Adjust ignition timing.

5	CHECK INJECTORS	
<p>1. Refer to Wiring Diagram for Injectors, EC-665. 2. Stop engine and then turn ignition switch "ON". 3. Check voltage between ECM terminals 101 and 107 (103 and 105) and ground with CONSULT-II or tester.</p>		
		
SEF891Z		
Battery voltage should exist.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Perform "Diagnostic Procedure" INJECTOR, EC-666.

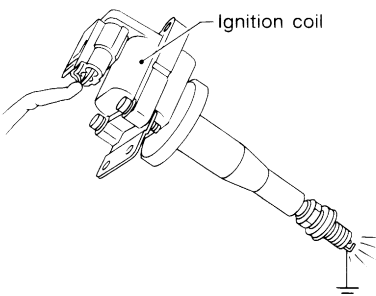
Terminal	CYL No.	Bank
101	1	1
107	4	
103	2	2
105	3	

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DTC P0420, P0430 THREE WAY CATALYST FUNCTION

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SPARK	
<ol style="list-style-type: none"> 1. Disconnect ignition wire from spark plug. 2. Connect a known-good spark plug to the ignition coil assembly. 3. Place end of spark plug against a suitable ground and crank engine. 4. Check for spark. 		
		
SEF575Q		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	CHECK INJECTOR	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove injector assembly. Refer to EC-68. Keep fuel hose and all injectors connected to injector gallery. 3. Disconnect ignition coil assembly harness connector. 4. Turn ignition switch "ON". Make sure fuel does not drip from injector. 		
OK or NG		
OK (Does not drip)	▶	GO TO 8.
NG (Drips)	▶	Replace the injector(s) from which fuel is dripping.

8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
Trouble is fixed	▶	INSPECTION END
Trouble is not fixed	▶	Replace three way catalyst.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0527

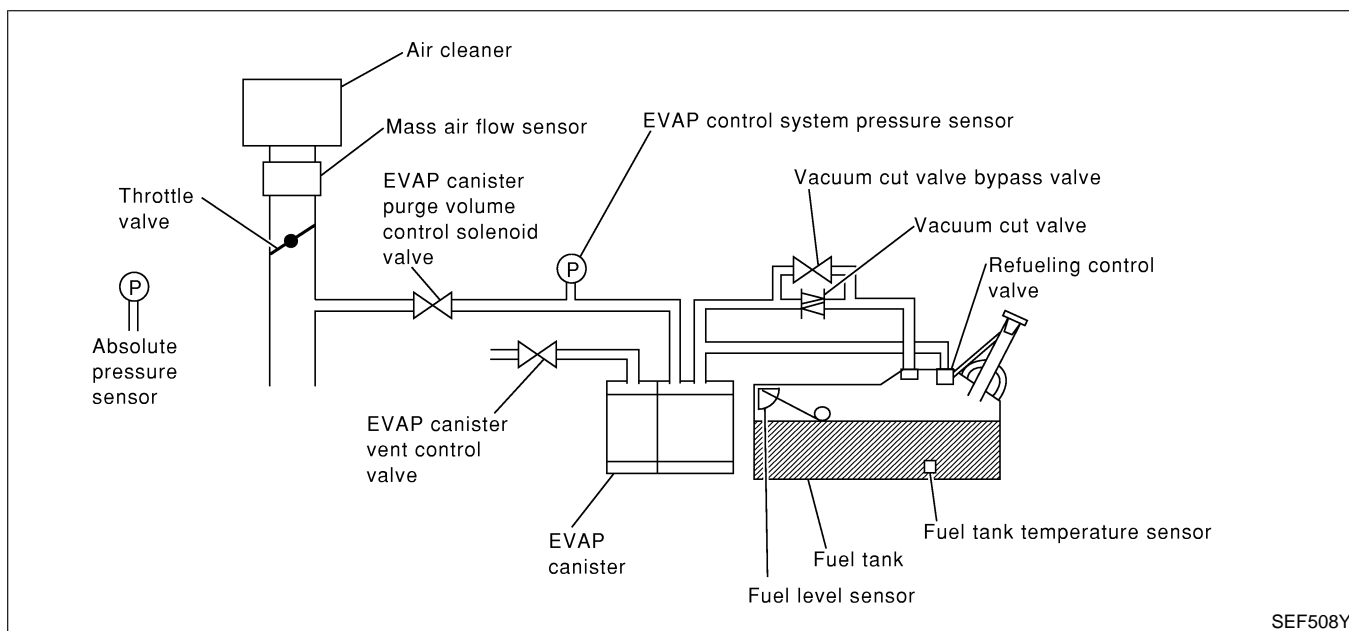
NOTE:

If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-627.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC0528

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Absolute pressure sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged
- Water separator
- EVAP canister is saturated with water
- EVAP control system pressure sensor
- Fuel level sensor and the circuit
- Refueling control valve
- ORVR system leaks

EVAP SML LEAK P0440/P1440
<p>1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. <p>2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC.THEN RESTART.</p> <p>3)TOUCH START.</p>

SEF565X

5	EVAP SML LEAK P0440/P1440
	<p>WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.</p>

SEF566X

5	EVAP SML LEAK P0440/P1440
	OK
	SELF-DIAG RESULTS
	<p>NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.</p>

SEF567X

DTC Confirmation Procedure

NIEC0529

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-627.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting following procedure.

WITH CONSULT-II

NIEC0529S01

- 1) Turn ignition switch "ON".
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
- 5) Select "EVAP SML LEAK P0440/P1440" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
 Follow the instruction displayed.

NOTE:

- If the engine speed cannot be maintained within the range

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-127.

- Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, refer to “Diagnostic Procedure”, EC-387.

WITH GST

NIEC0529S02

NOTE:

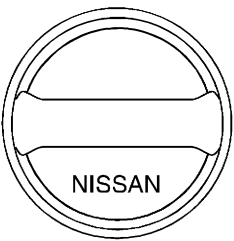
Be sure to read the explanation of “Driving Pattern” on EC-92 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-92.
- 3) Stop vehicle.
- 4) Select “MODE 1” with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch “OFF” and wait at least 10 seconds.
- 6) Start engine.

It is not necessary to cool engine down before driving.
- 7) Drive vehicle again according to the “Driving Pattern”, EC-92.
- 8) Stop vehicle.
- 9) Select “MODE 3” with GST.
 - If P0440 or P1440 is displayed on the screen, go to “Diagnostic Procedure”, EC-387.
 - If P1447 is displayed on the screen, go to “Diagnostic Procedure” for DTC P1447, EC-618.
 - If P0440, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select “MODE 1” with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NIEC0530

1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch “OFF”. 2. Check for genuine NISSAN fuel filler cap design.		
		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

SEF915U

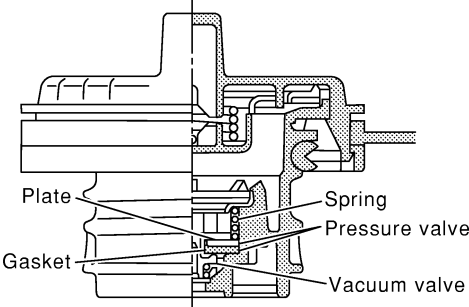
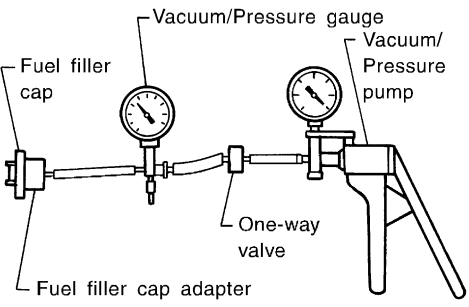
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
<ol style="list-style-type: none"> 1. Wipe valve housing clean. 2. Check valve opening pressure and vacuum. 		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

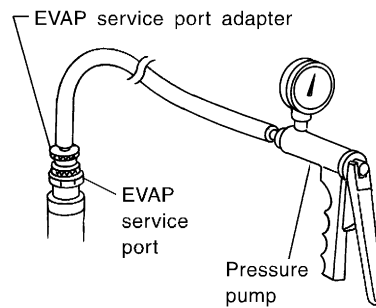
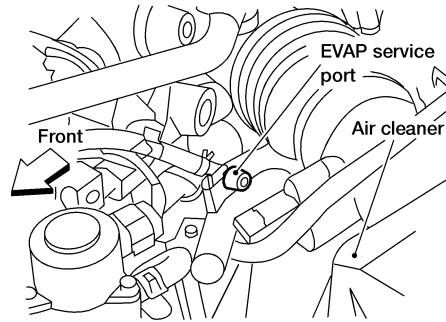
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



LEC256

SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II ►	GO TO 6.
Models without CON-SULT-II ►	GO TO 7.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

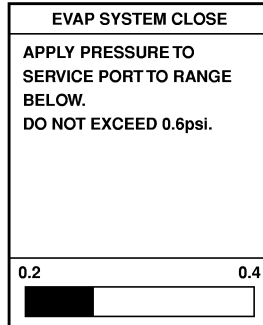
6 CHECK FOR EVAP LEAK

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

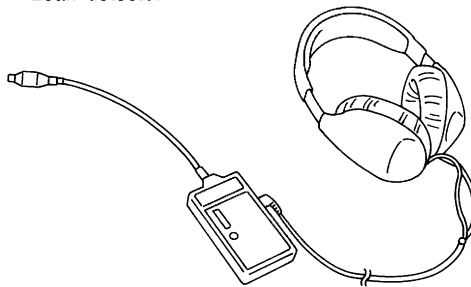
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

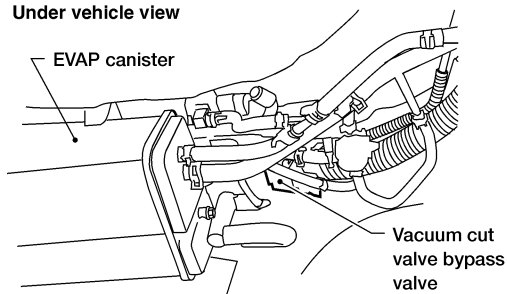
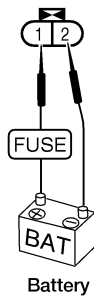
Diagnostic Procedure (Cont'd)

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7 CHECK FOR EVAP LEAK

⊗ **Without CONSULT-II**

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



WEC334

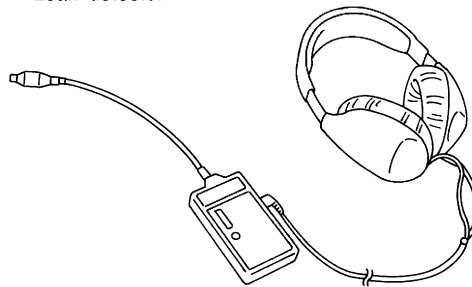
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.

Leak detector



SEF200U

OK or NG

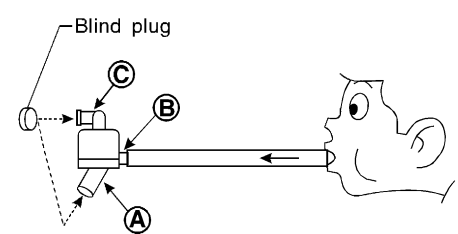
OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	RELEASE EVAP LINE PRESSURE
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 	
▶ GO TO 9.	

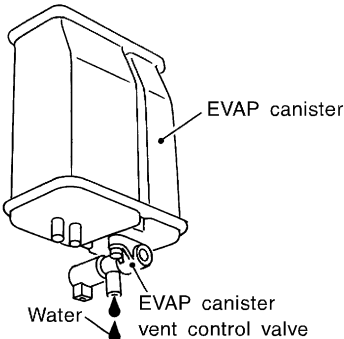
9	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
 <p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
SEF829T	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. 	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace water separator.

10	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-400.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister?</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 12.
No (With CONSULT-II)	▶	GO TO 14.
No (Without CONSULT-II)	▶	GO TO 15.

12	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
	▶	Repair hose or replace EVAP canister.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>A/F ALPHA-B2</td><td>XX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>X.XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X.XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X.XX V																					
Vacuum should exist.																						
SEF673Y																						
OK or NG																						
OK	▶	GO TO 17.																				
NG	▶	GO TO 16.																				

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue; margin-left: 20px;">Vacuum should exist.</p>		
OK or NG		
OK	▶	GO TO 19.
NG	▶	GO TO 16.

16	CHECK VACUUM HOSE	
<p>Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-42.</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 17.
OK (Without CONSULT-II)	▶	GO TO 18.
NG	▶	Repair or reconnect the hose.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓟ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
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ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
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HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
SEF677Y																						
OK or NG																						
OK	▶	GO TO 19.																				
NG	▶	GO TO 18.																				

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

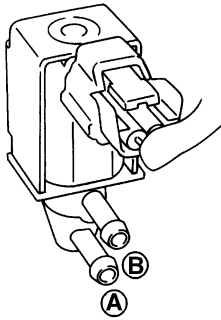
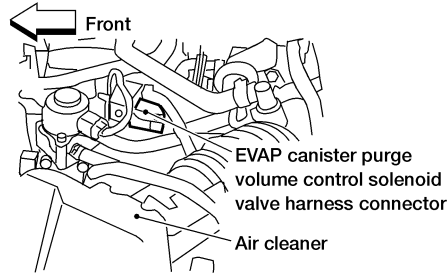
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

18 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



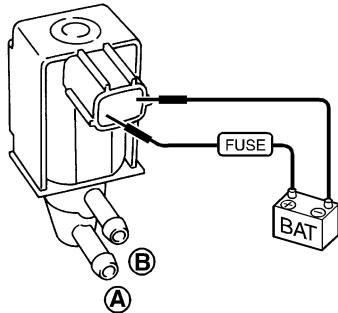
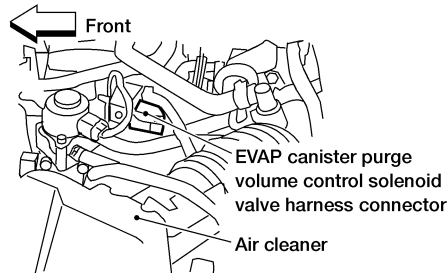
Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

WEC254

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

WEC254

SEF335X



OK or NG

OK	▶	GO TO 19.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

19	CHECK ABSOLUTE PRESSURE SENSOR	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure" for absolute pressure sensor. See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
Yes or No		
Yes	▶	GO TO 20.
No	▶	GO TO 21.

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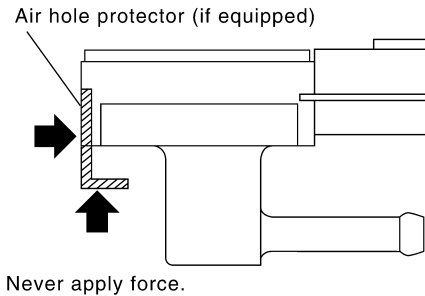
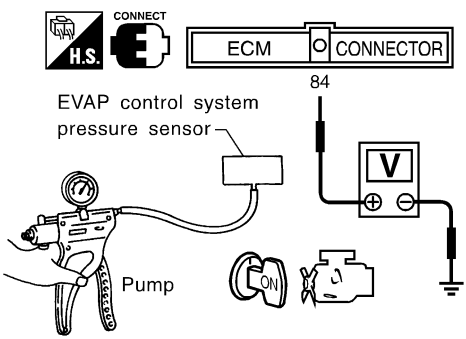
20	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-100. 3. Perform "Idle Air Volume Learning", EC-83. Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	GO TO 20.
INCMP	▶	Follow the instruction of "Idle Air Volume Learning", then GO TO 21.

21	CHECK FUEL TANK TEMPERATURE SENSOR	
<ol style="list-style-type: none"> 1. Remove fuel level sensor unit. 2. Check fuel tank temperature sensor. Refer to "Component Inspection", EC-323. 		
OK or NG		
OK	▶	GO TO 22.
NG	▶	Replace fuel level sensor unit.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

22	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 23.
NG	▶ Replace EVAP control system pressure sensor.

23	CHECK EVAP PURGE LINE
<p>Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-48.</p>	
OK or NG	
OK	▶ GO TO 24.
NG	▶ Repair or reconnect the hose.

24	CLEAN EVAP PURGE LINE
<p>Clean EVAP purge line (pipe and rubber tube) using air blower.</p>	
▶	GO TO 25.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

25	CHECK REFUELING EVAP VAPOR LINE	
<ul style="list-style-type: none"> ● Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to “EVAPORATIVE EMISSION LINE DRAWING”, EC-53. 		
OK or NG		
OK	▶	GO TO 26.
NG	▶	Repair or replace hoses and tubes.

GI

MA

EM

26	CHECK SIGNAL LINE AND RECIRCULATION LINE	
<ul style="list-style-type: none"> ● Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection. 		
OK or NG		
OK	▶	GO TO 27.
NG	▶	Repair or replace hoses, tubes or filler neck tube.

LC

EC

FE

27	CHECK REFUELING CONTROL VALVE	
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check that there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 		
OK or NG		
OK	▶	GO TO 28.
NG	▶	Replace refueling control valve with fuel tank.

CL

MT

AT

AX

28	CHECK FUEL LEVEL SENSOR	
Refer to EL-102 , “Fuel Level Sensor Unit Check”.		
OK or NG		
OK	▶	GO TO 29.
NG	▶	Replace fuel level sensor unit.

SU

BR

ST

29	CHECK INTERMITTENT INCIDENT	
Refer to “TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT”, EC-167.		
		▶ INSPECTION END

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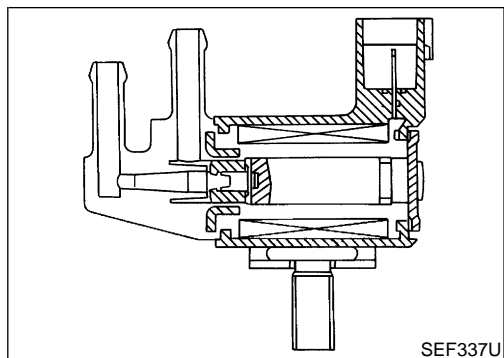
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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Description



Description

COMPONENT DESCRIPTION

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

NIEC0531

NIEC0531S02

CONSULT-II Reference Value in Data Monitor Mode

NIEC0532

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch "OFF" Shift lever: "N" No-load 	Idle (Vehicle stopped)	0%
		2,000 rpm	—

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

NIEC0533

Possible Cause

- Harness or connectors
(The valve circuit is open or shorted.)
- EVAP canister purge volume control solenoid valve

NIEC0534

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC0535

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

- Turn ignition switch "ON".

NIEC0535S01

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 13 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-403. GI



WITH GST

Follow the procedure "WITH CONSULT-II" above.

NIEC0535S02

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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

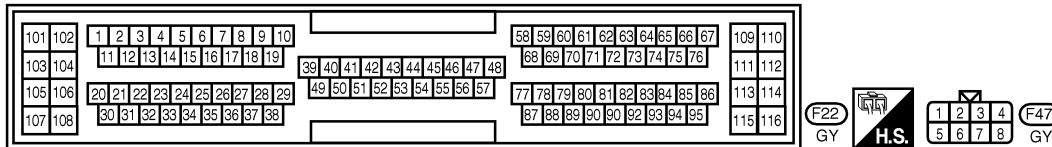
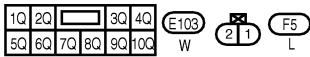
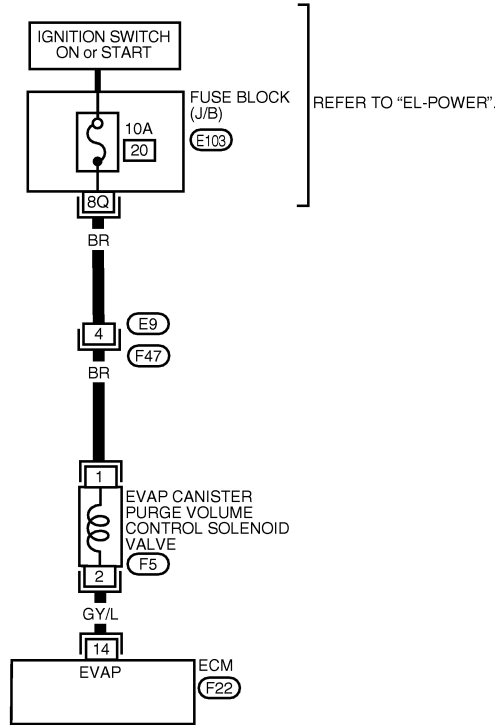
Wiring Diagram

Wiring Diagram

=NIEC0536

EC-PGC/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC401

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	GY/L	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE (V)
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE (V)

SEF576Y

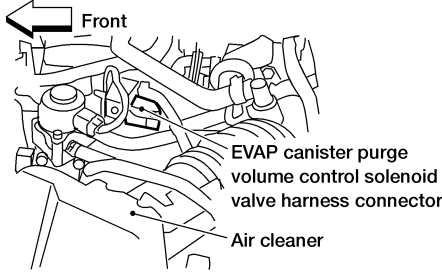
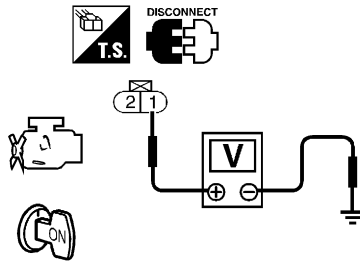
DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0537

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	GI MA EM LC EC FE CL MT AT AX SU BR
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>Front</p> <p>EVAP canister purge volume control solenoid valve harness connector</p> <p>Air cleaner</p> </div> <p style="text-align: right;">WEC254</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF206W</p> </div>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	ST RS BT HA SC EL IDX
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
	▶	Repair harness or connectors.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-402. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 5.
OK (Without CONSULT-II) ▶		GO TO 6.
NG ▶		GO TO 4.

4	DETECT MALFUNCTIONING PART	
Check the harness for open or short between EVAP canister purge volume control solenoid valve and ECM.		
▶		Repair open circuit or short to ground and short to power in harness or connectors.

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p>📖 With CONSULT-II</p> <p>1. Start engine. 2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr> <td>A/F ALPHA-B1</td> <td>XX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
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A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
OK or NG																						
OK ▶		GO TO 7.																				
NG ▶		GO TO 6.																				

SEF677Y

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

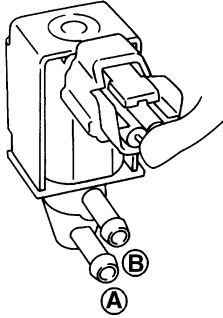
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

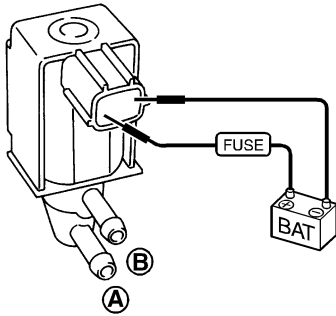


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

7 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

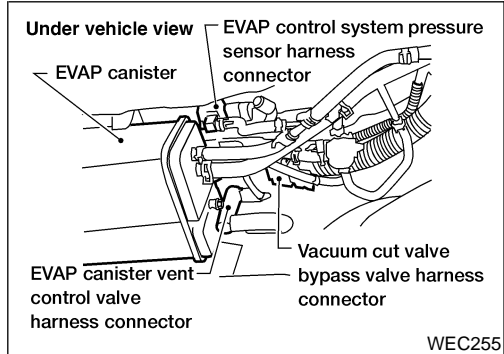
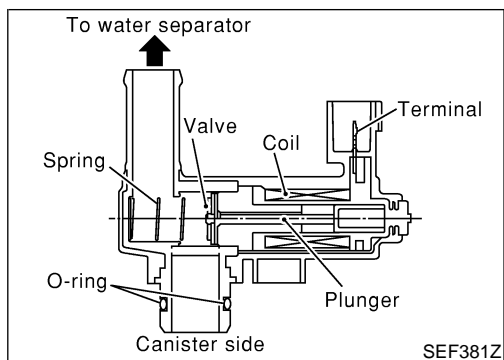
▶ **INSPECTION END**

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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0538

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0539

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

NIEC0540

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve.

Possible Cause

NIEC0541

- Harness or connectors
(The valve circuit is open or shorted.)
- EVAP canister vent control valve

DTC Confirmation Procedure

NIEC0542

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC0542S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 8 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-409.

WITH GST

NIEC0542S02

Follow the procedure "WITH CONSULT-II" above.

GI

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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

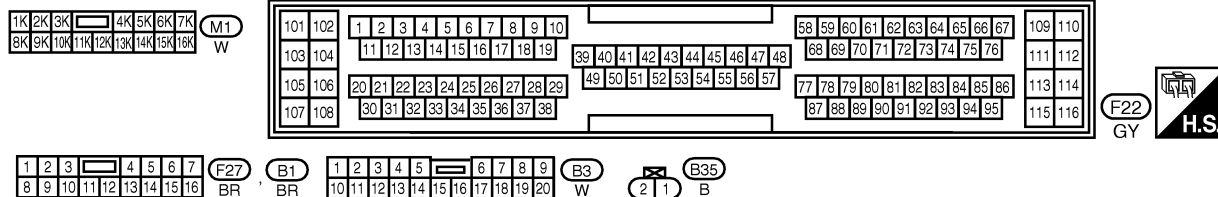
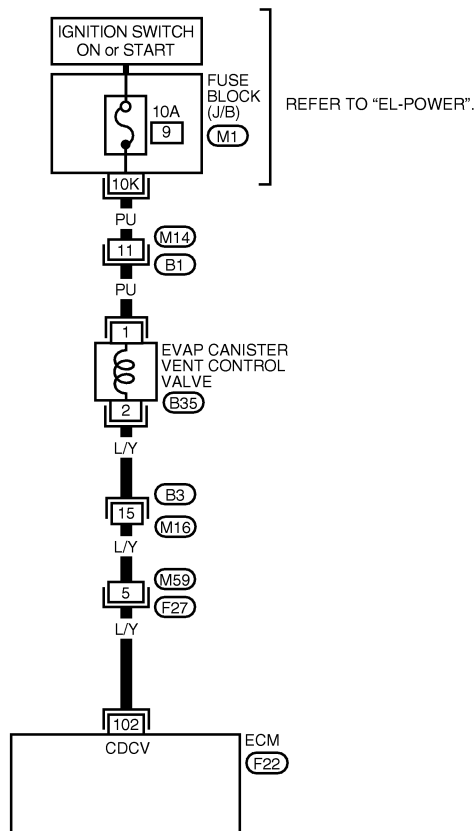
Wiring Diagram

Wiring Diagram

NIEC0543

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF577Y

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0544

1	INSPECTION START	
1. Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

GI
MA
EM

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT																					
<p>📖 With CONSULT-II</p> <p>1. Turn ignition switch "OFF" and then turn "ON".</p> <p>2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.</p> <p>3. Touch "ON/OFF" on CONSULT-II screen.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>A/F ALPHA-B2</td><td>XX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>X. XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
<p>4. Check for operating sound of the valve. Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

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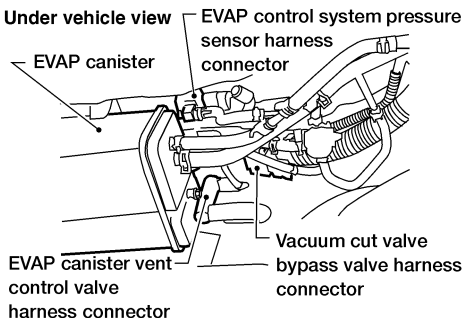
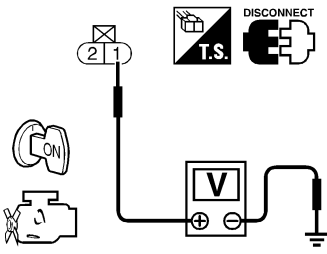
HA
SC

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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister vent control valve harness connector.</p> <div style="text-align: center;">  <p style="font-size: small;">Under vehicle view</p> <p style="font-size: small;">EVAP control system pressure sensor harness connector</p> <p style="font-size: small;">EVAP canister</p> <p style="font-size: small;">EVAP canister vent control valve harness connector</p> <p style="font-size: small;">Vacuum cut valve bypass valve harness connector</p> </div> <p style="text-align: right; font-size: x-small;">WEC255</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center; font-weight: bold;">OK or NG</p> <p style="text-align: right; font-size: x-small;">SEF336X</p> </div>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between EVAP canister vent control valve and fuse 	
▶	Repair harness or connectors.

5	CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 102 and EVAP canister vent control valve terminal 2. Refer to "Wiring Diagram", EC-408. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center; font-weight: bold;">OK or NG</p>	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connectors M59, F27 ● Harness for open or short between EVAP canister vent control valve and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

GI

MA

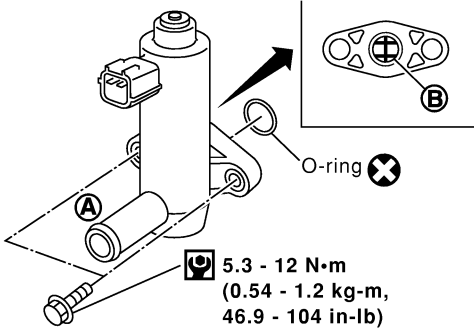
EM

LC

7	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Clean the rubber tube using an air blower.

EC

FE

8	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace EVAP canister vent control valve.

CL

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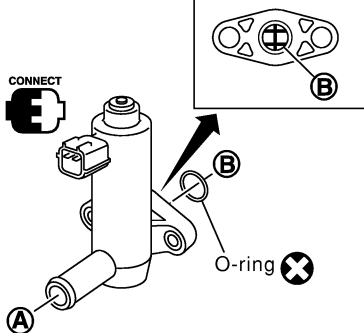
EL

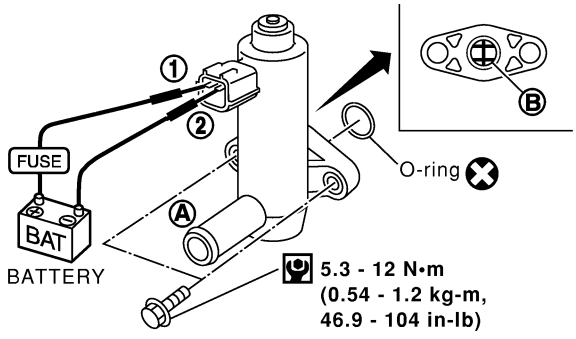
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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II																								
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																									
<table border="1" style="width: 50%; border-collapse: collapse; margin-right: 20px;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> </tbody> </table>  <table border="1" style="width: 50%; border-collapse: collapse; margin-left: 20px;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 5px;">Operation takes less than 1 second.</p>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	XXX V	Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																									
VENT CONTROL/V	OFF																								
MONITOR																									
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HO2S1 MNTR (B1)	LEAN																								
HO2S1 MNTR (B2)	LEAN																								
THRTL POS SEN	XXX V																								
Condition	Air passage continuity between A and B																								
VENT CONTROL/V ON	No																								
VENT CONTROL/V OFF	Yes																								
SEF377Z																									

<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
 <table border="1" style="width: 50%; border-collapse: collapse; margin-left: 20px;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 5px;">Operation takes less than 1 second.</p>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
SEF378Z							
Make sure new O-ring is installed properly.							
OK or NG							
OK	▶	GO TO 11.					
NG	▶	GO TO 10.					

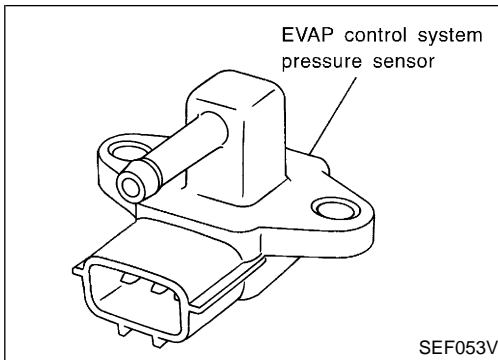
10	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 9 again. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.

NIEC0545

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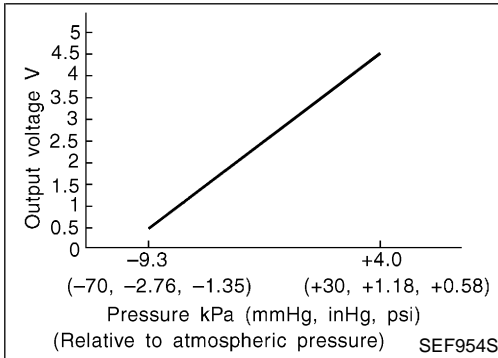
EC

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CONSULT-II Reference Value in Data Monitor Mode

NIEC0546

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 3.4V

AX

SU

BR

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal from EVAP control system pressure sensor is sent to ECM.

NIEC0547

ST

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HA

Possible Cause

NIEC0548

- Harness or connectors (The EVAP control system pressure sensor circuit is open or shorted.)
- Rubber hose to EVAP control system pressure sensor is clogged, vent, kinked, disconnected or improper connection.
- EVAP control system pressure sensor
- EVAP canister vent control valve
- EVAP canister purge volume control solenoid valve
- EVAP canister

SC

EL

IDX

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

- Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

NIEC0549

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 0°C (41°F) or more.

6

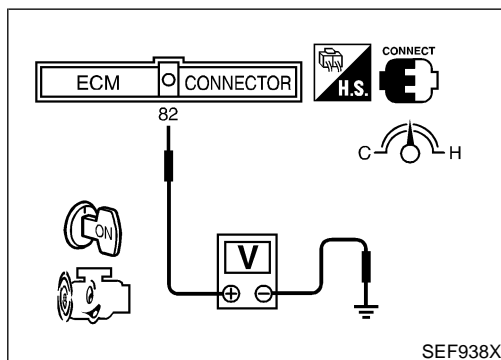
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

WITH CONSULT-II

NIEC0549S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
- 6) Start engine and wait at least 20 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-416.



WITH GST

NIEC0549S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 82 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and wait at least 20 seconds.
- 5) Select "MODE 7" with GST.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-416.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

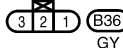
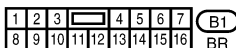
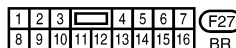
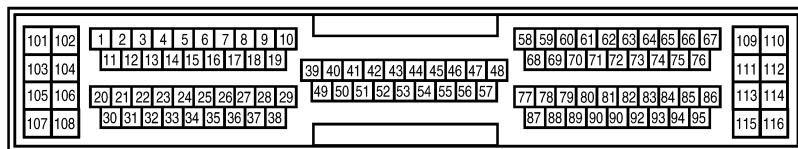
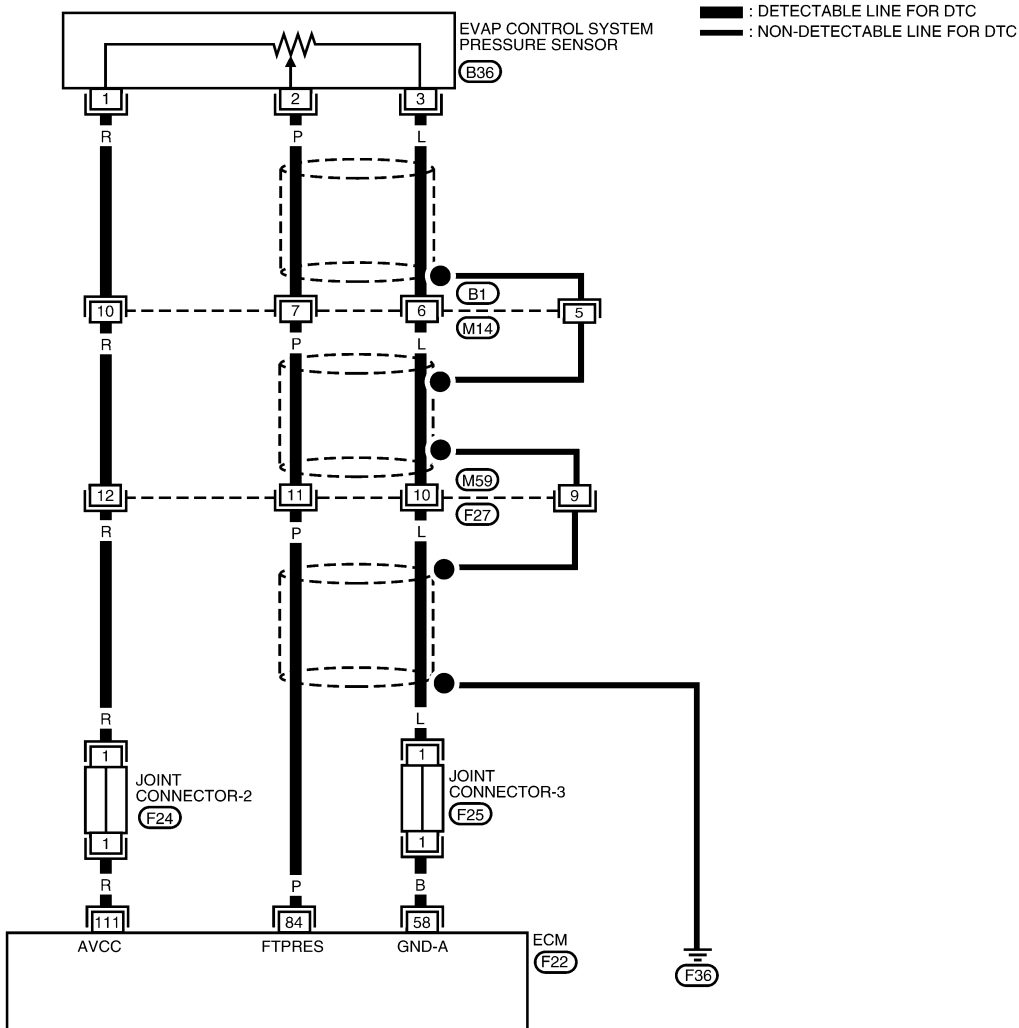
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0550

EC-PRE/SE-01



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR



WEC617

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
84	P	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF578Y

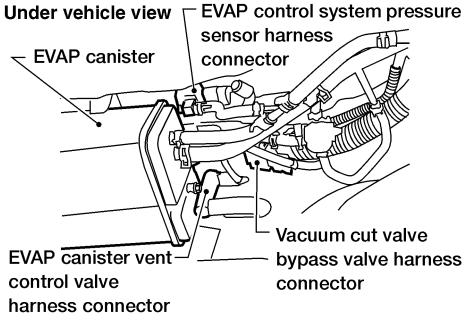
DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

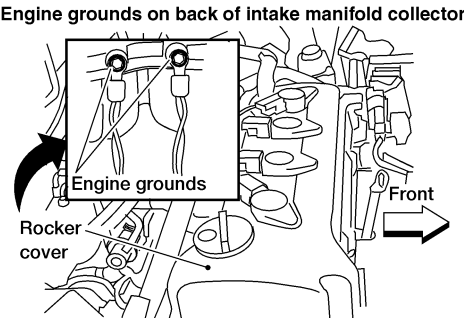
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0551

1	CHECK RUBBER TUBE	
<p>1. Turn ignition switch "OFF". 2. Check rubber tube connected to the EVAP control system pressure sensor for clogging, vent, kink, disconnection or improper connection.</p>		
		
WEC255		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Reconnect, repair or replace.

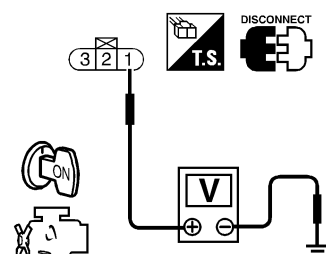
2	RETIGHTEN GROUND SCREWS	
Loosen and retighten engine ground screws.		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
▶		GO TO 3.

3	CHECK CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector. 2. Check sensor harness connector for water. Water should not exist.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace harness connector.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>		
 <p style="margin-left: 200px;">Voltage: Approximately 5V</p>		
SEF341X		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
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5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-2 ● Harness for open or short between EVAP control system pressure sensor and ECM 		
▶		Repair harness or connectors.

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to "Wiring Diagram", EC-415. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-3 ● Harness for open or short between EVAP control system pressure sensor and ECM ● Harness for open or short between EVAP control system pressure sensor and TCM (Transmission control module) 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 84 and EVAP control system pressure sensor terminal 2. Refer to "Wiring Diagram", EC-415. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 10.
OK (Without CONSULT-II) ▶		GO TO 11.
NG ▶		GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Harness for open or short between ECM and EVAP control system pressure sensor 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>④ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
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A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
OK or NG																						
OK ▶		GO TO 12.																				
NG ▶		GO TO 11.																				

SEF677Y

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

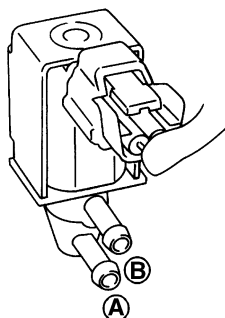
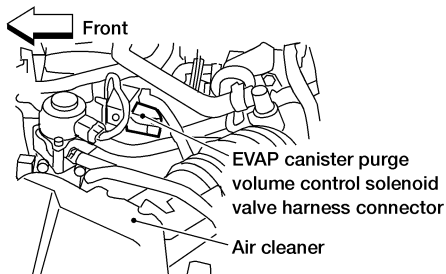
Diagnostic Procedure (Cont'd)

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11 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



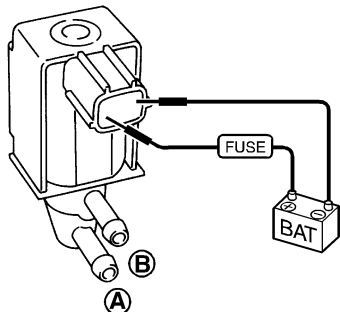
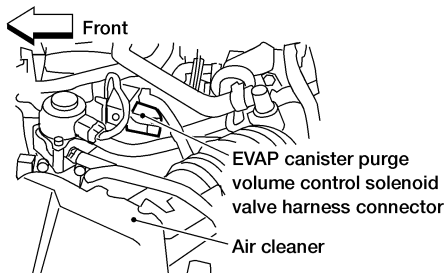
WEC254

Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



WEC254

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

12	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Clean the rubber tube using an air blower.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

SEF376Z

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

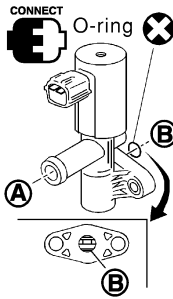
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14 CHECK EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THR TL POS SEN	XXX V



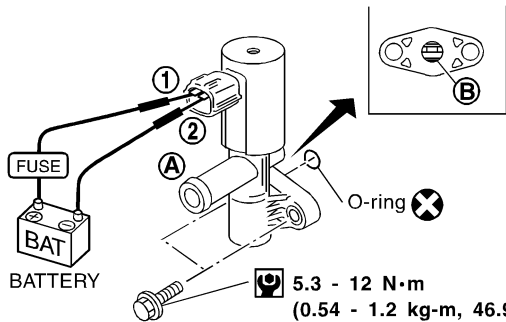
Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEF675Y

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF339X

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

15 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 14 again.

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

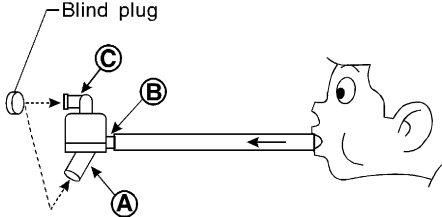
16	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP control system pressure sensor.

17	CHECK RUBBER TUBE
<p>Check obstructed rubber tube connected to EVAP canister vent control valve.</p>	
OK or NG	
OK	▶ GO TO 18.
NG	▶ Clean rubber tube using an air blower, repair or replace rubber tube.

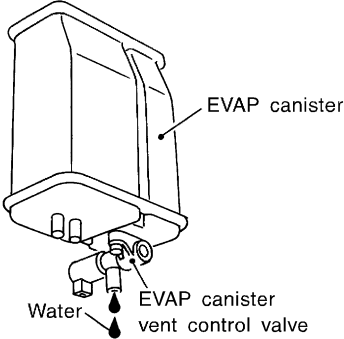
DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

18	CHECK WATER SEPARATOR						
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) * (B) : Emergency tube (From EVAP canister) * (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: • Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 19.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace water separator.</td> </tr> </table>		OK	▶	GO TO 19.	NG	▶	Replace water separator.
OK	▶	GO TO 19.					
NG	▶	Replace water separator.					

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19	CHECK IF EVAP CANISTER SATURATED WITH WATER						
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF596U</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 20.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 22.</td> </tr> </table> </div>		Yes	▶	GO TO 20.	No	▶	GO TO 22.
Yes	▶	GO TO 20.					
No	▶	GO TO 22.					

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20	CHECK EVAP CANISTER						
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 18.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 21.</td> </tr> </table>		OK	▶	GO TO 18.	NG	▶	GO TO 21.
OK	▶	GO TO 18.					
NG	▶	GO TO 21.					

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

21	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● EVAP canister for damage● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.
22	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

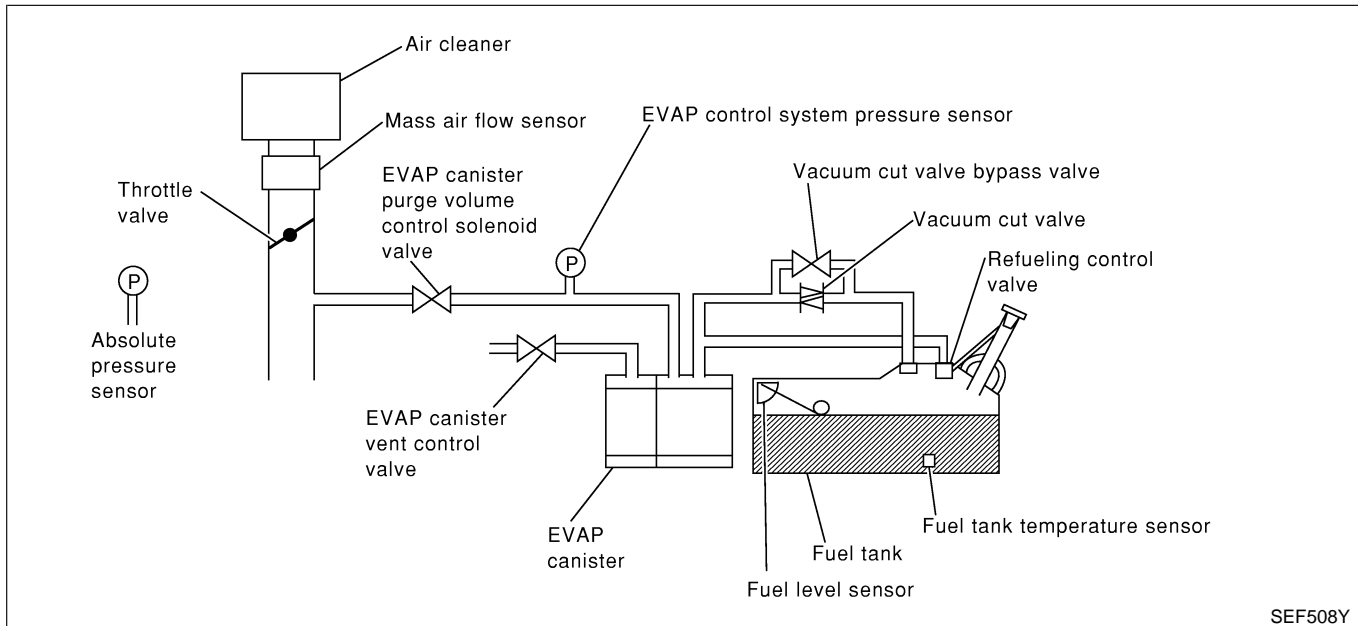
On Board Diagnosis Logic

NIEC0649

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-627.)

This diagnosis detects a very large leak (fuel filler cap fell off, etc.) in the EVAP system between the fuel tank and the EVAP canister purge volume control solenoid valve.



SEF508Y

Malfunction is detected when EVAP control system has very large leaks such as when fuel filler cap has fallen off, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC0650

- Fuel filler cap remains open or fails to close
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve
- Foreign matter caught in EVAP canister vent control valve
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Absolute pressure sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

6 EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
-FUEL LEVEL: 1/4-3/4
-AMBIENT TEMP: 0-30 C(32-86F)
-OPEN ENGINE HOOD.
2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
3)TOUCH START.

SEF565X

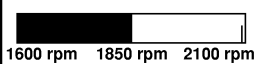
6 EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

SEF566X

6 EVAP SML LEAK P0440/P1440

MAINTAIN
1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
(APPROX. 3 MINUTES)



1600 rpm 1850 rpm 2100 rpm

SEF874X

6 EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

DTC Confirmation Procedure

NIEC0651

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-627.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

WITH CONSULT-II

NIEC0651S01

- 1) Tighten fuel filler cap securely until ratcheting sound is heard.
- 2) Turn ignition switch "ON".
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
- 6) Select "EVAP SML LEAK P0440/P1440" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-127.

- 7) Make sure that "OK" is displayed.
If "NG" is displayed, select "SELF-DIAG RESULTS" mode with CONSULT-II and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to "Diagnostic Procedure", EC-428.
If P0440 is displayed, perform "Diagnostic Procedure" for DTC P0440, EC-385.

WITH GST

NIEC0651S02

NOTE:

Be sure to read the explanation of "Driving Pattern" on EC-92 before driving vehicle.

- 1) Start engine.
 - 2) Drive vehicle according to "Driving Pattern", EC-92.
 - 3) Stop vehicle.
 - 4) Select "MODE 1" with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
 - 5) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 6) Start engine.
- It is not necessary to cool engine down before driving.**

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

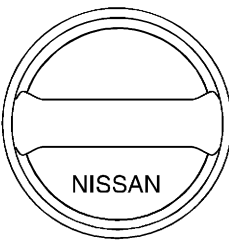
QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Drive vehicle again according to the "Driving Pattern", EC-92.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-428.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0440, EC-403.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-618.
 - If P0440, P0455, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NIEC0652

1	CHECK FUEL FILLER CAP DESIGN	
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><small>SEF915U</small></p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

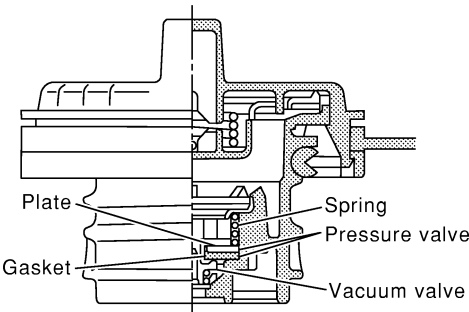
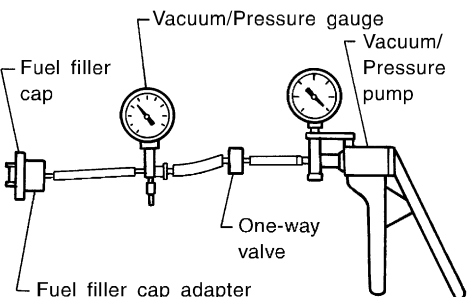
2	CHECK FUEL FILLER CAP INSTALLATION	
<p>Check that the cap is tightened properly by rotating the cap clockwise.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
<p>1. Wipe clean valve housing.</p> <p>2. Check valve opening pressure and vacuum.</p>		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

5	CHECK EVAP PURGE LINE	
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection. Refer to "Evaporative Emission System", EC-48.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or reconnect the hose.

6	CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.		
▶		
GO TO 7.		

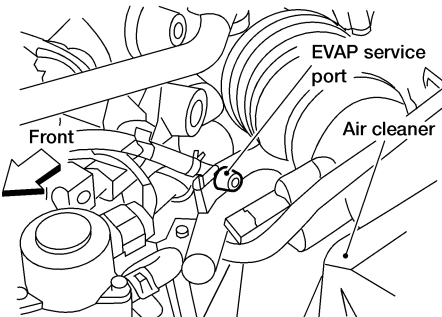
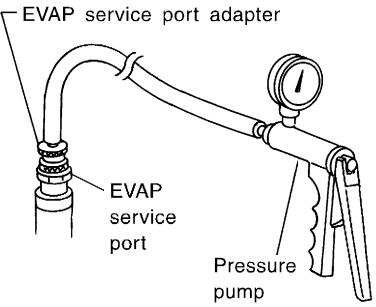
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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
Refer to "DTC Confirmation Procedure", EC-407.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

8	INSTALL THE PRESSURE PUMP	
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.		
		
LEC256		
		
SEF916U		
NOTE:		
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.		
Models with CONSULT-II	▶	GO TO 9.
Models without CON- SULT-II	▶	GO TO 10.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

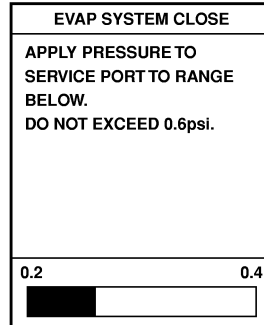
9 CHECK FOR EVAP LEAK

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

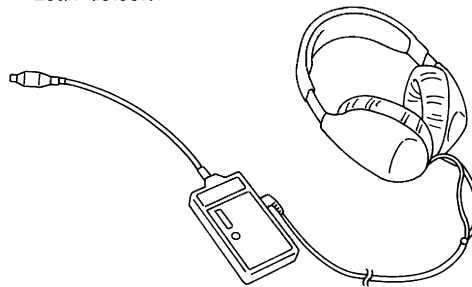
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

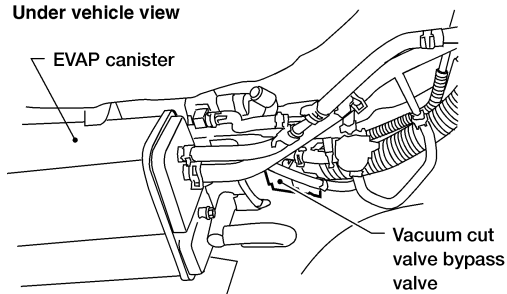
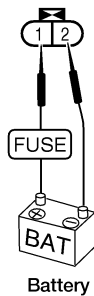
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



WEC334

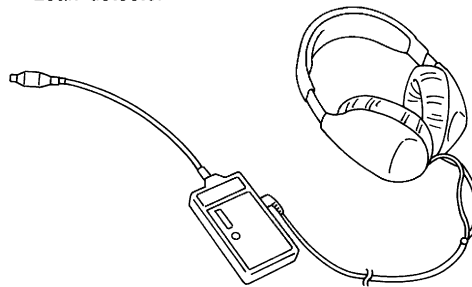
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	RELEASE EVAP LINE PRESSURE	
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 		
<p><input type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 		
With CONSULT-II		▶ GO TO 12.
Without CONSULT-II		▶ GO TO 13.

GI
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12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr> <td>A/F ALPHA-B1</td> <td>XX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p style="margin-left: 200px;">Vacuum should exist.</p>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
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A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
OK or NG																						
OK		▶ GO TO 15.																				
NG		▶ GO TO 14.																				

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13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p><input type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="margin-left: 20px;">Vacuum should exist.</p>		
OK or NG		
OK		▶ GO TO 16.
NG		▶ GO TO 14.

HA
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IDX

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-42.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	Repair or reconnect the hose.

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>ⓘ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
SEF677Y																						
OK or NG																						
OK	▶	GO TO 17.																				
NG	▶	GO TO 16.																				

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

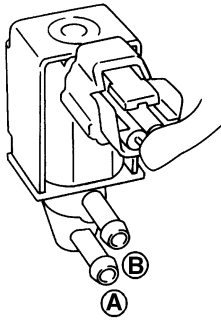
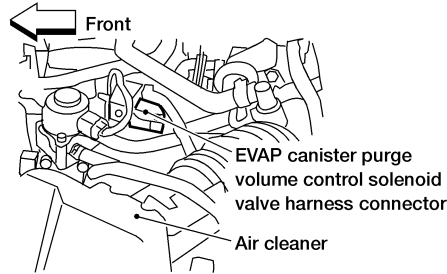
Diagnostic Procedure (Cont'd)

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16 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



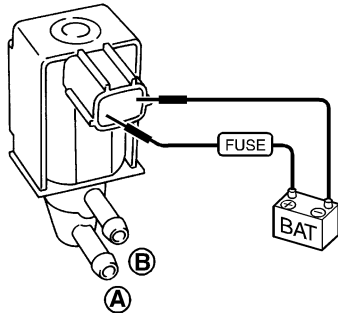
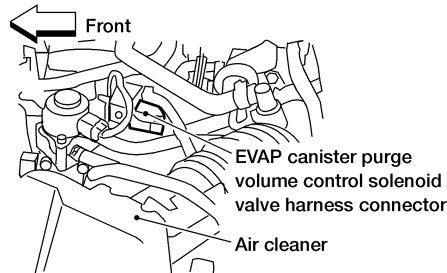
WEC254

Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



WEC254

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X



OK or NG

OK	▶	GO TO 17.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

17	CHECK ABSOLUTE PRESSURE SENSOR	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
Yes or No		
Yes	▶	GO TO 18.
No	▶	GO TO 19.

18	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-100. 3. Perform "Idle Air Volume Learning", EC-83. Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	GO TO 19.
INCMP	▶	Follow the instruction of "Idle Air Volume Learning", then GO TO 19.

19	CHECK FUEL TANK TEMPERATURE SENSOR	
<ol style="list-style-type: none"> 1. Remove fuel level sensor unit. 2. Check fuel tank temperature sensor. Refer to "Component Inspection", EC-323. 		
OK or NG		
OK	▶	GO TO 20.
NG	▶	Replace fuel level sensor unit.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

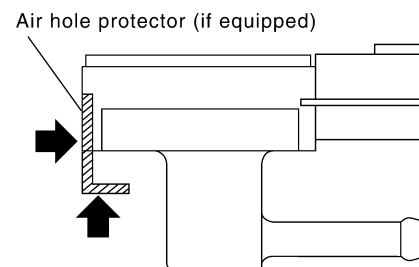
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20 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

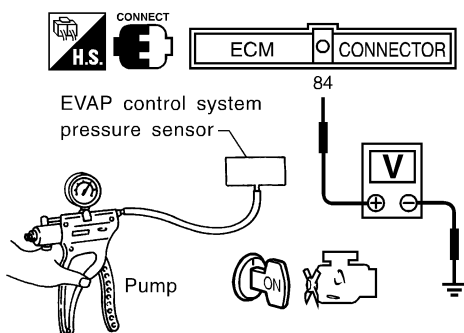
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK ► GO TO 21.

NG ► Replace EVAP control system pressure sensor.

21 CHECK INTERMITTENT INCIDENT

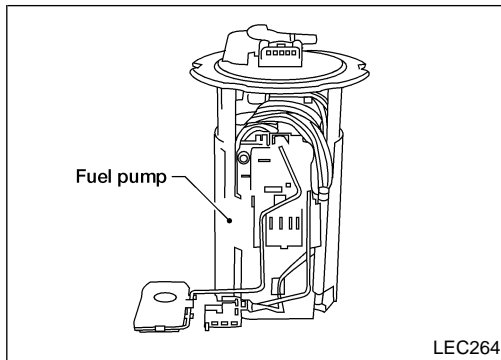
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

► INSPECTION END

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0552} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

When the vehicle is parked, the fuel level in the fuel tank is stable. ^{NIEC0553} It means the output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected.

Malfunction is detected when even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

Possible Cause

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

^{NIEC0554}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF563X

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

^{NIEC0555}

Ⓜ WITH CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait maximum of 2 consecutive minutes.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-440.

^{NIEC0555S01}

Ⓜ WITH GST

Follow the procedure "WITH CONSULT-II" above.

^{NIEC0555S02}

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

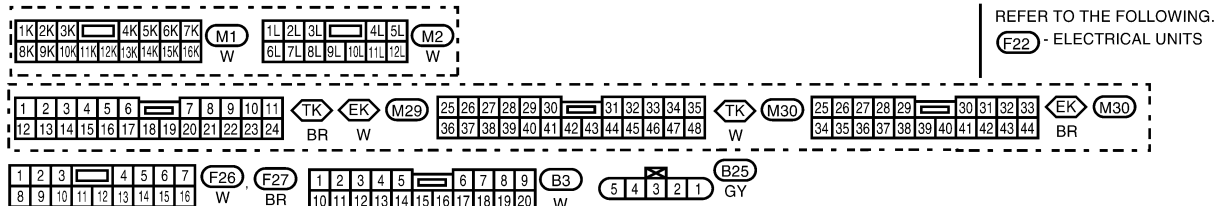
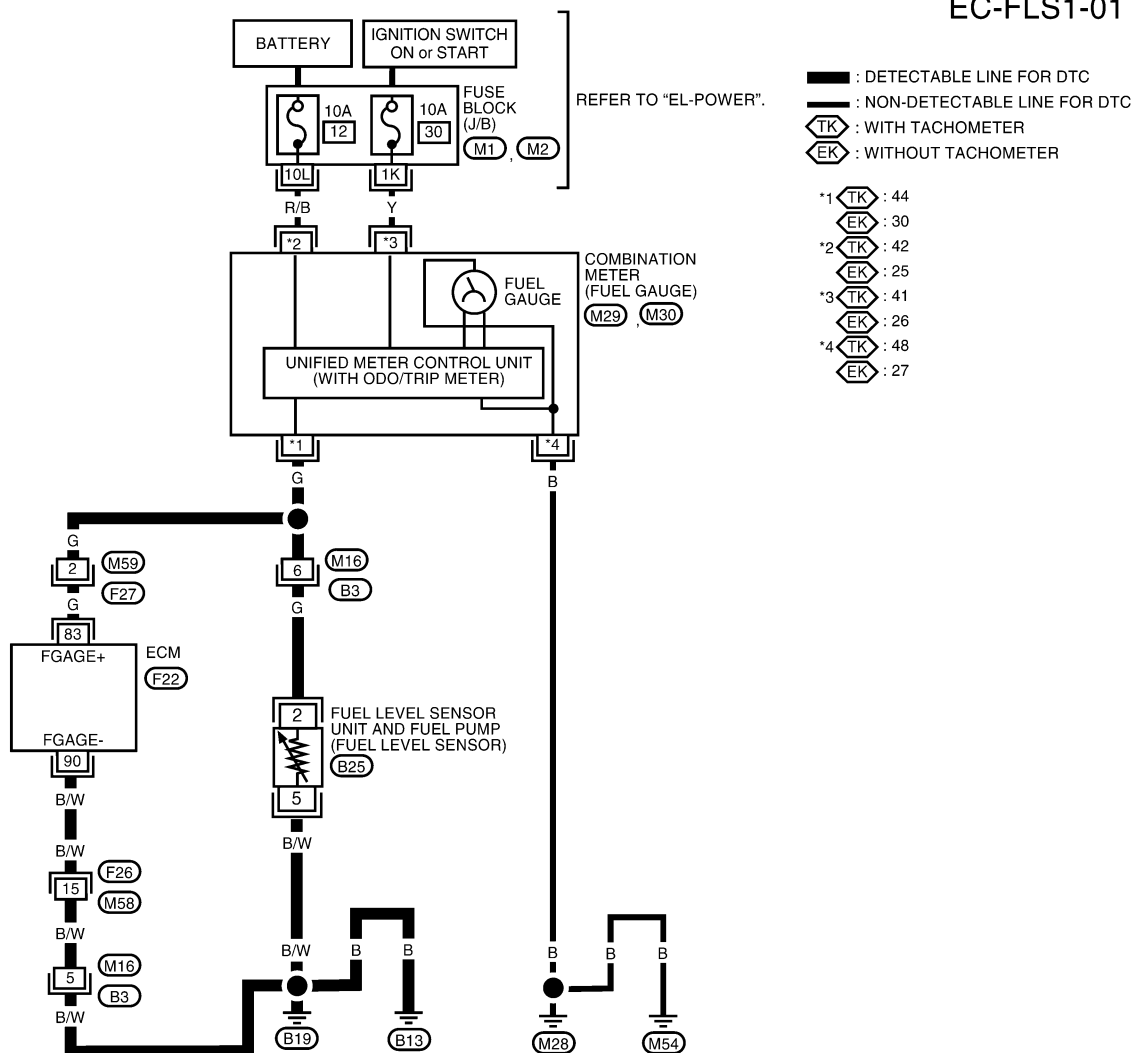
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0556

EC-FLS1-01



WEC140A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

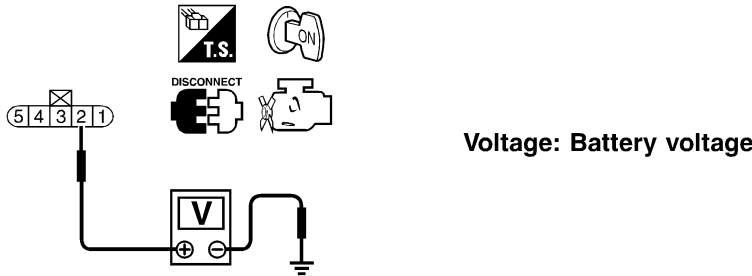
DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC0557

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or a tester.</p>		
		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF524Z

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M16, B3 ● Harness for open or short between combination meter and fuel level sensor unit 		
▶		Repair or replace harness or connectors.

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to "Wiring Diagram", EC-439. Continuity should exist. 3. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 2, ECM terminal 90 and fuel level sensor unit terminal 5. Refer to "Wiring Diagram", EC-439. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors F26, M58 ● Harness connectors M59, F27 ● Harness connectors M16, B3 ● Harness for open or short between ECM and fuel level sensor and combination meter 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA
EM

6	CHECK FUEL LEVEL SENSOR	
Refer to EL-102 , "FUEL LEVEL SENSOR UNIT CHECK".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace fuel level sensor unit.

LC
EC

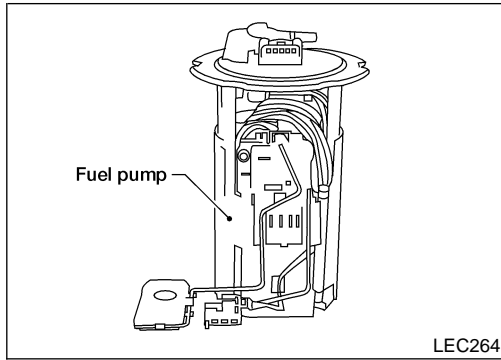
7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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DTC P0461 FUEL LEVEL SENSOR FUNCTION

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0558} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

Driving long distances affects fuel gauge level. ^{NIEC0559}

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

Malfunction is detected when the output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.

Possible Cause

- Harness or connectors
(The level sensor circuit is open or shorted.)
 - Fuel level sensor
- ^{NIEC0560}

Overall Function Check

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed. ^{NIEC0561}

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to *FE-5*, "FUEL SYSTEM".

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓜ WITH CONSULT-II

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance. ^{NIEC0561S01}

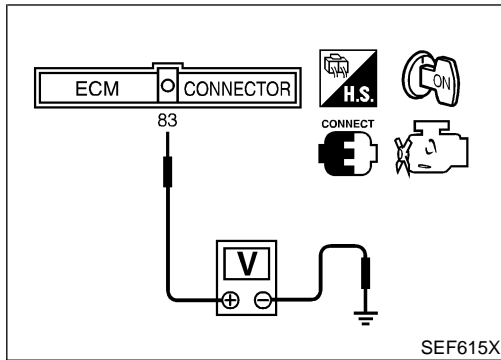
- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-67.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.

DTC P0461 FUEL LEVEL SENSOR FUNCTION

QG18DE (EXC CALIF CA)

Overall Function Check (Cont'd)

- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II. GI
- 7) Check "FUEL LEVEL SE" output voltage and note it. MA
- 8) Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II. EM
- 9) Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it. LC
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Check "FUEL LEVEL SE" output voltage and note it. EC
- 12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11. If NG, check the fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK".



WITH GST

NIEC0561S02

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

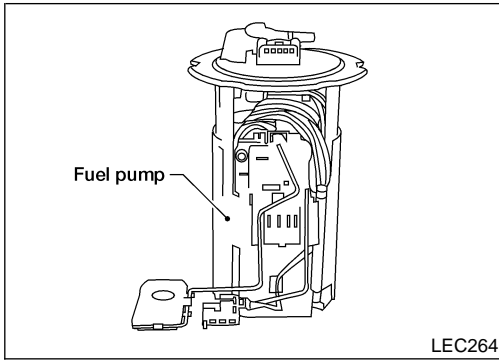
- 1) Prepare a fuel container and a spare hose. AT
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-67. AX
- 3) Remove the fuel feed hose on the fuel level sensor unit. SU
- 4) Connect a spare fuel hose where the fuel feed hose was removed. BR
- 5) Turn ignition switch "OFF". ST
- 6) Set voltmeters probe between ECM terminal 83 (fuel level sensor signal) and ground. RS
- 7) Turn ignition switch "ON". BT
- 8) Check voltage between ECM terminal 83 and ground and note it. HA
- 9) Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment. SC
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Confirm that the voltage between ECM terminal 83 and ground changes more than 0.03V during step 8 - 10. If NG, check component of fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK". EL

IDX

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0562} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor circuit. ^{NIEC0563}

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

Malfunction is detected when an excessively low or high voltage is sent from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.)
 - Fuel level sensor
- ^{NIEC0564}

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC0565}

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓟ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC0565S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-446.

Ⓢ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC0565S02}

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

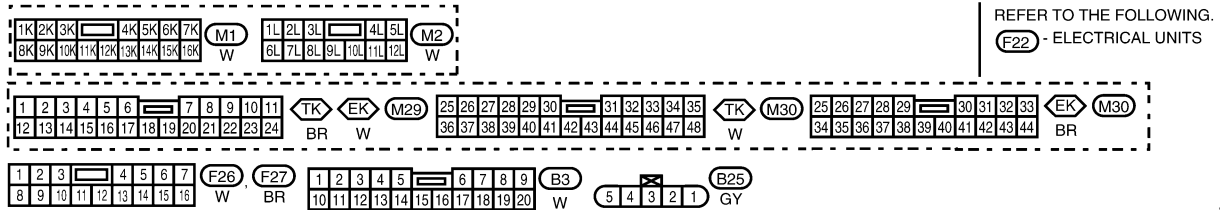
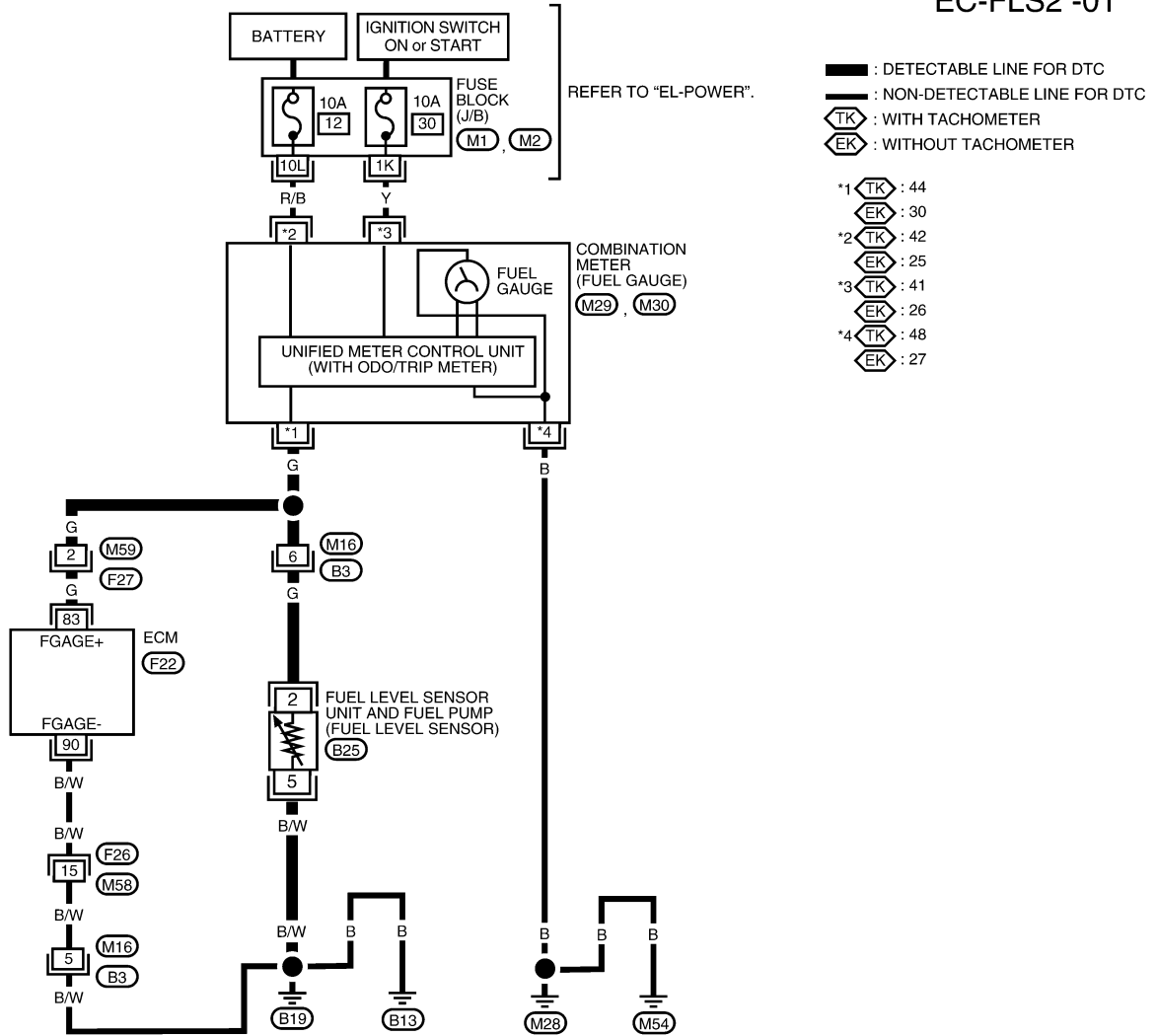
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0566

EC-FLS2 -01



WEC141A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

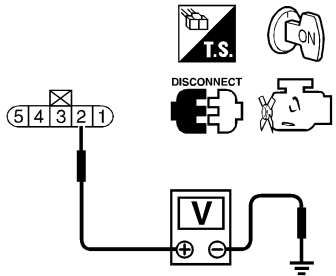
DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC0567

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or tester.</p>		
		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF524Z

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M16, B3 ● Harness for open or short between combination meter and fuel level sensor unit 		
▶ Repair or replace harness or connectors.		

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to "Wiring Diagram", EC-445. Continuity should exist. 3. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit terminal 2. Refer to "Wiring Diagram", EC-439. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors F26, M58 ● Harness connectors M16, B3 ● Harness connectors F27, M59 ● Harness for open or short between ECM and fuel level sensor 		
▶		Repair open circuit or short to ground or short to power in harness on connectors.

GI
 MA
 EM

6	CHECK FUEL LEVEL SENSOR	
Refer to <i>EL-102</i> , "Fuel Level Sensor Unit Check".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace fuel level sensor unit.

LC
EC

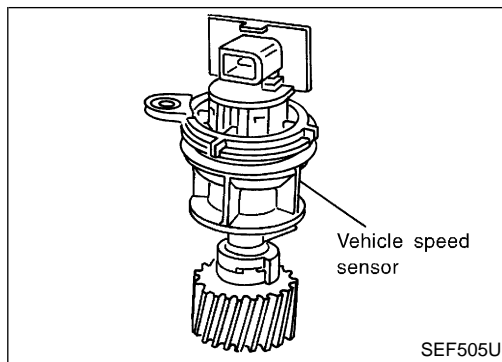
7	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the speedometer. The speedometer then sends a signal to the ECM. NIEC0272

On Board Diagnosis Logic

NIEC0274

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0500	<ul style="list-style-type: none"> The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. 	<ul style="list-style-type: none"> Harness or connector (The vehicle speed sensor circuit is open or shorted.) Vehicle speed sensor

DTC Confirmation Procedure

NIEC0275

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

This procedure may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-II

- Start engine
- Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- If NG, go to "Diagnostic Procedure", EC-451. If OK, go to following step.
- Select "DATA MONITOR" mode with CONSULT-II.
- Warm engine up to normal operating temperature.
- Maintain the following conditions for at least 10 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

ENG SPEED	1,800 - 3,400 rpm (A/T) 2,200 - 4,100 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.8 - 10.5 msec (A/T) 4.8 - 10.7 msec (M/T)
Selector lever	Suitable position
PW/ST SIGNAL	OFF

DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (EXC CALIF CA)

Overall Function Check

- 7) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-451.

GI

MA

EM

LC

Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a 1st trip DTC might not be confirmed.

NIEC0276

EC

With GST

- 1) Lift up drive wheels.
- 2) Start engine.
- 3) Read vehicle speed sensor signal in “MODE 1” with GST.
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4) If NG, go to “Diagnostic Procedure”, EC-451.

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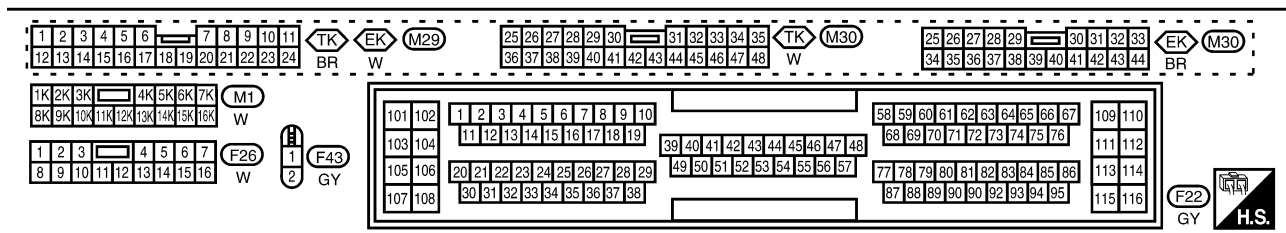
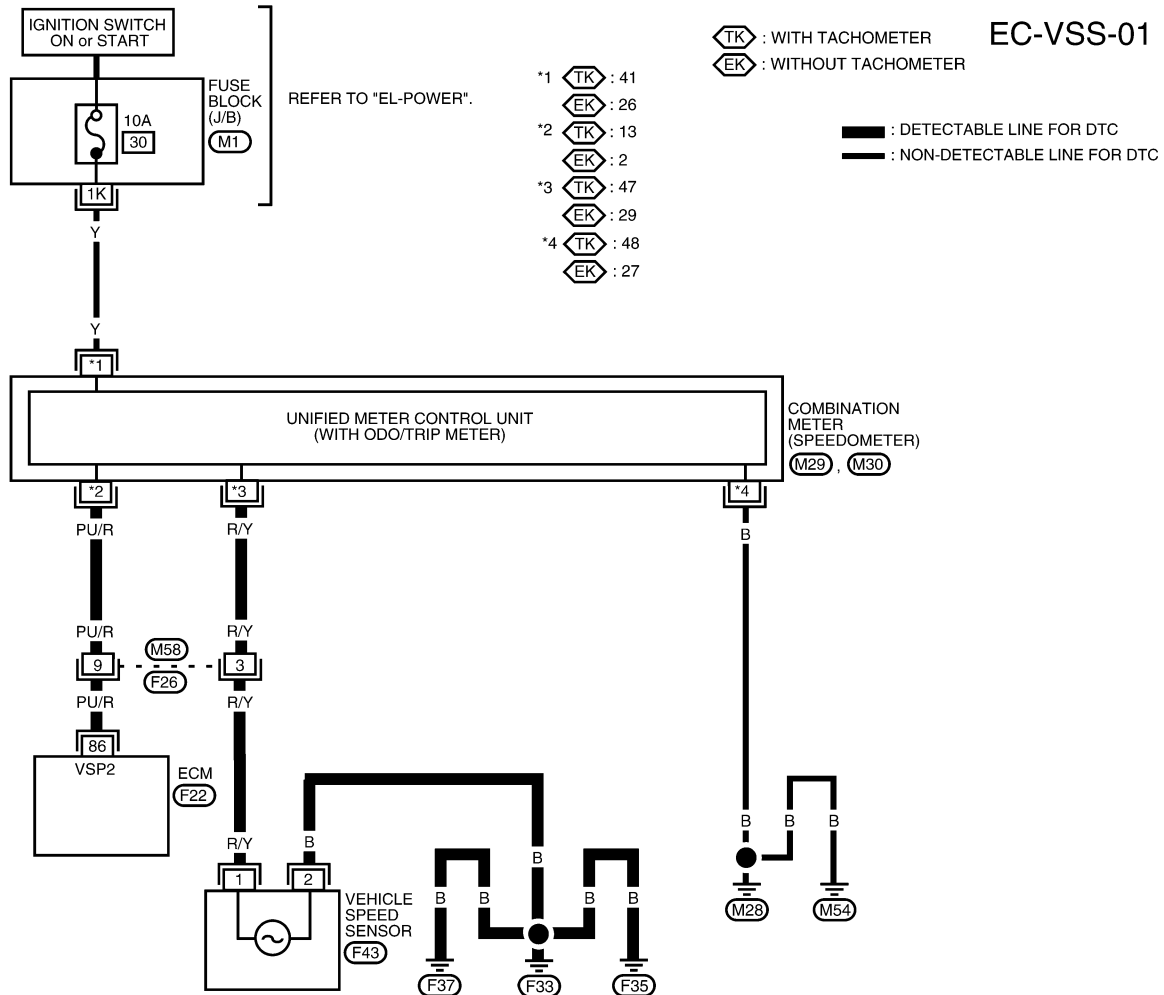
DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0277



WEC620

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	PU/R	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 40 KM/H (25 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	0 - APPROX. 4.2V (V) 10 5 0 50 ms

SEF580Y

DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0278

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and combination meter harness connector.</p> <p>3. Check harness continuity between ECM terminal 86 and combination meter terminal 13 (with tachometer) or 2 (without tachometer). Refer to "Wiring Diagram", EC-450. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

GI
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EC

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between ECM and combination meter 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

FE
CL

3	CHECK SPEEDOMETER FUNCTION	
<p>Make sure that speedometer functions properly.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

MT
AT
AX

4	CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between combination meter and vehicle speed sensor <p style="text-align: center;">OK or NG</p>		
OK	▶	Check combination meter and vehicle speed sensor. Refer to EL-85 , "METERS AND GAUGES".
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

SU
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RS

5	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.</p>		
		▶ INSPECTION END

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DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Description

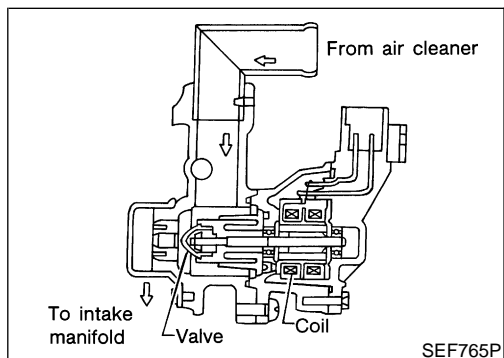
Description SYSTEM DESCRIPTION

NIEC0279

NIEC0279S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Idle air control	IACV-AAC valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Park/neutral position (PNP) switch	Park/neutral position		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		
Intake air temperature sensor	Intake air temperature		
Absolute pressure sensor	Ambient barometric pressure		

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which bypasses the throttle valve via IACV-AAC valve. The IACV-AAC valve changes the opening of the air bypass passage to control the amount of auxiliary air. This valve is actuated by a step motor built into the valve, which moves the valve in the axial direction in steps corresponding to the ECM output signals. One step of IACV-AAC valve movement causes the respective opening of the air bypass passage. (i.e., when the step advances, the opening is enlarged.) The opening of the valve is varied to allow for optimum control of the engine idling speed. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the step position of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warm up, deceleration, and engine load (air conditioner, power steering and cooling fan operation).



COMPONENT DESCRIPTION IACV-AAC Valve

NIEC0279S02

NIEC0279S0202

The IACV-AAC valve is operated by a step motor for centralized control of auxiliary air supply. This motor has four winding phases and is actuated by the output signals of ECM which turns ON and OFF two windings each in sequence. Each time the IACV-AAC valve opens or closes to change the auxiliary air quantity, the ECM sends a pulse signal to the step motor. When no change in the auxiliary air quantity is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC0280

MONITOR ITEM	CONDITION		SPECIFICATION
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	5 - 20 steps
		2,000 rpm	—

On Board Diagnosis Logic

NIEC0282

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0505	A)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is open.) ● IACV-AAC valve
	B)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is shorted.) ● Air control valve (Power steering) ● IACV-AAC valve

DTC Confirmation Procedure

NIEC0283

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- Perform "Procedure for Malfunction A" first. If 1st trip DTC cannot be confirmed, perform "Procedure for Malfunction B".
- If the target idle speed is out of the specified value, perform "Idle Air Volume Leaning", EC-83, before conducting "DTC Confirmation Procedure". For the target idle speed, refer to "SERVICE DATA AND SPECIFICATIONS (SDS)", EC-698.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC0283S01

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for three seconds, then let it idle for three seconds.
- 5) Perform step 4 once more.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-456.



With GST

Follow the procedure “With CONSULT-II” above.

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION B

NIEC0283S02

TESTING CONDITION:

- Before performing the following procedure, make sure battery voltage is more than 11V at idle.
- For best results, perform the test at a temperature above -10°C (14°F).
- Electrical load not applied.



With CONSULT-II

- 1) Open engine hood.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
- 5) Start engine and run it for at least 1 minute at idle speed.
- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-456.



With GST

Follow the procedure “With CONSULT-II” above.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

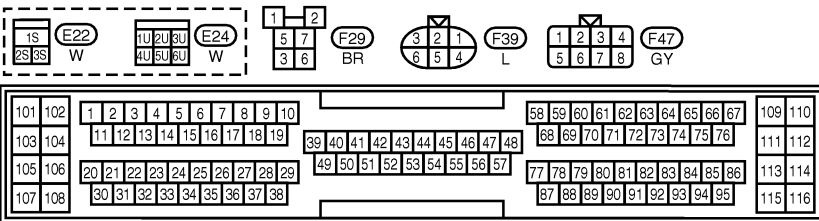
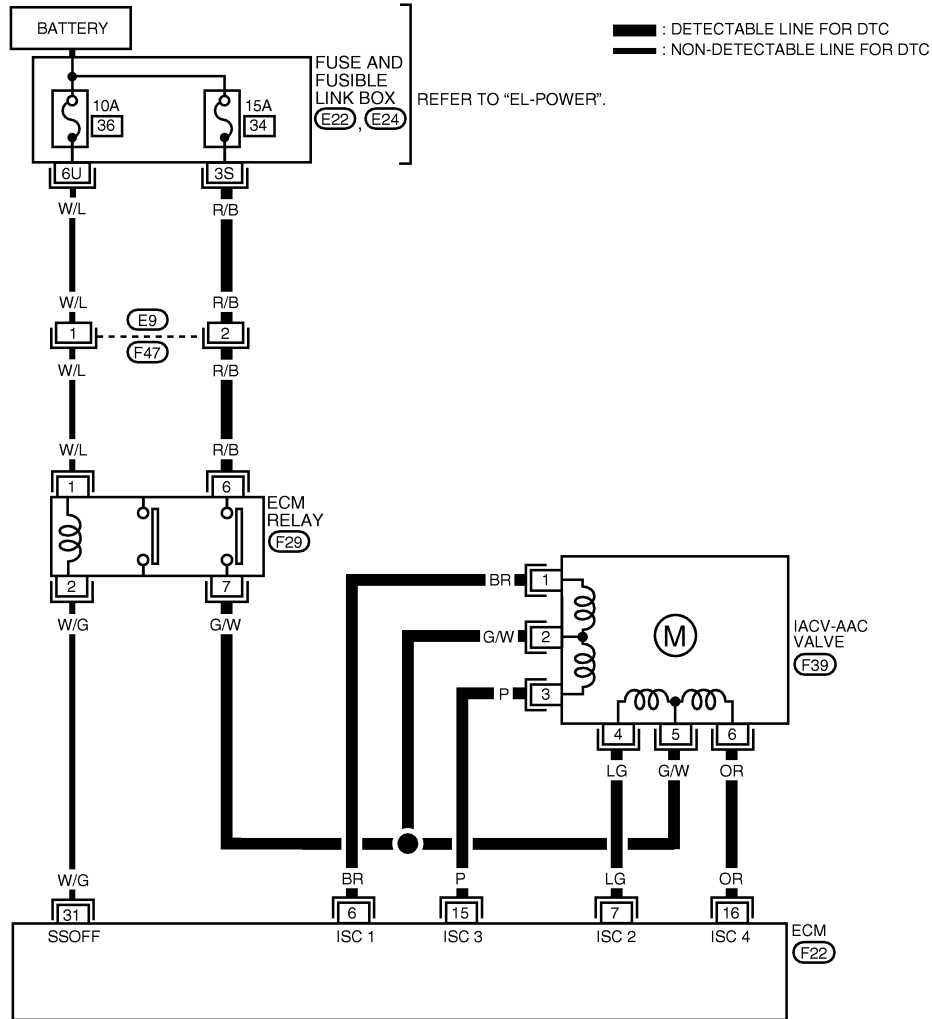
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0284

EC-AAC/V-01



LEC208

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
6	BR	IACV-AAC VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
7	LG			
15	P			
16	OR			

SEF581Y

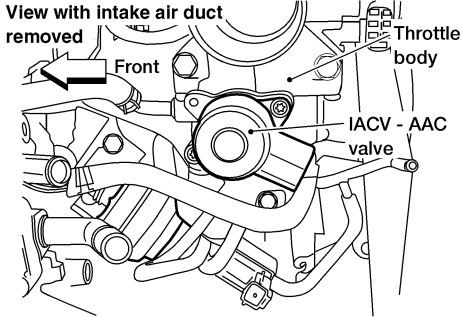
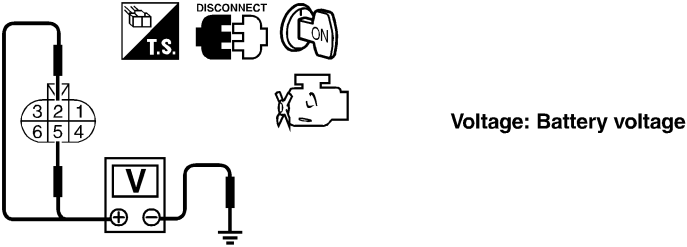
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0285

1	CHECK IACV-AAC VALVE POWER SUPPLY CIRCUIT						
<p>1. Stop engine. 2. Disconnect IACV-AAC valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">WEC257</p> <p>3. Turn ignition switch "ON". 4. Check voltage between IACV-AAC valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF343X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; text-align: center;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td style="text-align: center;">NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>		OK	▶	GO TO 3.	NG	▶	GO TO 2.
OK	▶	GO TO 3.					
NG	▶	GO TO 2.					

2	DETECT MALFUNCTIONING PART		
<p>Check the followikng.</p> <ul style="list-style-type: none"> ● 15A fuse ● Harness connectors E9, F47 ● Harness for open or short between fuse and ECM relay ● ECM relay ● Harness for open or short between IACV-AAC valve and ECM relay <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; text-align: center;">▶</td> <td>Repair harness or connectors, or replace fuse or ECM relay.</td> </tr> </table>		▶	Repair harness or connectors, or replace fuse or ECM relay.
▶	Repair harness or connectors, or replace fuse or ECM relay.		

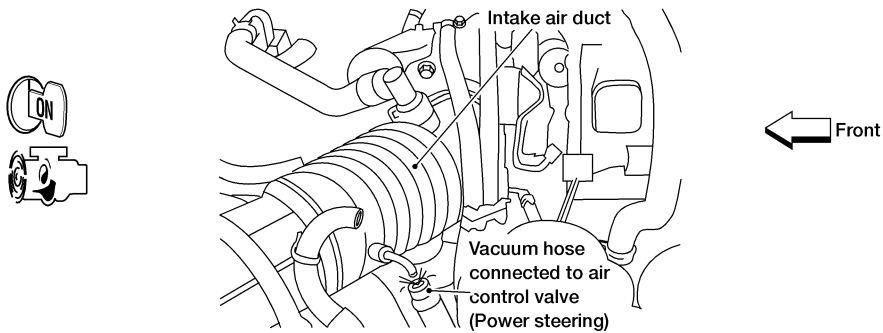
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK IACV-AAC VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT											
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and IACV-AAC valve terminals as follows. Refer to "Wiring Diagram", EC-455. 												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">IACV-AAC valve terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">6</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">15</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">16</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>			ECM terminal	IACV-AAC valve terminal	6	1	7	4	15	3	16	6
ECM terminal	IACV-AAC valve terminal											
6	1											
7	4											
15	3											
16	6											
MTBL0572												
<p style="color: blue; margin: 0;">Continuity should exist.</p>												
<ol style="list-style-type: none"> 4. Also check harness for short to ground and short to power. 												
OK or NG												
OK	▶	GO TO 4.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

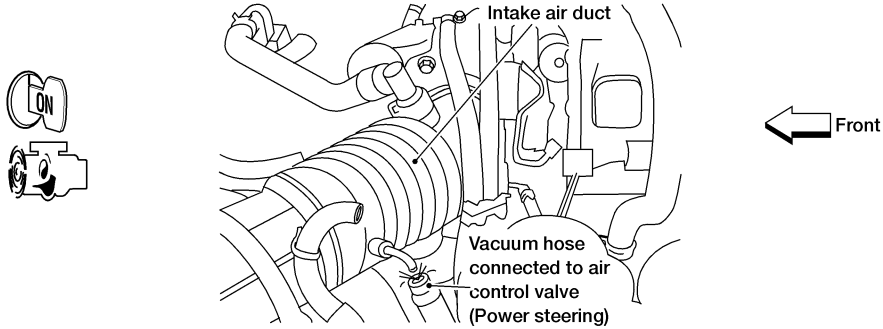
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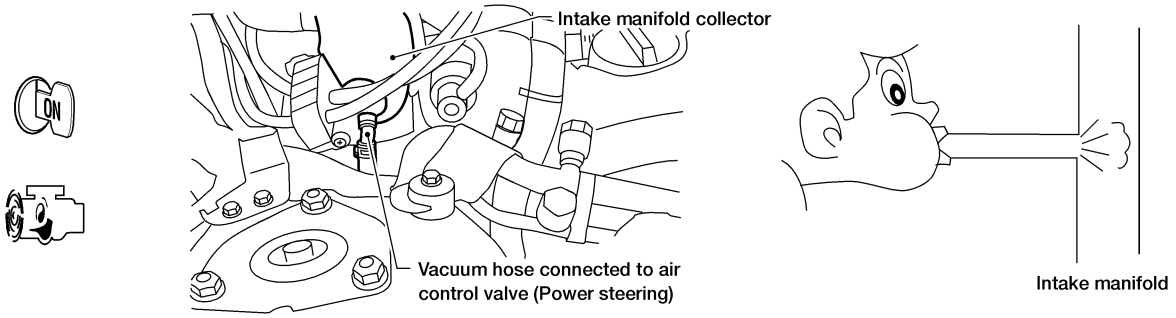
4	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-I	
<ol style="list-style-type: none"> 1. Reconnect ECM harness connector and IACV-AAC valve harness connector. 2. Disconnect vacuum hose connected to air control valve (Power steering) at intake air duct. 3. Start engine and let it idle. 4. Check vacuum hose for vacuum existence. 		
		
LEC324		
<p style="color: blue; margin: 0;">Vacuum slightly exists or does not exist.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace air control valve (Power steering).

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

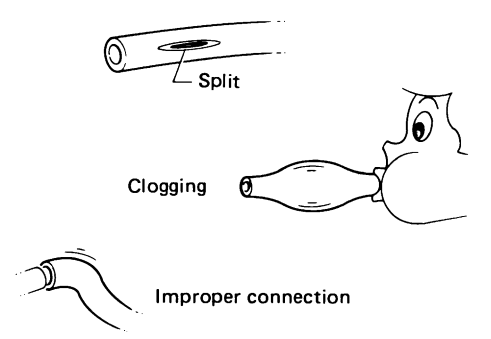
5	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-II	<p>Check vacuum hose for vacuum existence when steering wheel is turned.</p>  <p style="text-align: right;">Front</p> <p style="text-align: right;">LEC324</p> <p style="text-align: center;">Vacuum should exist.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 8.	
NG	▶	GO TO 6.	

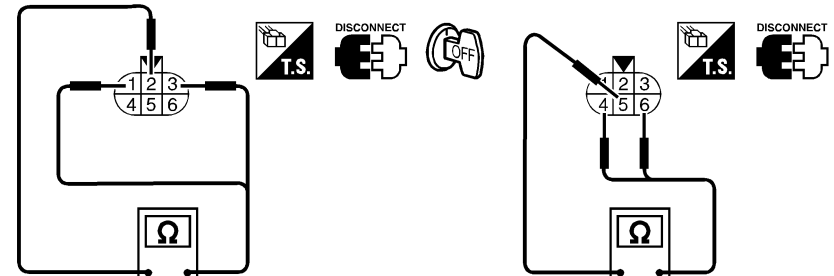
6	CHECK VACUUM PORT	<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect vacuum hose connected to air control valve (Power steering) at the vacuum port. 3. Blow air into vacuum port. 4. Check that air flows freely.  <p style="text-align: right;">Intake manifold</p> <p style="text-align: right;">LEC325</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 7.	
NG	▶	Repair or clean vacuum port.	

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK VACUUM HOSES AND TUBES	<p>1. Disconnect vacuum hoses between air control valve (Power steering) and vacuum port, air control valve (Power steering) and intake air duct.</p> <p>2. Check the hoses and tubes for cracks, clogging, improper connection or disconnection.</p> <div style="text-align: center;">  <p>Split</p> <p>Clogging</p> <p>Improper connection</p> </div> <p style="text-align: right;">SEF109L</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 8.
NG	▶	Repair hoses or tubes.

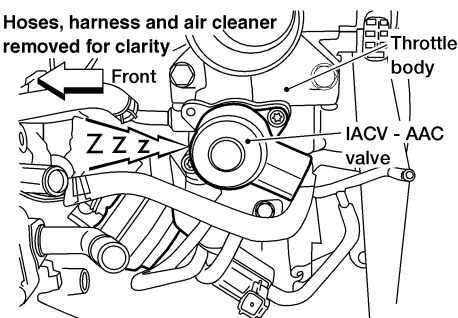
8	CHECK IACV-AAC VALVE-I	<p>1. Disconnect IACV-AAC valve harness connector.</p> <p>2. Check resistance between IACV-AAC valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p> <div style="text-align: center;">  <p style="text-align: right;">Resistance: 20 - 24 Ω [at 20°C (68°F)]</p> </div> <p style="text-align: right;">SEF214Z</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 9.
NG	▶	GO TO 10.

GI
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DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK IACV-AAC VALVE-II	
<ol style="list-style-type: none"> 1. Reconnect IACV-AAC valve harness connector and ECM harness connector. 2. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve makes operating sound according to the ignition switch position. 		
		
LEC431		
OK or NG		
OK	▶	GO TO 11.
NG	▶	GO TO 10.

10	REPLACE IACV-AAC VALVE	
<ol style="list-style-type: none"> 1. Replace IACV-AAC valve assembly. 2. Perform "Idle Air Volume Learning", EC-83. Is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the construction of "Idle Air Volume Learning".

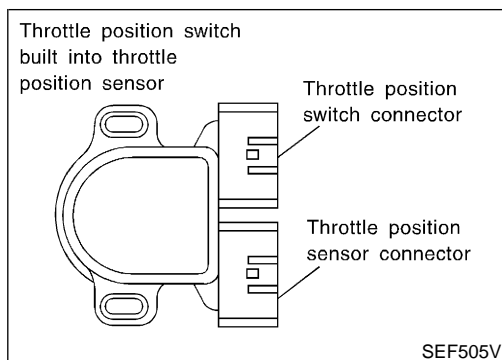
11	CHECK TARGET IDLE SPEED	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect all harness connectors and vacuum hoses. 3. Start engine and warm it up to normal operating temperature. 4. Also warm up transmission to normal operating temperature. <ul style="list-style-type: none"> ● For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE", in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V. ● For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes. 5. Stop vehicle with engine running. 6. Check target idle speed. M/T = 650 ± 50 rpm A/T = 800 ± 50 rpm (in "P" or "N" position) 		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Perform "Idle Air Volume Learning", EC-83.

12	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0287

A closed throttle position switch and wide open throttle position switch are built into the throttle position sensor unit. The wide open throttle position switch is used only for A/T control.

When the throttle valve is in the closed position, the closed throttle position switch sends a voltage signal to the ECM. The ECM only uses this signal to open or close the EVAP canister purge control valve when the throttle position sensor is malfunctioning.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0655

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CLSD THL/P SW	● Engine: After warming up, idle the engine	Throttle valve: Idle position ON
		Throttle valve: Slightly open OFF

On Board Diagnosis Logic

NIEC0289

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0510	● Battery voltage from the closed throttle position switch is sent to ECM with the throttle valve opened.	<ul style="list-style-type: none"> ● Harness or connectors (The closed throttle position switch circuit is shorted.) ● Closed throttle position switch ● Throttle position sensor

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
CLSD THL/P SW	ON

SEF197Y

6

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V

SEF175Y

DTC Confirmation Procedure

NIEC0290

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF", wait at least 10 seconds and then start engine.
- 3) Select "CLSD THL/P SW" in "DATA MONITOR" mode with CONSULT-II.
- 4) Check the signal under the following conditions.

Condition	Signal indication
Throttle valve: Idle position	ON
Throttle valve: Slightly open	OFF

If the result is NG, go to "Diagnostic Procedure", EC-464.
If OK, go to following step.

- 5) Select "DATA MONITOR" mode with CONSULT-II.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

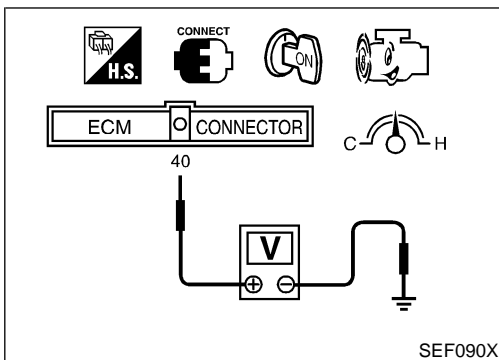
QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 6) Drive the vehicle for at least 5 consecutive seconds under the following condition.

THRTL POS SEN	More than 2.3V
VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-464.



Overall Function Check

Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a 1st trip DTC might not be confirmed.

NIEC0291

⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check the voltage between ECM terminal 40 (Closed throttle position switch signal) and ground under the following conditions.

Condition	Voltage
At idle	Battery voltage
At 2,000 rpm	Approximately 0V

- 3) If NG, go to "Diagnostic Procedure", EC-464.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0292

EC-TP/SW-01

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

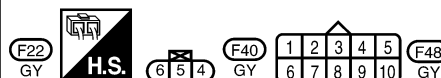
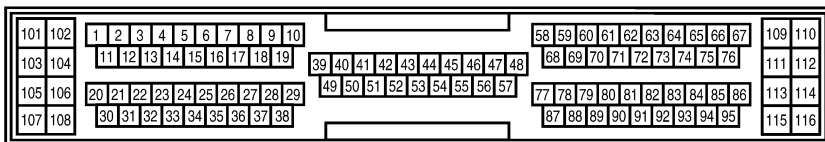
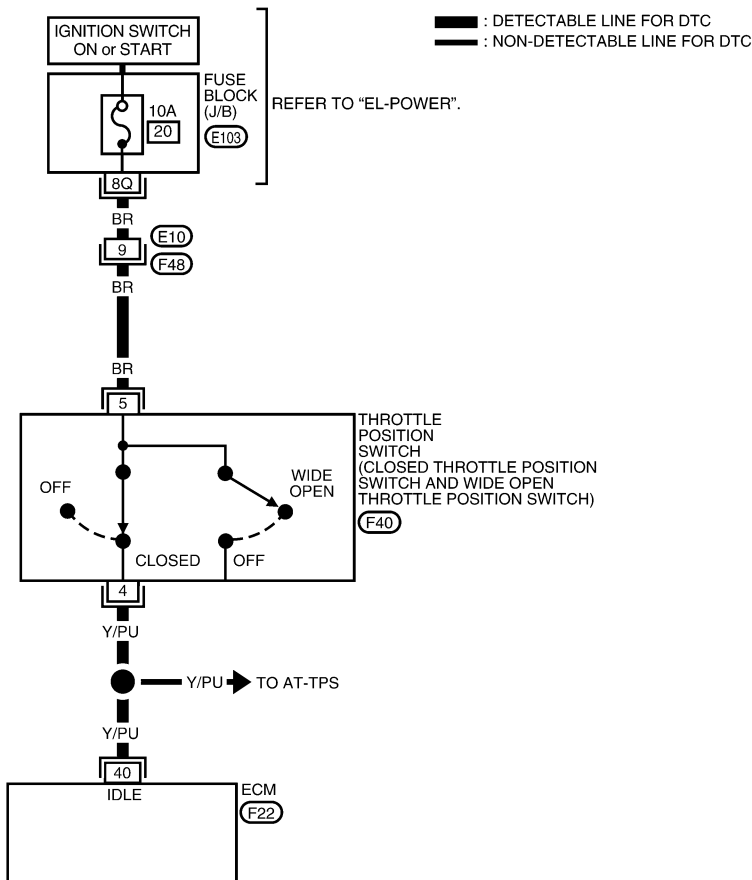
BT

HA

SC

EL

IDX



WEC594

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	Y/PU	THROTTLE POSITION SWITCH (CLOSED POSITION)	ENGINE RUNNING WITH ACCELERATOR PEDAL FULLY RELEASED UNDER WARM-UP CONDITION	BATTERY VOLTAGE
			IGN ON WITH ACCELERATOR PEDAL DEPRESSED	APPROX. 0V

SEF582Y

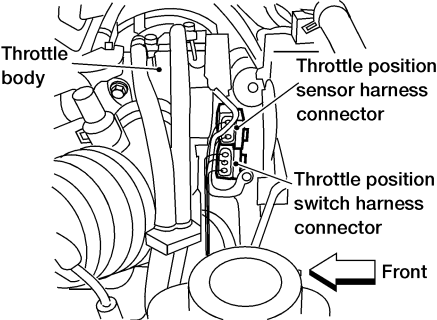
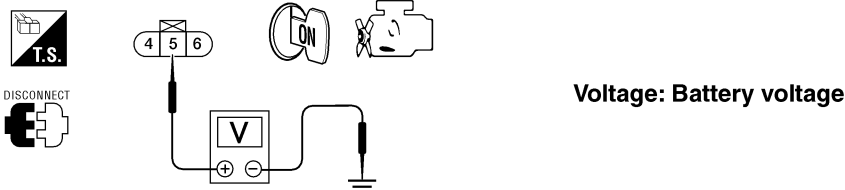
DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0293

1	CHECK CLOSED THROTTLE POSITION SWITCH POWER SUPPLY CIRCUIT						
<p>1. Turn ignition switch "OFF". 2. Disconnect throttle position switch harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">WEC244</p> <p>3. Turn ignition switch "ON". 4. Check voltage between throttle position switch terminal 5 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC435</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>		OK	▶	GO TO 3.	NG	▶	GO TO 2.
OK	▶	GO TO 3.					
NG	▶	GO TO 2.					

2	DETECT MALFUNCTIONING PART			
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between throttle position switch and fuse <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 10%; text-align: center;">▶</td> <td>Repair harness or connectors.</td> </tr> </table>			▶	Repair harness or connectors.
	▶	Repair harness or connectors.		

3	CHECK CLOSED THROTTLE POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT						
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 40 and throttle position switch terminal 6. Refer to "Wiring Diagram", EC-463. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>		OK	▶	GO TO 5.	NG	▶	GO TO 4.
OK	▶	GO TO 5.					
NG	▶	GO TO 4.					

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between ECM and throttle position switch ● Harness for open or short between TCM (Transmission control module) and throttle position sensor 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK IGNITION TIMING AND ENGINE IDLE SPEED						
<p>Check the following items. Refer to "Basic Inspection", EC-127.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Items</th> <th style="text-align: center;">Specifications</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignition timing</td> <td style="text-align: center;">9° ± 2° BTDC</td> </tr> <tr> <td style="text-align: center;">Idle speed</td> <td style="text-align: center;">M/T: 650 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table> <p style="text-align: right; margin-top: 10px;">MTBL0439</p>		Items	Specifications	Ignition timing	9° ± 2° BTDC	Idle speed	M/T: 650 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)
Items	Specifications						
Ignition timing	9° ± 2° BTDC						
Idle speed	M/T: 650 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)						
Models with CONSULT-II	▶ GO TO 6.						
Models without CONSULT-II	▶ GO TO 7.						

6	CHECK THROTTLE POSITION SWITCH						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Remove vacuum hose connected to throttle opener. 4. Connect suitable vacuum hose to vacuum pump and the throttle opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. <div style="text-align: center; margin: 10px 0;"> </div> <p style="text-align: right; margin-top: 10px;">SEF793W</p> <ol style="list-style-type: none"> 6. Turn ignition switch "ON". 7. Select "DATA MONITOR" mode with CONSULT-II. 8. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: center;">Throttle valve conditions</th> <th style="text-align: center;">CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Completely closed</td> <td style="text-align: center;">ON</td> </tr> <tr> <td style="text-align: center;">Partially open or completely open</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table> <p style="text-align: right; margin-top: 10px;">MTBL0355</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>		Throttle valve conditions	CLSD THL/P SW	Completely closed	ON	Partially open or completely open	OFF
Throttle valve conditions	CLSD THL/P SW						
Completely closed	ON						
Partially open or completely open	OFF						
OK (With CONSULT-II)	▶ GO TO 9.						
OK (Without CONSULT-II)	▶ GO TO 10.						
NG	▶ GO TO 8.						

DTC P0510 CLOSED THROTTLE POSITION SWITCH

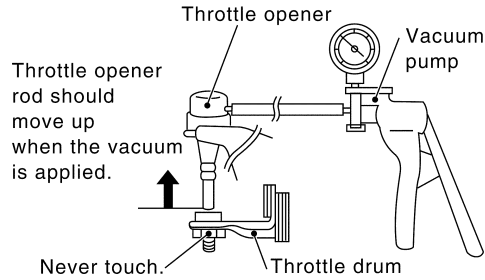
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7 CHECK THROTTLE POSITION SWITCH

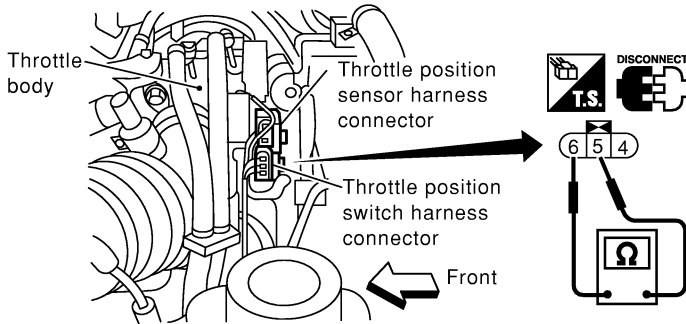
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Remove vacuum hose connected to throttle opener.
4. Connect suitable vacuum hose to vacuum pump and the throttle opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Disconnect closed throttle position switch harness connector.
7. Check continuity between closed throttle position switch terminals 6 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

LEC436

OK or NG

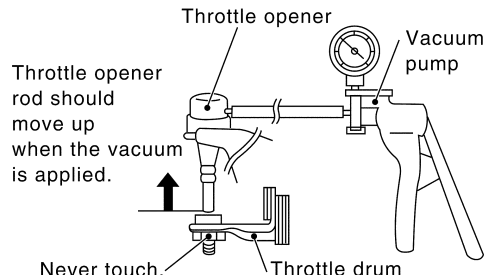
OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	GO TO 8.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	ADJUST THROTTLE POSITION SWITCH									
Check the following items. Refer to "Basic Inspection", EC-127.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Items</th> <th style="width: 50%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>9°±2° BTDC</td> </tr> <tr> <td>Closed throttle position switch idle position adjustment</td> <td>Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>			Items	Specifications	Ignition timing	9°±2° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Items	Specifications									
Ignition timing	9°±2° BTDC									
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF									
Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)									
MTBL0440										
Is it possible to adjust closed throttle position switch?										
Yes or No										
Yes (With CONSULT-II) ▶	GO TO 9.									
Yes (Without CONSULT-II) ▶	GO TO 10.									
No ▶	Replace throttle position switch.									

9	CHECK THROTTLE POSITION SENSOR									
<p>🔧 With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine (ignition switch OFF). 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to the vacuum pump and the opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 										
										
SEF793W										
<ol style="list-style-type: none"> 6. Turn ignition switch ON. 7. Select "DATA MONITOR" mode with CONSULT-II. 8. Check voltage of "THRTL POS SEN" under the following conditions. <p>Voltage measurement must be made with throttle position sensor installed in vehicle.</p>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Completely closed (a)</td> <td>0.15 - 0.85V</td> </tr> <tr> <td>Partially open</td> <td>Between (a) and (b)</td> </tr> <tr> <td>Completely open (b)</td> <td>3.5 - 4.7V</td> </tr> </tbody> </table>			Throttle valve conditions	Voltage	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	Voltage									
Completely closed (a)	0.15 - 0.85V									
Partially open	Between (a) and (b)									
Completely open (b)	3.5 - 4.7V									
MTBL0231										
OK or NG										
OK ▶	GO TO 11.									
NG ▶	Replace throttle position sensor.									

DTC P0510 CLOSED THROTTLE POSITION SWITCH

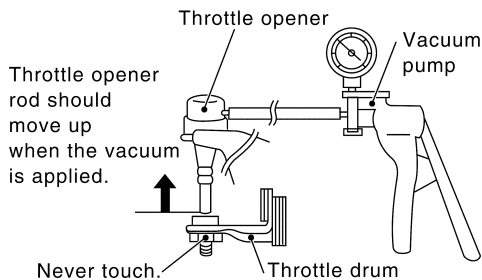
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10 CHECK THROTTLE POSITION SENSOR

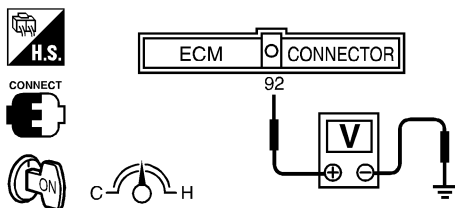
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground.
Voltage measurement must be made with throttle position sensor installed in vehicle.



Throttle valve conditions	Voltage
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

SEF892Z

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace throttle position sensor.

11 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

	▶	INSPECTION END
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System Description

NIEC0494

These circuit lines are used to control the smooth shifting up and down of A/T during the hard acceleration/ deceleration. Voltage signals are exchanged between ECM and TCM (Transmission control module).

On Board Diagnosis Logic

NIEC0496

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0600*	<ul style="list-style-type: none"> ECM receives incorrect voltage from TCM (Transmission control module) continuously. 	<ul style="list-style-type: none"> Harness or connectors [The circuit between ECM and TCM (Transmission control module) is open or shorted.]

*: This DTC can be detected only by "DATA MONITOR (AUTO TRIG)" with CONSULT-II.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC0497

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at ignition switch "ON".

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-471.

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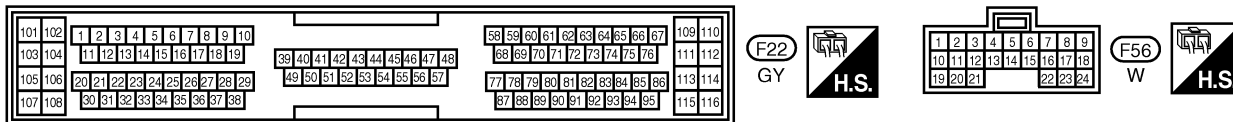
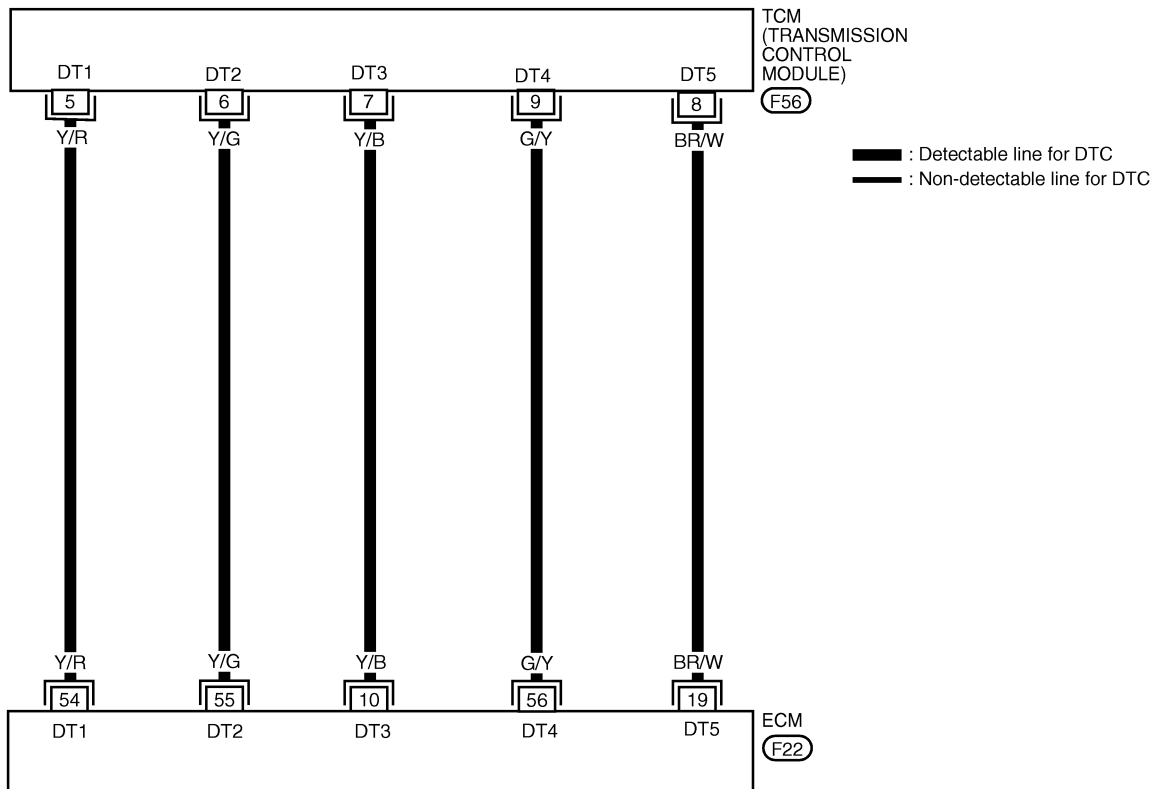
EL

IDX

Wiring Diagram

NIEC1189

EC-AT/C-01



LEC376

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

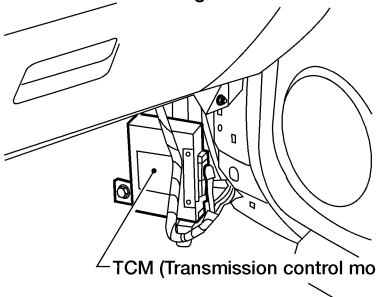
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	Y/B	A/T SIGNAL NO. 3	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
19	BR/W	A/T SIGNAL NO. 5	ENGINE RUNNING AT IDLE SPEED	APPROX. 8V
54	Y/R	A/T SIGNAL NO. 1	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
55	Y/G	A/T SIGNAL NO. 2	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
56	G/Y	A/T SIGNAL NO. 4	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V

SEF583Y

Diagnostic Procedure

NIEC1190

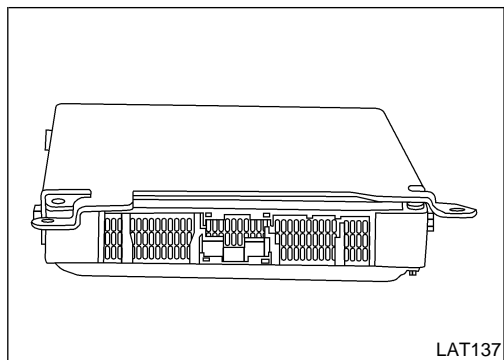
1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM (Transmission control module) harness connector.</p> <p style="text-align: center;">View with dash side lower garnish RH removed</p>  <p style="text-align: center;">TCM (Transmission control module)</p> <p style="text-align: right;">LEC306</p> <p>3. Check harness continuity between ECM terminal 10 and TCM terminal 7, ECM terminal 19 and TCM terminal 8, ECM terminal 54 and terminal 5, ECM terminal 55 and TCM terminal 6, ECM terminal 56 and TCM terminal 9. Refer to "Wiring Diagram", EC-470. Continuity should exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Repair harness or connectors.

2	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Check harness continuity between ECM terminal 10 and ground, ECM terminal 19 and ground, ECM terminal 54 and ground, ECM terminal 55 and ground, ECM terminal 56 and ground. Refer to "Wiring Diagram", EC-470. Continuity should not exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	Repair short to ground or short to power in harness.

3	CHECK INTERMITTENT INCIDENT	
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.</p>		
	▶	INSPECTION END

GI
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Component Description



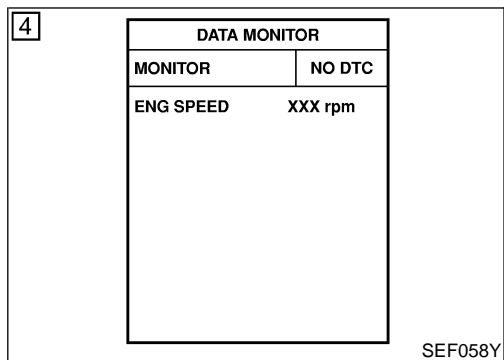
Component Description

The ECM consists of a microcomputer and connector for signal input and output and for power supply. The ECM controls the engine. NIEC0295

On Board Diagnosis Logic

NIEC0296

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0605	<ul style="list-style-type: none"> ECM calculation function is malfunctioning. 	<ul style="list-style-type: none"> ECM



DTC Confirmation Procedure

NIEC0297

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Run engine for at least 30 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-473.

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NIEC0298

1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-472. 5. Is the 1st trip DTC P0605 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-472. 5. Is the 1st trip DTC P0605 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-100. 3. Perform "Idle Air Volume Learning", EC-83, Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the instruction of "Idle Air Volume Learning".

GI
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DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

Description

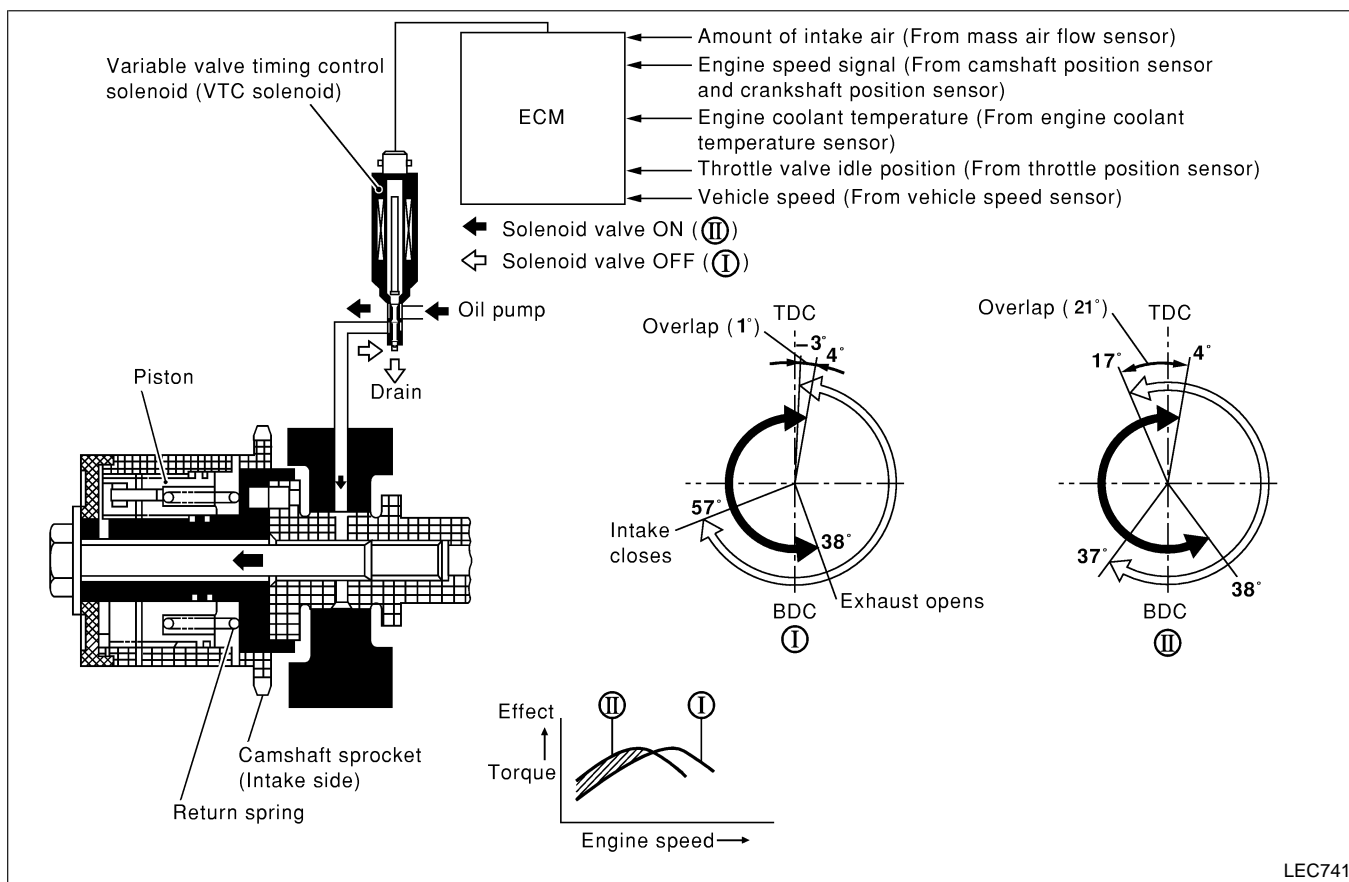
Description SYSTEM DESCRIPTION

NIEC0668

NIEC0668S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and cylinder number	ECM	Intake valve timing control solenoid valve
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Vehicle speed sensor	Vehicle speed		

The intake valve timing control system is utilized to control intake valve opening and closing timing. Engine coolant temperature signals, engine speed, amount of intake air, vehicle speed and throttle position are used to determine intake valve timing. The intake camshaft sprocket position is regulated by oil pressure controlled by the intake valve timing control. When ECM sends ON signal to intake valve timing control solenoid valve, oil pressure is transmitted to camshaft sprocket. Then, intake side camshaft is advanced.



DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

Description (Cont'd)

OPERATION

-NIEC0668S02

Engine operating condition	Intake valve timing control solenoid valve	Intake valve opening and closing time	Valve overlap	Engine valve timing
<ul style="list-style-type: none"> Engine coolant temperature is between 15°C (59°F) to 110°C (230°F) and engine speed is between 1,100 rpm and 4,200 rpm. During high load condition 	ON	Advance	Increased	II
Those other than above	OFF	Normal	Normal	I

GI
MA
EM
LC

CONSULT-II Reference Value in Data Monitor Mode

NIEC0669

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V SOL-B1	<ul style="list-style-type: none"> Engine is in warm up condition. Engine speed is more than 2,000 rpm. Quickly depressed accelerator pedal 	OFF → ON

EC
FE
CL

On Board Diagnosis Logic

NIEC0671

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1110	<ul style="list-style-type: none"> Comparing the intake valve timing position when the intake valve timing solenoid is ON with that when the solenoid is OFF, the difference does not exceed a certain limit. 	<ul style="list-style-type: none"> Harness or connectors (The intake valve timing control position sensor circuit is open.) Intake valve timing control position sensor Accumulation of debris to the signal pick-up portion of the camshaft

AT
AX
SU

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec
INT/V SOL-B1	OFF
INT/V TIM-B1	XXX deg

SEF493Y

DTC Confirmation Procedure

NIEC0672

CAUTION:
Always drive at safe speed.

NOTE:
If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Do not apply electrical load (e.g., cooling fan, rear window defogger, etc.)

With CONSULT-II

- 1) Warm up engine to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 4) Restart engine and wait at least 30 seconds.
- 5) Let engine idle at least 50 seconds. (Test is completed when "INT/V SOL - B1 in "DATA MONITOR" with CONSULT-II remains "OFF".) If indication is "ON", repeat step.
- 6) Maintain the following conditions for at least 30 seconds. (Test is completed when "INT/V SOL - B1 in "DATA MONITOR" with CONSULT-II remains "ON".) If indication is "OFF", repeat step.

ST
RS
BT
HA
SC
EL
IDX

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

ENG SPEED	More than 2,000 rpm
B/FUEL SCHDL	More than 6 msec
Selector lever	5th (M/T) 3rd with OD "OFF" (A/T)

- 7) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-478.

 **With GST**

- 1) Warm up engine to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Restart engine and wait at least 30 seconds.
- 4) Let engine idle at least 50 seconds.
- 5) Maintain the following conditions for at least 30 seconds.

ENG SPEED	More than 2,000 rpm
B/FUEL SCHDL	More than 6 msec
Selector lever	5th (M/T) 3rd with OD "OFF" (A/T)

- 6) Select "MODE 7" with GST.
- 7) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-478.

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

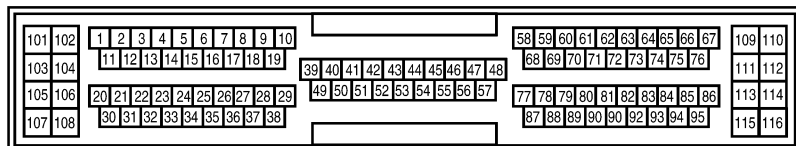
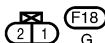
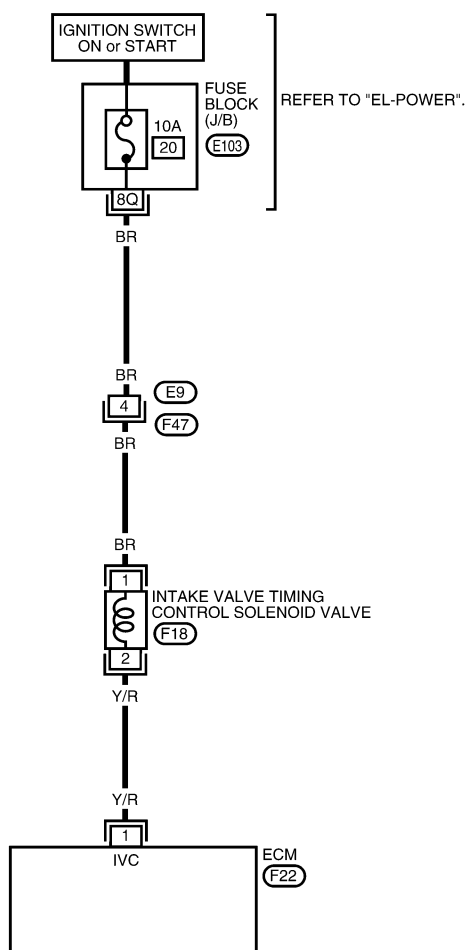
Wiring Diagram

Wiring Diagram

NIEC0673

EC-IVC-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC621

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y/R	INTAKE VALVE TIMING CONTROL SOLENOID VALVE	SOLENOID VALVE IS OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	APPROX. 0V
			SOLENOID VALVE IS NOT OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	BATTERY VOLTAGE

SEF737YA

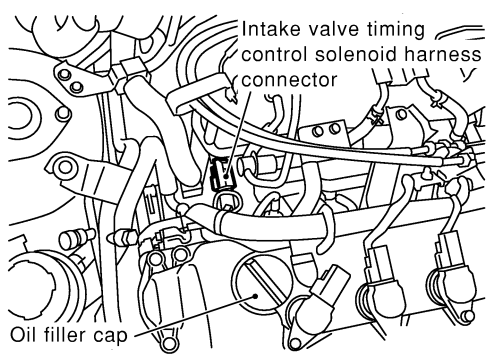
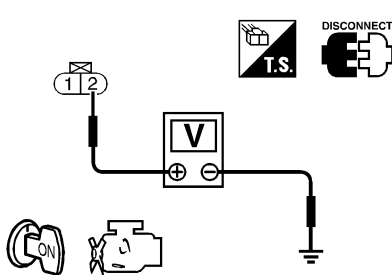
DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0674

1	CHECK POWER SUPPLY	<p>1. Stop engine. 2. Disconnect intake valve timing control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>Intake valve timing control solenoid harness connector</p> <p>Oil filler cap</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 1 and ground.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	SEF735Y						
			SEF097X						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>	OK	▶	GO TO 3.	NG	▶	GO TO 2.	
OK	▶	GO TO 3.							
NG	▶	GO TO 2.							

2	DETECT MALFUNCTIONING PART	<ul style="list-style-type: none"> ● Harness connectors F47, E9 ● 10A fuse ● Harness for open or short between the intake valve timing control solenoid valve and fuse 	
	▶	Repair harness or connectors.	

3	CHECK OUTPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 1 and solenoid valve terminal 2. Refer to "Wiring Diagram", EC-477. Continuity should exist. If OK, check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair harness or connectors.	
OK	▶	GO TO 4.							
NG	▶	Repair harness or connectors.							

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK ENGINE OIL PRESSURE	
Refer to LC-5 , "Oil Pressure Check".		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair lubrication system.

GI

MA

EM

5	CHECK INTAKE AIR SYSTEM	
Check intake air system for leaks.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair intake air system.

LC

EC

6	CHECK INTAKE VALVE TIMING CONTROL POSITION SENSOR	
Refer to "DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR", EC-516.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace.

FE

CL

MT

7	CHECK COMPONENT (Intake valve timing control solenoid valve).	
Refer to "COMPONENT INSPECTION" below.		
OK or NG		
OK	▶	Replace intake valve timing control sprocket with camshaft.
NG	▶	Replace intake valve timing control solenoid valve.

AT

AX

SU

8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

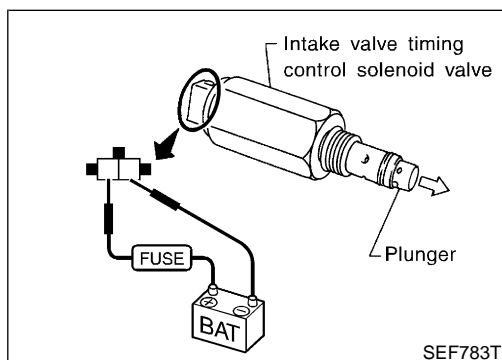
BR

ST

RS

BT

HA



Component Inspection

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

NIEC0675
NIEC0675S01

1. Check oil passage visually for any metal debris.
2. Supply intake valve timing control solenoid valve terminals with battery voltage.
3. Make sure that inside plunger protrudes.
If NG, replace intake valve timing control solenoid valve.

SC

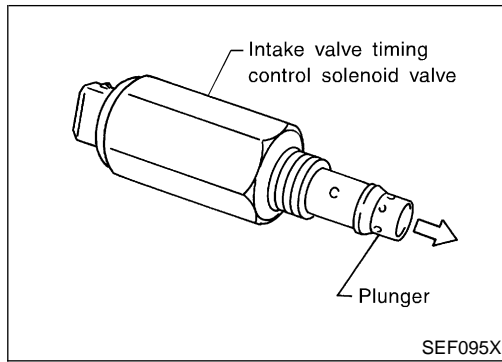
EL

IDX

DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0677

The valve timing control system is utilized to control intake valve opening and closing timing. Engine coolant temperature signals, engine speed and throttle position are used to determine intake valve timing.

The intake camshaft sprocket position is regulated by oil pressure controlled by the intake valve timing control.

When ECM sends ON signal to intake valve timing control solenoid valve, oil pressure is transmitted to camshaft sprocket. Then, intake side camshaft is advanced.

Operation

NIEC0678

Engine operating condition				Intake valve timing control solenoid valve	Intake valve opening and closing time	Valve overlap
Engine coolant temperature	Engine speed	B/FUEL SCHDL	Neutral switch			
15°C (59°F) - 55°C (131°F)	1,100 - 4,200 rpm	Above 0 msec	OFF	ON	Advance	Increased
Above 70°C (158°F)		Above 6 msec				
Conditions other than those above				OFF	Normal	Normal

CONSULT-II Reference Value in Data Monitor Mode

NIEC0679

MONITOR ITEM	CONDITION		SPECIFICATION
INT/V TIM SOL	● Engine: After warming up	Idle	OFF
		Revsing engine with full throttle opening (Under 4,200 rpm)	ON

On Board Diagnosis Logic

NIEC0681

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1111	● An improper voltage signal is entered to ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The intake valve timing control solenoid valve circuit is open or shorted.) ● Intake valve timing control solenoid valve

DATA MONITOR	
MONITORING	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V
INT/V TIM SOL	OFF

SEF736Y

DTC Confirmation Procedure

NIEC0682

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.

DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

4) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-483.

Without CONSULT-II
Follow the procedure "With CONSULT-II" above.

GI

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HA

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EL

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DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

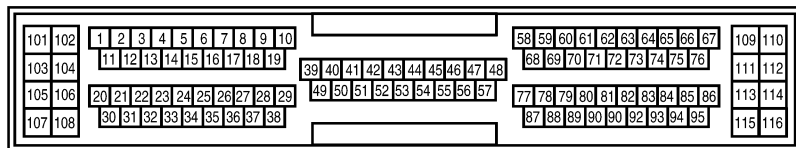
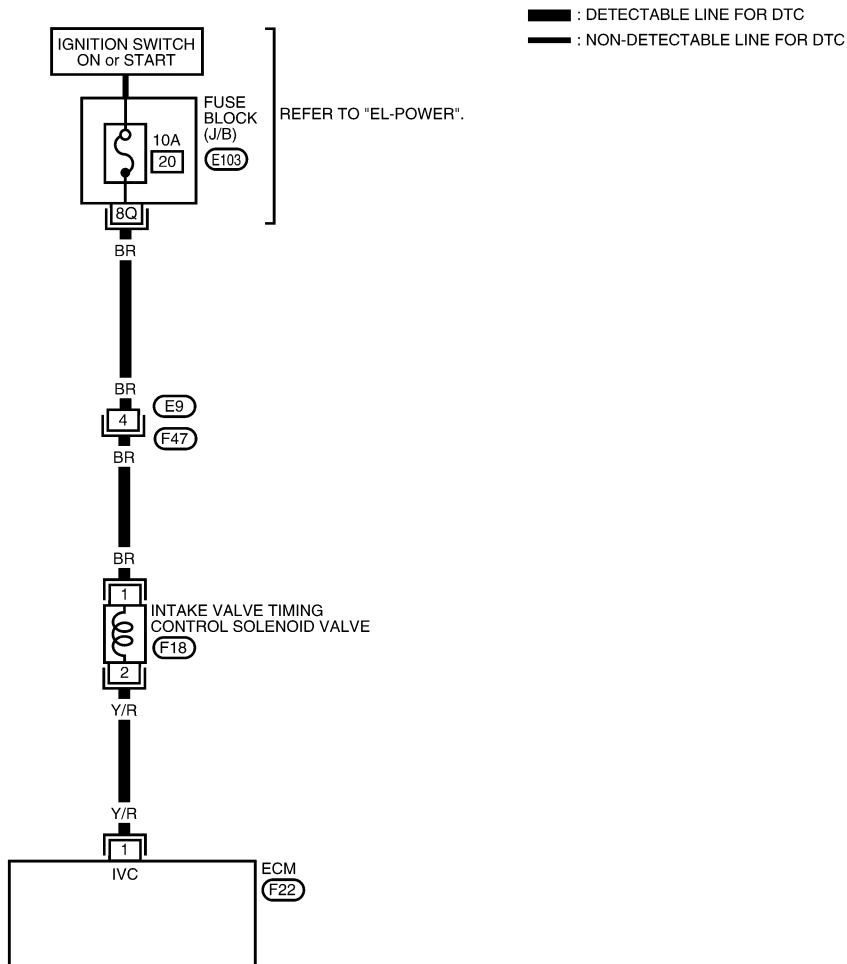
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC0683

EC-IVC-02



WEC622

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y/R	INTAKE VALVE TIMING CONTROL SOLENOID VALVE	SOLENOID VALVE IS OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	APPROX. 0V
			SOLENOID VALVE IS NOT OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	BATTERY VOLTAGE

SEF737YA

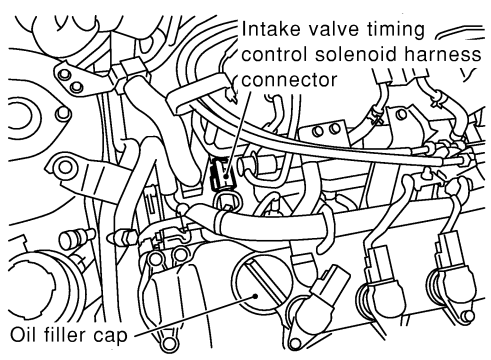
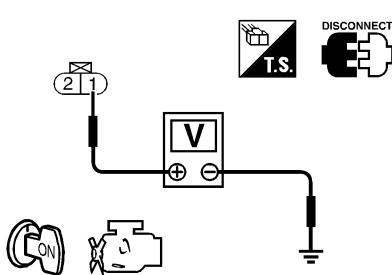
DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0684

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect intake valve timing control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>Intake valve timing control solenoid harness connector</p> <p>Oil filler cap</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between terminal 2 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>DISCONNECT</p> <p>T.S.</p> </div> <p style="color: blue;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

SEF735Y

SEF193Z

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connector F47, E9 ● 10A fuse ● Harness for open or short between valve timing control solenoid valve and fuse <p style="text-align: right;">▶ Repair harness or connectors.</p>	<p>ST</p> <p>RS</p> <p>BT</p>
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3	CHECK OUTPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 1 and intake valve timing control solenoid valve harness connector terminal 2.</p> <p style="padding-left: 20px;">Refer to "Wiring Diagram", EC-482.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground to short to power or connectors.	

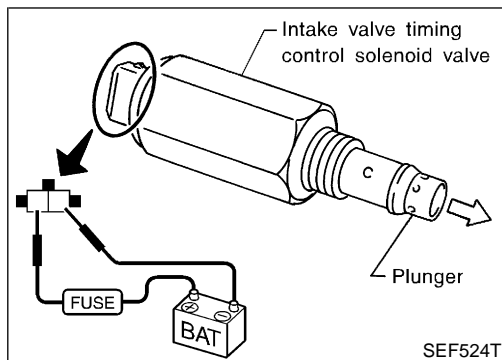
DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK VALVE TIMING CONTROL SOLENOID VALVE
Refer to "Component Inspection", EC-484.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace valve timing control solenoid valve.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END



Component Inspection

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

NIEC0685
NIEC0685S01

1. Check oil passage visually for any metal debris.
2. Supply intake valve timing control solenoid valve terminals with battery voltage.
3. Make sure that inside plunger protrudes.
If NG, replace intake valve timing control solenoid valve.

On Board Diagnosis Logic

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough. NIEC0568

This is due to a leak in the seal or the thermostat stuck open. Malfunction is detected when the engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

GI

MA

EM

LC

Possible Cause

- Thermostat function
- Leakage from sealing portion of thermostat
- Engine coolant temperature sensor

NIEC0569

EC

FE

CL

MT

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

NIEC0570

AT

AX

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 60°C (140°F).

SU

BR

WITH CONSULT-II

- 1) Replace thermostat with new one. Refer to **LC-13**, "Thermostat". Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on. NIEC0570S01
- 2) Turn ignition switch "ON".
- 3) Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- 4) Check that the "COOLAN TEMP/S" is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
- 5) Drive vehicle for 10 consecutive minutes under the following conditions.

ST

RS

BT

HA

SC

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
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If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-486.

EL

WITH GST

- 1) Follow the procedure "WITH CONSULT-II" above.

NIEC0570S02

IDX

DTC P1126 THERMOSTAT FUNCTION

QG18DE (EXC CALIF CA)

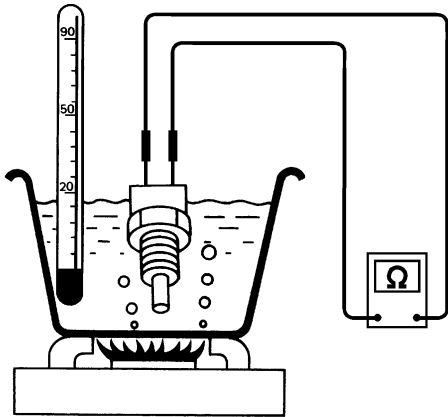
Diagnostic Procedure

Diagnostic Procedure

NIEC0571

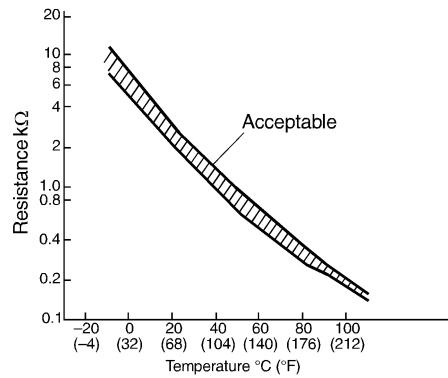
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK



INSPECTION END

NG



Replace engine coolant temperature sensor.

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Description

Description

If DTC P1130 is displayed with P1165, first perform trouble diagnosis for DTC P1165, EC-523. NIEC0686

SYSTEM DESCRIPTION

NIEC0686S01

Sensor	Input Signal to ECM	ECM function	Actuator
Throttle position sensor	Throttle position	ECM	Swirl control valve control solenoid valve ↓ Vacuum signal Swirl control valve actuator ↓ Swirl control valve
Ignition switch	Start signal		
Crankshaft position sensor (POS)	Engine speed		
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		

This system has a swirl control valve in the intake passage of each cylinder.

While idling and during low engine speed operation, the swirl control valve closes. Thus the velocity of the air in the intake passage increases, promoting the vaporization of the fuel and producing a swirl in the combustion chamber.

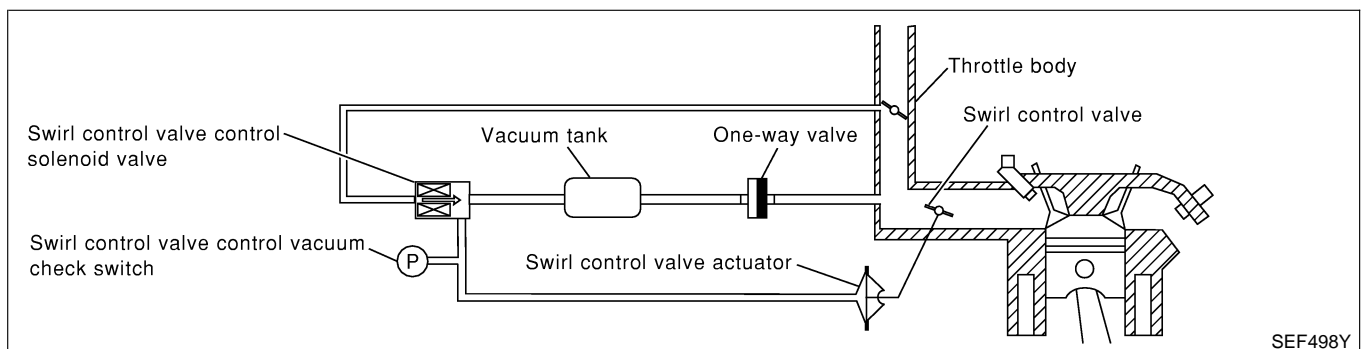
Because of this operation, this system tends to increase the burning speed of the gas mixture, improve fuel consumption, and increase the stability in running conditions.

Also, except when idling and during low engine speed operation, this system opens the swirl control valve. In this condition, this system tends to increase power by improving intake efficiency via reduction of intake flow resistance, intake flow.

The solenoid valve controls swirl control valve's shut/open condition. This solenoid valve is operated by the ECM.

Throttle position sensor (Idle position)	Engine speed	Swirl control valve control solenoid valve	Swirl control valve
ON	Below 3,200 rpm	ON	Closed
OFF	Less than 3,200 rpm	ON	Closed
	More than 3,200 rpm	OFF	Open

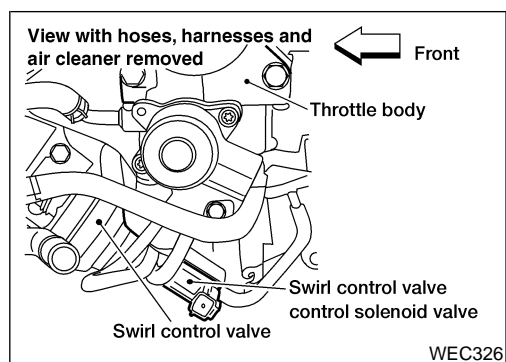
When engine coolant temperature is below 10°C (50°F) and above 55°C (131°F), swirl control valve is kept open regardless of above condition.



DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Description (Cont'd)



COMPONENT DESCRIPTION

NIEC0686S02

Swirl Control Valve Control Solenoid Valve

NIEC0686S0201

The swirl control valve control solenoid valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the solenoid valve is bypassed to apply intake manifold vacuum to the swirl control valve actuator. This operation closes the swirl control valve. When the ECM sends an OFF signal, the vacuum signal is cut and the swirl control valve opens.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0687

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWRL CONT S/V	● Engine speed: Idle	Engine coolant temperature is between 15°C (59°F) to 55°C (131°F).	ON
		Engine coolant temperature is above 55°C (131°F).	OFF

On Board Diagnosis Logic

NIEC0688

Malfunction is detected when

(Malfunction A) The vacuum signal is not sent to swirl control valve under specified driving conditions, even though swirl control valve control solenoid valve is ON,

(Malfunction B) The vacuum signal is sent to swirl control valve even though swirl control valve control solenoid valve is OFF.

Possible Cause

NIEC0689

MALFUNCTION A

NIEC0689S02

- Harness or connector (The swirl control valve control solenoid valve circuit is open.)
- Swirl control valve control solenoid valve
- Intake system (Intake air leaks)
- Hoses and tubes between intake manifold, vacuum tank and swirl control valve actuator
- Swirl control valve actuator
- Swirl control valve control vacuum check switch
- One-way valve
- Vacuum tank
- Mass air flow sensor
- Crankshaft position sensor (POS)
- Camshaft position sensor (PHASE)
- Throttle position sensor

MALFUNCTION B

NIEC0689S03

- Harness or connector (The swirl control valve control solenoid valve circuit is shorted.)

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

- Swirl control valve control vacuum check switch
- Camshaft position sensor (PHASE)
- Crankshaft position sensor (POS)
- Throttle position sensor
- Hoses and tubes between air cleaner and swirl control valve vacuum check switch
- Swirl control valve control solenoid valve

GI

MA

EM

LC

DTC Confirmation Procedure

NIEC0690

Perform "Procedure for Malfunction A" first. If the 1st trip DTC cannot be confirmed, perform "Procedure for Malfunction B".

EC

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

FE

CL

MT

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION A

NIEC0690S02

TESTING CONDITION:

- For best results, perform the test at a temperature above 5°C (41°F).
- Before performing the following procedure, confirm that battery voltage is more than 10V at idle, then stop engine immediately.

AT

AX

SU

With CONSULT-II

NIEC0690S0201

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON".
- 3) Check "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- 4) Confirm COOLAN TEMP/S value is 40°C (104°F) or less. If the value is more than 40°C (104°F), park the vehicle in a cool place and retry from step 1.
- 5) Start engine and wait until COOLAN TEMP/S value increases to more than 55°C (131°F). If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-492.

BR

ST

RS

BT

With GST

NIEC0690S0202

Follow the procedure "With CONSULT-II" above.

HA

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION B

NIEC0690S03

TESTING CONDITION:

- Always perform the test at a temperature above 5°C (41°F).
- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

SC

EL

With CONSULT-II

NIEC0690S0301

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT-II.

IDX

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 4) Start engine and let it idle for at least 20 seconds. If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-492.



With GST

Follow the procedure "With CONSULT-II" above.

NIEC0690S0302

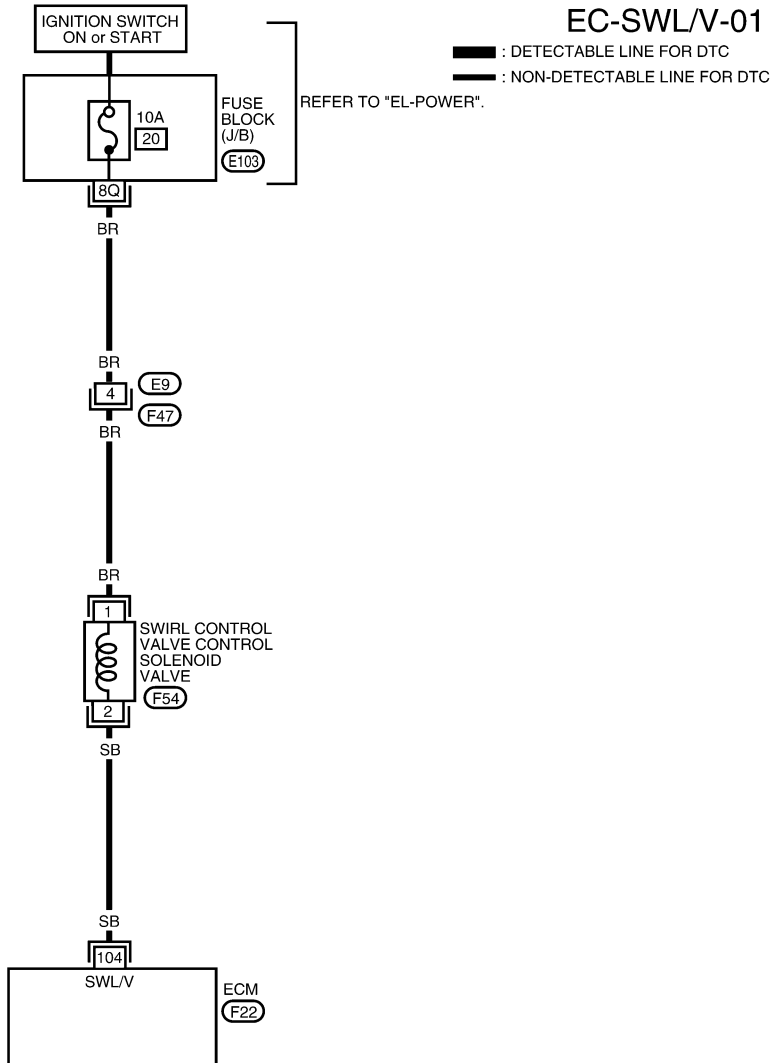
DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

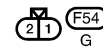
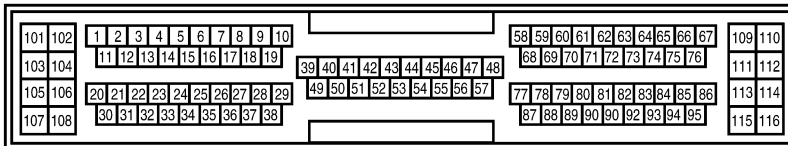
Wiring Diagram

Wiring Diagram

=NIEC0691



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WEC623

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
104	G	SWIRL CONTROL VALVE CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE BETWEEN 15°C (59°F) AND 50°C (122°F).	0 - 1V
			ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE ABOVE 55°C (131°F).	BATTERY VOLTAGE

SEF738YA

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure PROCEDURE A

NIEC0692

NIEC0692S02

1	CHECK INTAKE SYSTEM	
1. Start engine and let it idle. 2. Check intake air system for air leaks.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 2.
OK (Without CONSULT-II)	▶	GO TO 3.
NG	▶	Repair intake system.

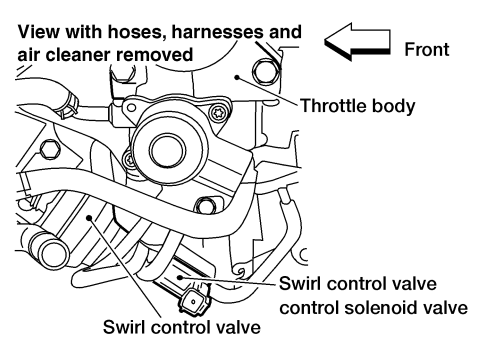
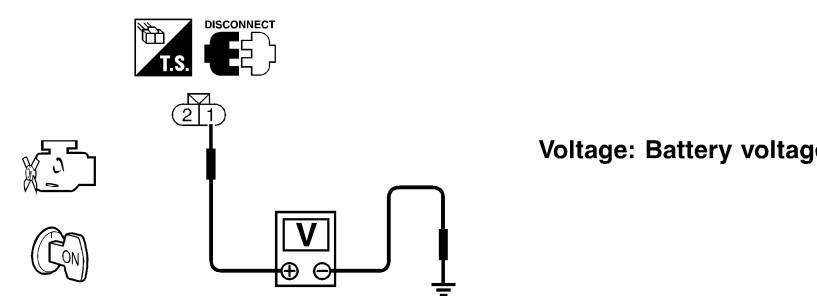
2	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE CIRCUIT																			
ⓘ With CONSULT-II 1. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II. 2. Touch "ON" and "OFF" on CONSULT-II screen.																				
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="width: 50%;">SWIRL CONT SOL/V</td> <td style="width: 50%;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>IACV-AAC/V</td> <td>XXX step</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		SWIRL CONT SOL/V	OFF	MONITOR		ENG SPEED	XXX rpm	IACV-AAC/V	XXX step								
ACTIVE TEST																				
SWIRL CONT SOL/V	OFF																			
MONITOR																				
ENG SPEED	XXX rpm																			
IACV-AAC/V	XXX step																			
3. Make sure that clicking sound is heard from the swirl control valve control solenoid valve.																				
OK or NG																				
OK	▶	GO TO 6.																		
NG	▶	GO TO 3.																		

SEF499Y

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect swirl control valve control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">WEC326</p> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between swirl control valve control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF500Y</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 5.	SU
NG	▶	GO TO 4.	BR <p style="text-align: center;">ST</p> <p style="text-align: center;">RS</p>

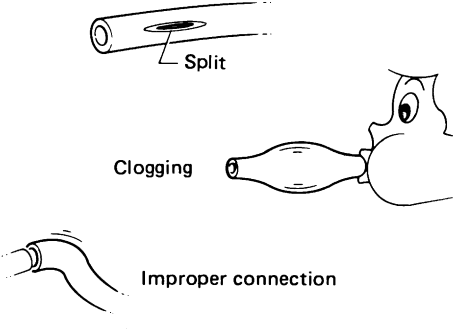
4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between swirl control valve control solenoid valve and fuse <p style="text-align: right;">▶ Repair harness or connectors.</p>	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
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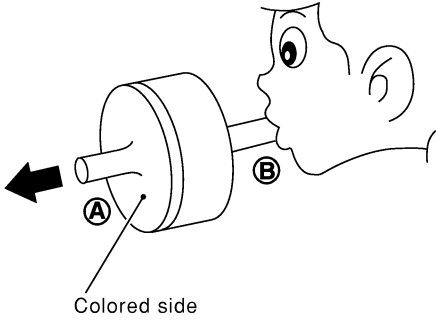
5	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 104 and swirl control valve control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-491.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 6.	SU
NG	▶	Repair open circuit, short to ground or short to power in harness connectors.	BR <p style="text-align: center;">ST</p> <p style="text-align: center;">RS</p>

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK HOSES		
<p>Check hoses and tubes between intake manifold, and swirl control valve actuator for crack, clogging, improper connection or disconnection.</p>			
			
SEF109L			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Repair hoses or tubes.	

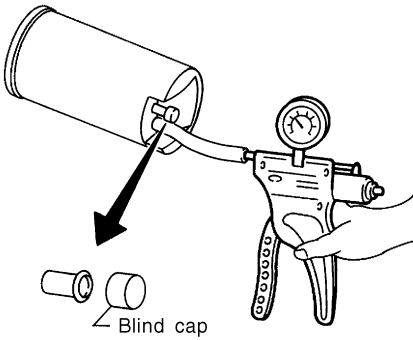
7	CHECK ONE-WAY VALVE		
<p>Check one-way valve air passage continuity under the following conditions.</p>			
			
SEF194Z			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	Replace one-way valve.	

Condition	Air passage continuity
Blow air from side B to A	Yes
Blow air from side A to B	No

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK VACUUM TANK	<p>1. Apply vacuum -80.0 kPa (-600 mmHg, -23.62 inHg, -11.60 psi).</p> <p>2. Confirm that there is no leakage.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Blind cap</p> </div> <p style="text-align: right;">SEF405S</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 9.
NG	▶	Replace vacuum tank.

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DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9 CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

With CONSULT-II

1. Reconnect the disconnected harness connectors.
2. Start engine and let it idle.
3. Remove vacuum hose connected to swirl control valve actuator.
4. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Touch "ON" and "OFF" on CONSULT-II screen.
6. Check vacuum existence and operation delay time under the following conditions.

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

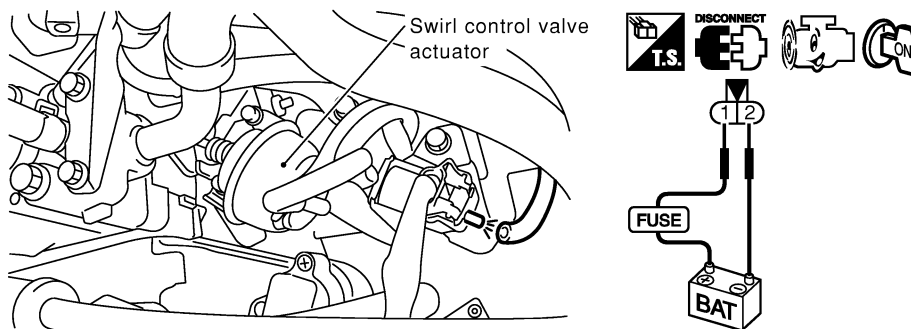
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
59	P/L	SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH	ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE BETWEEN 15°C (59°F) AND 50°C (122°F).	APPROX. 5V
			ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE ABOVE 55°C (131°F).	0 - 1V

SEF764YA

Without CONSULT-II

1. Reconnect ECM harness connector.
2. Remove vacuum hose connected to swirl control valve actuator.
3. Start engine and let it idle.
4. Apply 12V of direct current between swirl control valve control solenoid valve terminals 1 and 2.
5. Check vacuum existence and operation delay time under the following conditions.



SEF763Y

OK or NG

OK	▶	GO TO 10.
NG	▶	Replace intake manifold collector assembly.

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

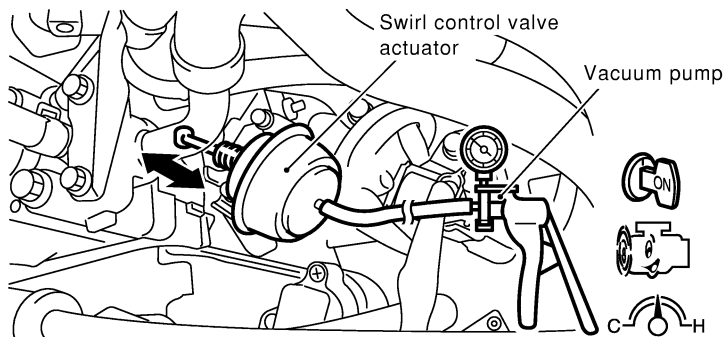
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10 CHECK SWIRL CONTROL VALVE ACTUATOR

With CONSULT-II

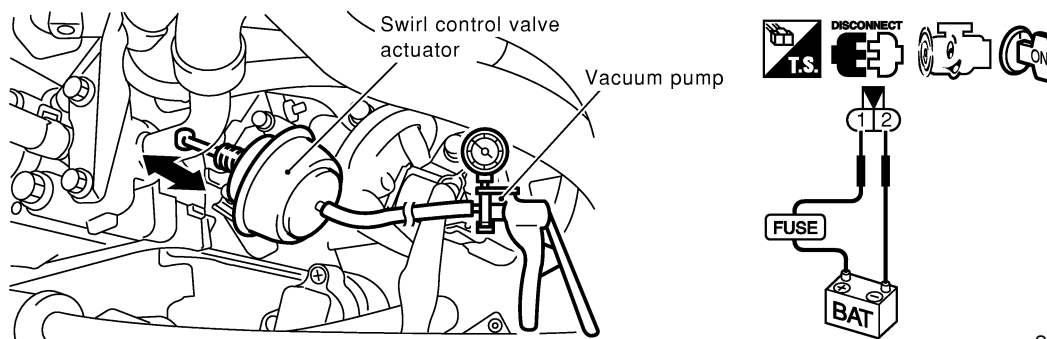
1. Reconnect vacuum hose between swirl control valve actuator and swirl control valve control solenoid valve.
2. Start engine and let it idle.
3. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode.
4. Touch "ON" and "OFF" on CONSULT-II screen.
5. Make sure that swirl control valve actuator rod moves according to "SWIRL CONT SOL/V" indication.



SEF762Y

Without CONSULT-II

1. Reconnect vacuum hose between swirl control valve actuator and swirl control valve control solenoid valve.
2. Start engine and let it idle.
3. Apply 12V direct current between swirl control valve control solenoid valve terminals 1 and 2.
4. Make sure that swirl control valve actuator rod moves according to 12V direct current being applied.



SEF761Y

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace swirl control valve and actuator.

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DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH									
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect vacuum hose connected to swirl control valve control vacuum check switch. 3. Attach vacuum pump to swirl control valve control vacuum check switch. 4. Turn ignition switch "ON". 5. Check voltage between ECM terminal 59 and ground under the following conditions. 										
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;"> <p style="font-size: small;">Swirl control valve control vacuum check switch</p> <p style="font-size: small;">Vacuum pump</p> </div> <div style="width: 45%; border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Applied pressure kPa (mmHg, inHg)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">More than -20.0 (-150, -5.91)</td> <td style="text-align: center;">Engine ground</td> </tr> <tr> <td style="text-align: center;">-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)</td> <td style="text-align: center;">Engine ground or Approx. 4.8</td> </tr> <tr> <td style="text-align: center;">Less than -23.0 (-172, -6.77)</td> <td style="text-align: center;">Approx. 4.8</td> </tr> </tbody> </table> </div> </div> <p style="text-align: right; font-size: x-small;">SEF894Z</p>			Applied pressure kPa (mmHg, inHg)	Voltage V	More than -20.0 (-150, -5.91)	Engine ground	-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8	Less than -23.0 (-172, -6.77)	Approx. 4.8
Applied pressure kPa (mmHg, inHg)	Voltage V									
More than -20.0 (-150, -5.91)	Engine ground									
-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8									
Less than -23.0 (-172, -6.77)	Approx. 4.8									
OK or NG										
OK	▶	GO TO 12.								
NG	▶	Replace swirl control valve control vacuum check switch.								

12	CHECK MASS AIR FLOW SENSOR											
<ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Start engine and warm it up to normal operating temperature. 3. Check voltage between ECM terminal 61 (Mass air flow sensor signal) and ground. 												
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;"> <p style="font-size: small;">ECM</p> <p style="font-size: small;">CONNECTOR</p> <p style="font-size: small;">61</p> </div> <div style="width: 45%; border: 1px solid black; padding: 5px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Ignition switch "ON" (Engine stopped.)</td> <td style="text-align: center;">Approx. 1.0</td> </tr> <tr> <td style="text-align: center;">Idle (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.2 - 1.8</td> </tr> <tr> <td style="text-align: center;">2,500 rpm (Engine is warmed-up to normal operating temperature.)</td> <td style="text-align: center;">1.6 - 2.2</td> </tr> <tr> <td style="text-align: center;">Idle to about 4,000 rpm*</td> <td style="text-align: center;">1.2 - 1.8 to Approx. 4.0</td> </tr> </tbody> </table> <p style="font-size: x-small; margin-top: 5px;">*: Check for linear voltage rise in response to engine being increased to about 4,000 rpm.</p> </div> </div> <p style="text-align: right; font-size: x-small;">SEF895Z</p>			Condition	Voltage V	Ignition switch "ON" (Engine stopped.)	Approx. 1.0	Idle (Engine is warmed-up to normal operating temperature.)	1.2 - 1.8	2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.2	Idle to about 4,000 rpm*	1.2 - 1.8 to Approx. 4.0
Condition	Voltage V											
Ignition switch "ON" (Engine stopped.)	Approx. 1.0											
Idle (Engine is warmed-up to normal operating temperature.)	1.2 - 1.8											
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.6 - 2.2											
Idle to about 4,000 rpm*	1.2 - 1.8 to Approx. 4.0											
<p>4. If the voltage is out of specification, disconnect MAFS harness connector and connect it again. Then repeat above check.</p> <p style="text-align: center;">OK or NG</p>												
OK (With CONSULT-II)	▶	GO TO 13.										
OK (Without CONSULT-II)	▶	GO TO 14.										
NG	▶	Replace mass air flow sensor.										

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

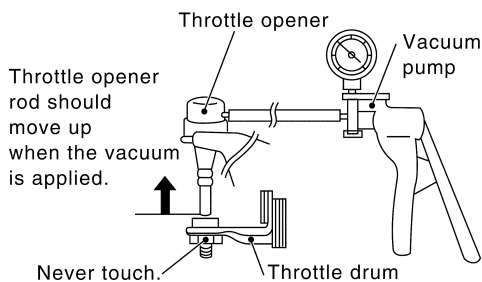
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

13 CHECK THROTTLE POSITION SENSOR

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Select "DATA MONITOR" mode with CONSULT-II.
8. Check voltage of "THRTL POS SEN" under the following conditions.

Voltage measurement must be made with throttle position sensor installed in vehicle.

DATA MONITOR	
MONITORING	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

Throttle valve conditions	THRTL POS SEN
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

SEF741Y

OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

GI

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DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

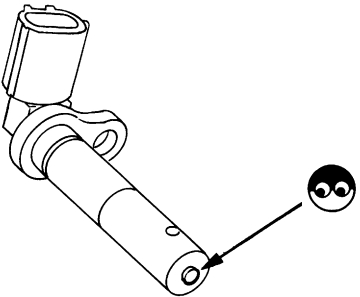
14	CHECK THROTTLE POSITION SENSOR								
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine (ignition switch OFF). 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to the vacuum pump and the opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 									
SEF793W									
<ol style="list-style-type: none"> 6. Turn ignition switch ON. 7. Check voltage between ECM terminal 91 (Throttle position sensor signal) and ground. <p>Voltage measurement must be made with throttle position sensor installed in vehicle.</p>									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Throttle valve conditions</th> <th style="padding: 5px;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Completely closed (a)</td> <td style="padding: 5px;">0.15 - 0.85V</td> </tr> <tr> <td style="padding: 5px;">Partially open</td> <td style="padding: 5px;">Between (a) and (b)</td> </tr> <tr> <td style="padding: 5px;">Completely open (b)</td> <td style="padding: 5px;">3.5 - 4.7V</td> </tr> </tbody> </table>		Throttle valve conditions	Voltage	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	Voltage								
Completely closed (a)	0.15 - 0.85V								
Partially open	Between (a) and (b)								
Completely open (b)	3.5 - 4.7V								
MTBL0231									
OK or NG									
OK	▶	GO TO 16.							
NG	▶	GO TO 15.							

15	ADJUST CLOSED THROTTLE POSITION SWITCH								
<p>Adjust closed throttle position switch. Refer to "Basic Inspection", EC-127.</p>									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Items</th> <th style="padding: 5px;">Specifications</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Ignition timing</td> <td style="padding: 5px;">9°±2° BTDC</td> </tr> <tr> <td style="padding: 5px;">Closed throttle position switch idle position adjustment</td> <td style="padding: 5px;">Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td style="padding: 5px;">Target idle speed</td> <td style="padding: 5px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>		Items	Specifications	Ignition timing	9°±2° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Items	Specifications								
Ignition timing	9°±2° BTDC								
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF								
Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)								
MTBL0440									
OK or NG									
OK	▶	GO TO 16.							
NG	▶	Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-127.							

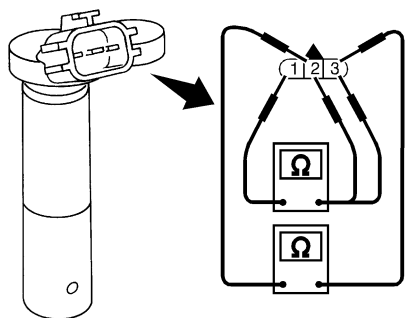
DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

16	CHECK CRANKSHAFT POSITION SENSOR (POS)-I	
<p>1. Turn ignition switch "OFF". 2. Loosen the fixing bolts and remove the crankshaft position sensor (POS). 3. Visually check the crankshaft position sensor (POS) for chipping.</p>		
		
SEF960N		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Replace crankshaft position sensor (POS).

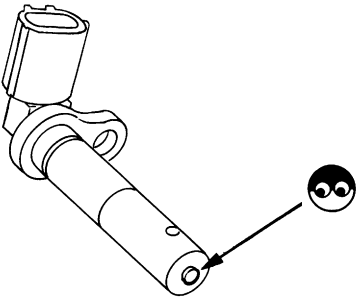
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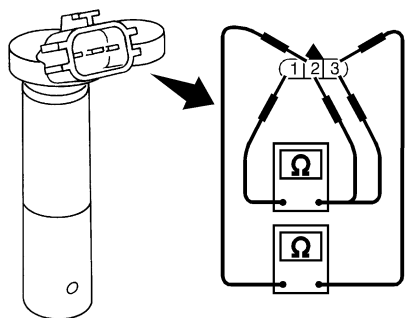
17	CHECK CRANKSHAFT POSITION SENSOR (POS)-II	
Check resistance between crankshaft position sensor (POS) terminals as shown below.		
		
SEF492Y		
OK or NG		
OK	▶	GO TO 18.
NG	▶	Replace crankshaft position sensor (POS).

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

18	CHECK CAMSHAFT POSITION SENSOR (PHASE)-I	<p>1. Turn ignition switch "OFF". 2. Loosen fixing bolt and remove the camshaft position sensor (PHASE). 3. Visually check the camshaft position sensor (PHASE) for chipping.</p>	
			
		SEF960N	
		OK or NG	
OK	▶	GO TO 19.	
NG	▶	Replace camshaft position sensor (PHASE).	

19	CHECK CAMSHAFT POSITION SENSOR (PHASE)-II	Check resistance as shown below.	
			
		SEF492Y	
		OK or NG	
OK	▶	GO TO 20.	
NG	▶	Replace camshaft position sensor (PHASE).	

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 1 (-)	
3 (+) - 2 (-)	

20	CHECK INTERMITTENT INCIDENT	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
		▶	INSPECTION END

PROCEDURE B

NIEC0692S03

1	INSPECTION START	Do you have CONSULT-II?	
		Yes or No	
Yes	▶	GO TO 2.	
No	▶	GO TO 3.	

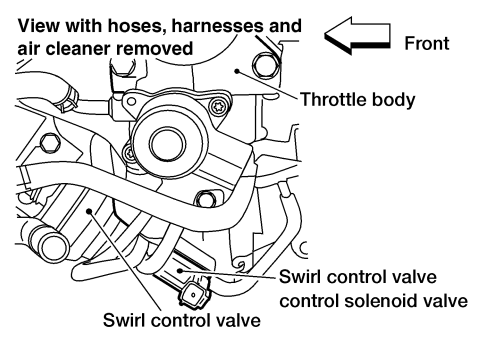
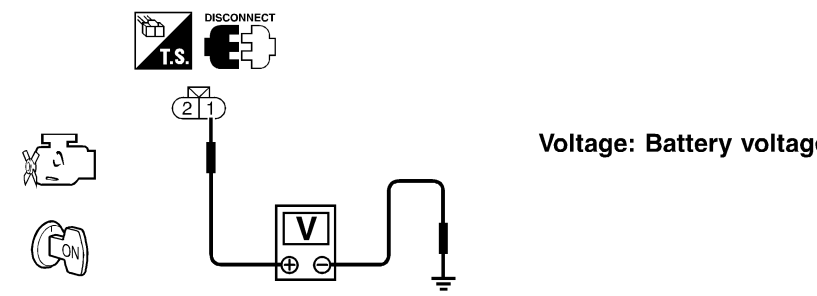
DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE CIRCUIT																						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON" and "OFF" on CONSULT-II screen. 																							
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>SWIRL CONT SOL/V</td><td>OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		SWIRL CONT SOL/V	OFF	MONITOR		ENG SPEED	XXX rpm	IACV-AAC/V	XXX step												
ACTIVE TEST																							
SWIRL CONT SOL/V	OFF																						
MONITOR																							
ENG SPEED	XXX rpm																						
IACV-AAC/V	XXX step																						
SEF499Y																							
<p>4. Make sure that clicking sound is heard from the swirl control valve control solenoid valve.</p> <p style="text-align: center;">OK or NG</p>																							
OK	▶ GO TO 6.																						
NG	▶ GO TO 3.																						

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3	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect swirl control valve control solenoid valve harness connector. 	
	
WEC326	
<ol style="list-style-type: none"> 3. Turn ignition switch "ON". 4. Check voltage between swirl control valve control solenoid valve terminal 1 and ground with CONSULT-II or tester. 	
	
SEF500Y	
OK or NG	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between swirl control valve control solenoid valve and fuse 	
▶	Repair harness or connectors.

5	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 104 and terminal 2. Refer to "Wiring Diagram", EC-491. Continuity should exist.</p> <p>4. Also, check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Repair open circuit, short to ground or short to power in harness connectors.

6	CHECK HOSES
<p>Check hoses and tubes between air cleaner and swirl control valve vacuum check switch for clogging or improper connection.</p> <div style="text-align: center; margin: 20px 0;"> </div> <p style="text-align: right; margin-right: 50px;">SEF109L</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 7.
NG	▶ Repair hoses or tubes.

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7 CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

☑ With CONSULT-II

1. Reconnect the disconnected harness connectors.
2. Start engine and let it idle.
3. Remove vacuum hose connected to swirl control valve actuator.
4. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Touch "ON" and "OFF" on CONSULT-II screen.
6. Check vacuum existence and operation delay time under the following conditions.

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

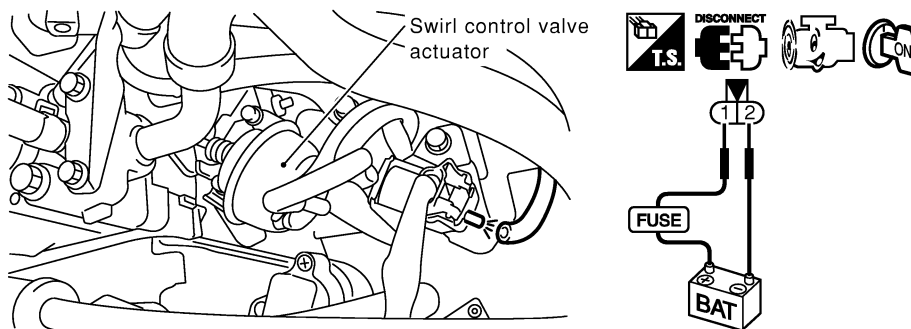
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
59	P/L	SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH	ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE BETWEEN 15°C (59°F) AND 50°C (122°F).	APPROX. 5V
			ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE ABOVE 55°C (131°F).	0 - 1V

SEF764YA

☒ Without CONSULT-II

1. Reconnect ECM harness connector.
2. Remove vacuum hose connected to swirl control valve actuator.
3. Start engine and let it idle.
4. Apply 12V of direct current between swirl control valve control solenoid valve terminals 1 and 2.
5. Check vacuum existence and operation delay time under the following conditions.



SEF763Y

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace intake manifold collector assembly.

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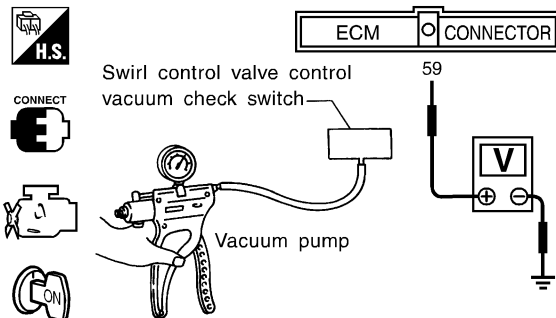
EL

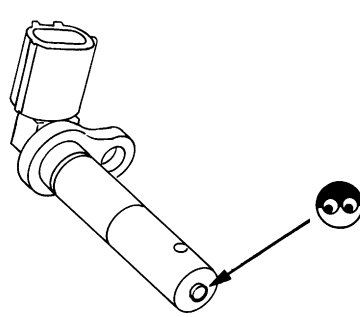
IDX

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH									
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect vacuum hose connected to swirl control valve control vacuum check switch. 3. Attach vacuum pump to swirl control valve control vacuum check switch. 4. Turn ignition switch "ON". 5. Check voltage between ECM terminal 55 and ground under the following conditions. 										
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 45%;">  </div> <div style="width: 45%;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Applied pressure kPa (mmHg, inHg)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">More than -20.0 (-150, -5.91)</td> <td style="text-align: center;">Engine ground</td> </tr> <tr> <td style="text-align: center;">-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)</td> <td style="text-align: center;">Engine ground or Approx. 4.8</td> </tr> <tr> <td style="text-align: center;">Less than -23.0 (-172, -6.77)</td> <td style="text-align: center;">Approx. 4.8</td> </tr> </tbody> </table> </div> </div>			Applied pressure kPa (mmHg, inHg)	Voltage V	More than -20.0 (-150, -5.91)	Engine ground	-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8	Less than -23.0 (-172, -6.77)	Approx. 4.8
Applied pressure kPa (mmHg, inHg)	Voltage V									
More than -20.0 (-150, -5.91)	Engine ground									
-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8									
Less than -23.0 (-172, -6.77)	Approx. 4.8									
SEF894Z										
OK or NG										
OK	▶	GO TO 9.								
NG	▶	Replace swirl control valve control vacuum check switch.								

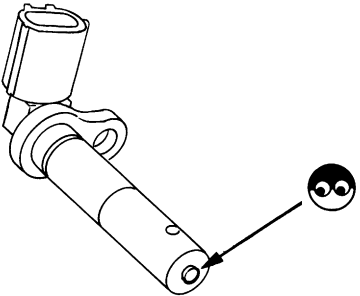
9	CHECK CRANKSHAFT POSITION SENSOR (POS)-I	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen the fixing bolts and remove the POS. 3. Visually check the crankshaft position sensor (POS) for chipping. 		
		
SEF960N		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace crankshaft position sensor (POS).

10	CHECK CRANKSHAFT POSITION SENSOR (POS)-II	
Check resistance between crankshaft position sensor (POS) terminals 1 and 2.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace crankshaft position sensor (POS).

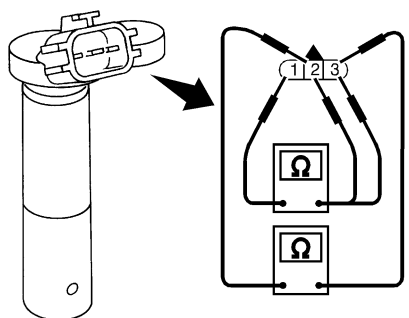
DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK CAMSHAFT POSITION SENSOR (PHASE)-I	
<p>1. Turn ignition switch "OFF". 2. Loosen fixing bolt and remove the camshaft position sensor (PHASE). 3. Visually check the camshaft position sensor (PHASE) for chipping.</p>		
		
SEF960N		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace camshaft position sensor (PHASE).

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12	CHECK CAMSHAFT POSITION SENSOR (PHASE)-II	
Check resistance as shown below.		
		
SEF492Y		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 13.
OK (Without CONSULT-II)	▶	GO TO 14.
NG	▶	Replace camshaft position sensor (PHASE).

Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
3 (+) - 1 (-)	
3 (+) - 2 (-)	

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

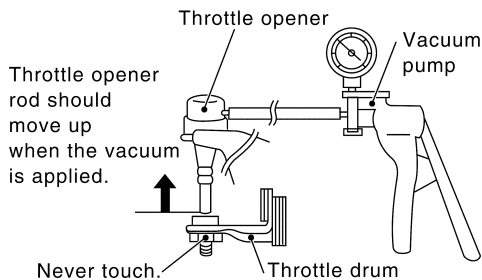
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

13 CHECK THROTTLE POSITION SENSOR

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Select "DATA MONITOR" mode with CONSULT-II.
8. Check voltage of "THRTL POS SEN" under the following conditions.

Voltage measurement must be made with throttle position sensor installed in vehicle.

DATA MONITOR	
MONITORING	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

Throttle valve conditions	THRTL POS SEN
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

SEF741Y

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 13.

DTC P1130 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK THROTTLE POSITION SENSOR								
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine (ignition switch OFF). 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to the vacuum pump and the opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 									
SEF793W									
<ol style="list-style-type: none"> 6. Turn ignition switch ON. 7. Check voltage between ECM terminal 91 (Throttle position sensor signal) and ground. Voltage measurement must be made with throttle position sensor installed in vehicle. 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Throttle valve conditions</th> <th style="padding: 5px;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Completely closed (a)</td> <td style="padding: 5px;">0.15 - 0.85V</td> </tr> <tr> <td style="padding: 5px;">Partially open</td> <td style="padding: 5px;">Between (a) and (b)</td> </tr> <tr> <td style="padding: 5px;">Completely open (b)</td> <td style="padding: 5px;">3.5 - 4.7V</td> </tr> </tbody> </table>		Throttle valve conditions	Voltage	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	Voltage								
Completely closed (a)	0.15 - 0.85V								
Partially open	Between (a) and (b)								
Completely open (b)	3.5 - 4.7V								
MTBL0231									
OK or NG									
OK	▶ GO TO 16.								
NG	▶ GO TO 15.								

15	ADJUST CLOSED THROTTLE POSITION SWITCH								
Adjust closed throttle position switch. Refer to "Basic Inspection", EC-127.									
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">Items</th> <th style="padding: 5px;">Specifications</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Ignition timing</td> <td style="padding: 5px;">9°±2° BTDC</td> </tr> <tr> <td style="padding: 5px;">Closed throttle position switch idle position adjustment</td> <td style="padding: 5px;">Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td style="padding: 5px;">Target idle speed</td> <td style="padding: 5px;">M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>		Items	Specifications	Ignition timing	9°±2° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Items	Specifications								
Ignition timing	9°±2° BTDC								
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF								
Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)								
MTBL0440									
OK or NG									
OK	▶ GO TO 16.								
NG	▶ Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-127.								

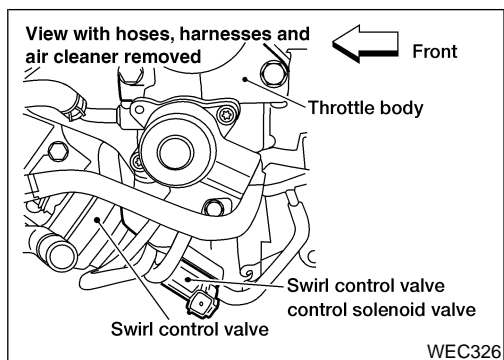
16	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

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DTC P1131 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The swirl control valve control solenoid valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the solenoid valve is bypassed to apply intake manifold vacuum to the swirl control valve actuator. This operation closes the swirl control valve. When the ECM sends an OFF signal, the vacuum signal is cut and the swirl control valve opens.

NIEC0717

CONSULT-II Reference Value in Data Monitor Mode

NIEC0718

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWRL CONT S/V	● Engine speed: Idle	Engine coolant temperature is between 15°C (59°F) to 55°C (131°F).	ON
		Engine coolant temperature is above 55°C (131°F).	OFF

On Board Diagnosis Logic

NIEC0719

Malfunction is detected when an improper voltage signal is sent to ECM through swirl control valve control solenoid valve.

Possible Cause

NIEC0720

- Harness or connectors
(The swirl control valve control solenoid valve circuit is open or shorted.)
- Swirl control valve control solenoid valve

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC0721

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-513.

**DTC P1131 SWIRL CONTROL VALVE CONTROL
SOLENOID VALVE (CIRCUIT)**

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)



With GST

Follow the procedure "With CONSULT-II" above.

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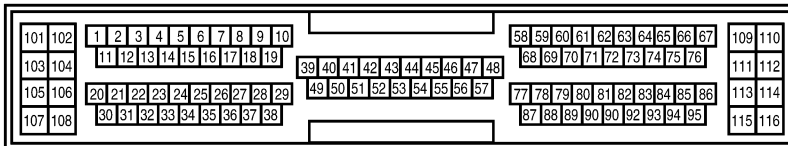
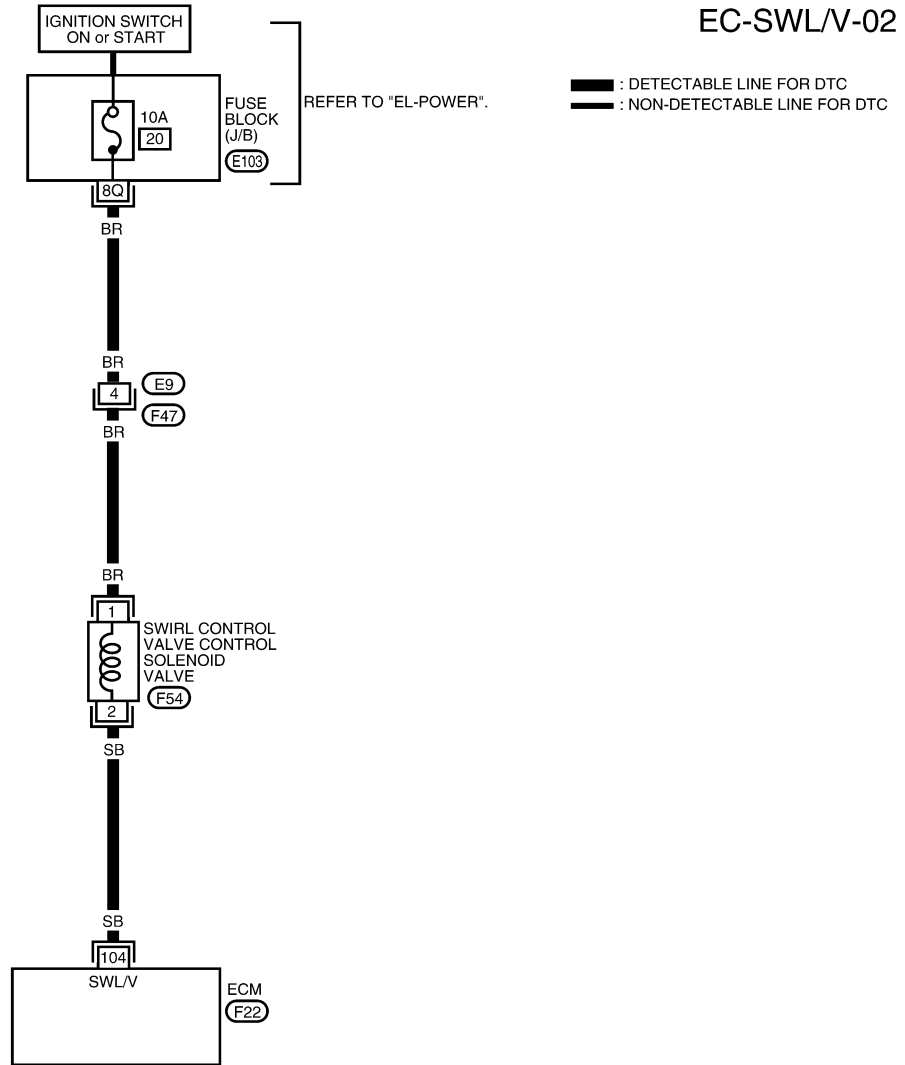
DTC P1131 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC0722



WEC624

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
104	G	SWIRL CONTROL VALVE CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE BETWEEN 15°C (59°F) AND 50°C (122°F).	0 - 1V
			ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE ABOVE 55°C (131°F).	BATTERY VOLTAGE

SEF738YA

DTC P1131 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0723

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

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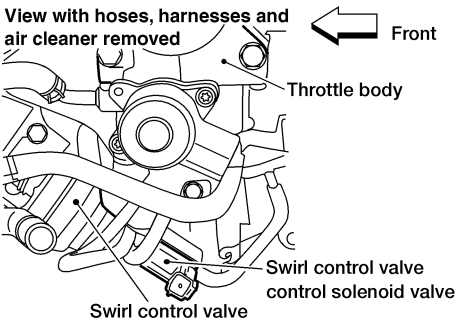
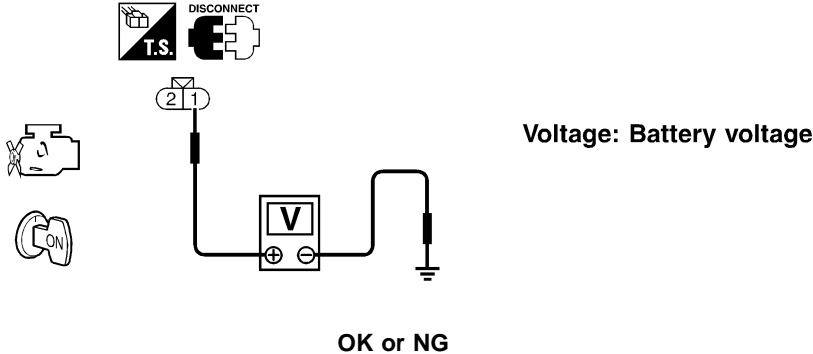
2	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE CIRCUIT																					
<p>📖 With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II.</p> <p>3. Touch "ON" and "OFF" on CONSULT-II screen.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>SWIRL CONT SOL/V</td><td>OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		SWIRL CONT SOL/V	OFF	MONITOR		ENG SPEED	XXX rpm	IACV-AAC/V	XXX step										
ACTIVE TEST																						
SWIRL CONT SOL/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
IACV-AAC/V	XXX step																					
<p>4. Make sure that clicking sound is heard from the swirl control valve control solenoid valve.</p> <p style="text-align: right;"><small>SEF499Y</small></p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 6.																				
NG	▶	GO TO 3.																				

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DTC P1131 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect swirl control valve control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">WEC326</p> <p>3. Turn ignition switch "ON". 4. Check voltage between swirl control valve control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF500Y</p>	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between swirl control valve control solenoid valve and fuse 	
▶	Repair harness or connectors.

5	CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 104 and swirl control valve control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-512. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Repair open circuit, short to ground or short to power in harness connectors.

DTC P1131 SWIRL CONTROL VALVE CONTROL SOLENOID VALVE (CIRCUIT)

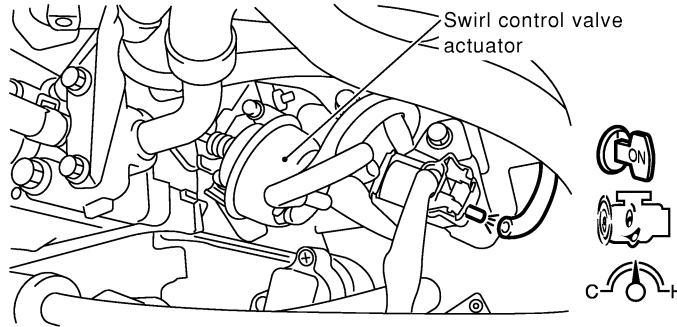
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6 CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

④ With CONSULT-II

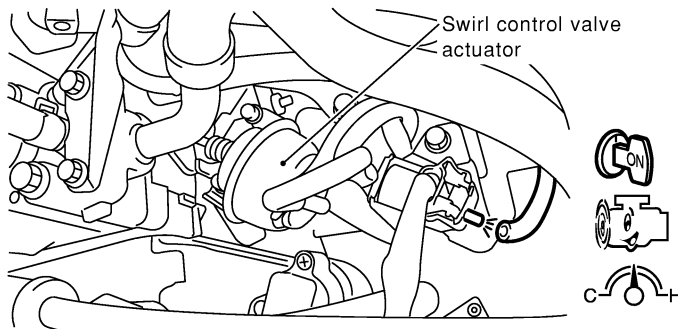
1. Reconnect the disconnected harness connectors.
2. Start engine and let it idle.
3. Remove vacuum hose connected to swirl control valve actuator.
4. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Touch "ON" and "OFF" on CONSULT-II screen.
6. Check vacuum existence and operation delay time under the following conditions.



SEF757Y

⊗ Without CONSULT-II

1. Reconnect ECM harness connector.
2. Remove vacuum hose connected to swirl control valve actuator.
3. Start engine and let it idle.
4. Apply 12V of direct current between swirl control valve control solenoid valve terminals 1 and 2.
5. Check vacuum existence and operation delay time under the following conditions.



Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

SEF195Z

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace intake manifold collector assembly.

7 CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

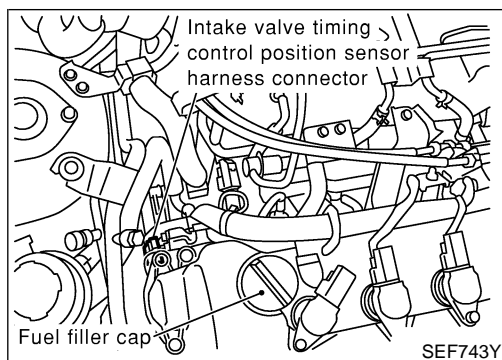
▶ INSPECTION END

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DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

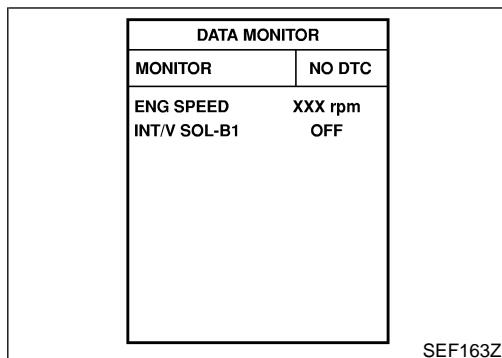
The intake valve timing control position sensor is located in front of the cylinder head. This sensor detects a signal (intake valve position) generated by the protrusion of camshaft sprocket and sends it to the ECM. This sensor is not used to control the engine system. It is used only for the on board diagnosis of intake valve timing control.

NIEC0676

On Board Diagnosis Logic

NIEC0695

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1140	<ul style="list-style-type: none"> The proper pulse signal from the intake valve timing control position sensors is not sent to ECM while the engine is running at the specified engine speed. 	<ul style="list-style-type: none"> Harness or connectors (The intake valve timing control position sensor circuit is open.) Intake valve timing control position sensor Accumulation of debris to the signal pick-up portion of the camshaft



DTC Confirmation Procedure

NIEC0696

NOTE:

If "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and keep the engine speed at 2,000 rpm and wait at least 15 seconds.
- If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-518.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

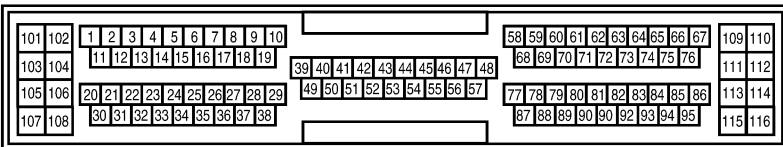
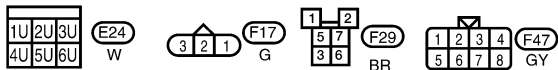
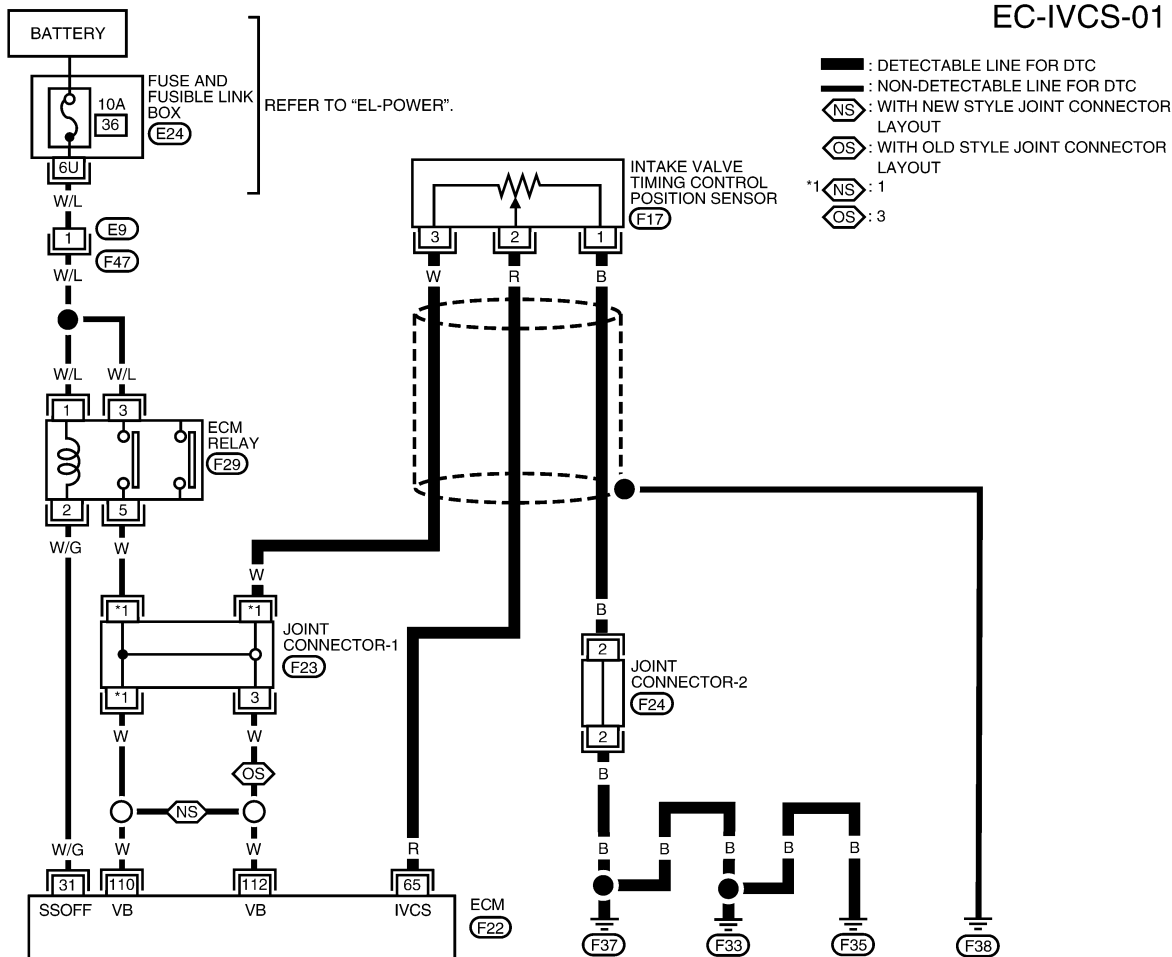
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0697

EC-IVCS-01



REFER TO THE FOLLOWING.
 (F23), (F24) - JOINT CONNECTOR

WEC944

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
65	R	INTAKE VALVE TIMING CONTROL POSITION SENSOR	ENGINE RUNNING AT IDLE UNDER WARM-UP CONDITION	APPROX. 0V
			ENGINE RUNNING AT 2,000 RPM UNDER WARM-UP CONDITION	APPROX. 0V

SEF744YB

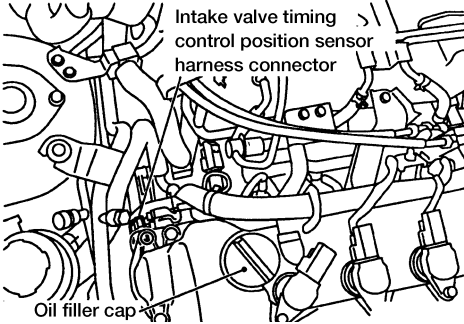
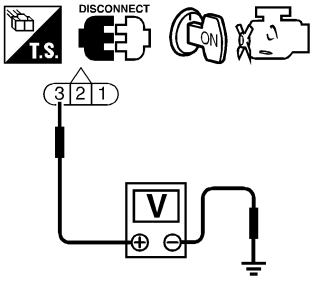
DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0698

1	CHECK POWER SUPPLY	
<p>1. Turn ignition switch "OFF". 2. Disconnect intake valve timing control position sensor harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 3 and engine ground.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 3.
NG		▶ GO TO 2.

WEC874

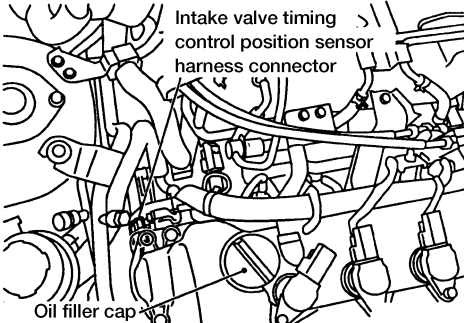
SEF509Y

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between the intake valve timing control position sensor and ECM relay 		
		▶ Repair harness or connectors.

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Disconnect intake valve timing control position sensor harness connector.</p>		
		
<p>4. Check harness continuity between ECM terminal 65 and terminal 2. Refer to "Wiring Diagram", EC-517.</p> <p style="color: blue;">Continuity should exist.</p> <p>If OK, check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 4.
NG		▶ Repair harness or connectors.

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WEC874

4	CHECK GROUND CIRCUIT	
<p>1. Loosen and retighten engine ground screws.</p> <p>2. Check harness continuity between sensor terminal 1 and engine ground. Refer to wiring diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>If OK, check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 6.
NG		▶ GO TO 5.

AT
AX
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5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between the intake valve timing control position sensor and ground 		
		▶ Repair open circuit or short to power in harness or connectors.

ST
RS
BT

6	CHECK CAMSHAFT	
<p>Check accumulation of debris to the signal pick-up portion of the camshaft. Refer to EM-20, "TIMING CHAIN".</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ Replace intake valve timing control position sensor. GO TO 7.
NG		▶ Remove debris and clean the signal pick-up cutout of camshaft.

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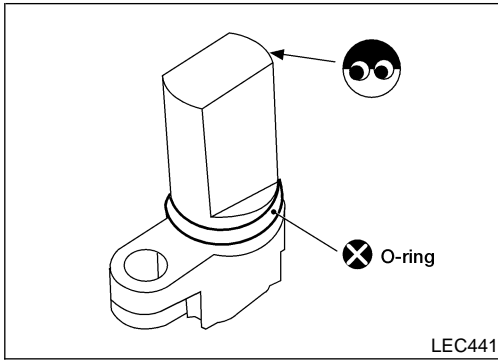
7	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.</p>		
		▶ INSPECTION END

IDX

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (EXC CALIF CA)

Component Inspection



Component Inspection

INTAKE VALVE TIMING CONTROL POSITION SENSOR

NIEC0699

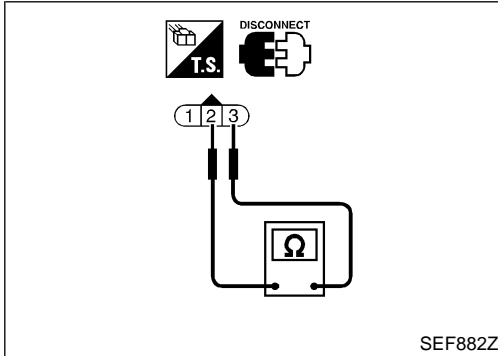
NIEC0699S01

1. Disconnect intake valve timing control position sensor harness connector.
2. Loosen fixing bolt of the sensor.
3. Visually check the sensor for chipping.
4. Check resistance between terminals 2 and 3.

Resistance:

600 - 740Ω [at 20°C (68°F)]

If NG, replace intake valve timing control position sensor.



On Board Diagnosis Logic

NIEC0307

★ The closed loop control has the one trip detection logic.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1148 (BANK 1)	<ul style="list-style-type: none"> The closed loop control function does not operate even when vehicle is driving in the specified condition. 	<ul style="list-style-type: none"> The heated oxygen sensor 1 (front) circuit is open or shorted. Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front)
P1168 (BANK 2)		

GI

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3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF682Y

DTC Confirmation Procedure

NIEC0308

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Never raise engine speed above 3,600 rpm during the “DTC Confirmation Procedure”. If the engine speed limit is exceeded, retry the procedure from step 4.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Select “DATA MONITOR” mode with CONSULT-II.
- Hold engine speed at 2,000 rpm and check the following.
 - “HO2S1 (B1)/(B2)” voltage should go above 0.70V at least once.
 - “HO2S1 (B1)/(B2)” voltage should go below 0.21V at least once.

If the result is NG, perform “Diagnosis Procedure”, EC-522.
If the result is OK, perform the following step.
- Let engine idle at least 5 minutes.
- Maintain the following condition at least 50 consecutive seconds.

B/FUEL SCHDL	More than 3.3 msec (A/T), 2.8 msec (M/T)
ENG SPEED	More than 1,750 rpm (A/T), 2,100 rpm (M/T)
Selector lever	Suitable position
VHCL SPEED SE	More than 70 km/h (43 MPH)

During this test, P0130 DTC may be displayed on CONSULT-II screen.

- If DTC is detected, go to “Diagnostic Procedure”, EC-522.

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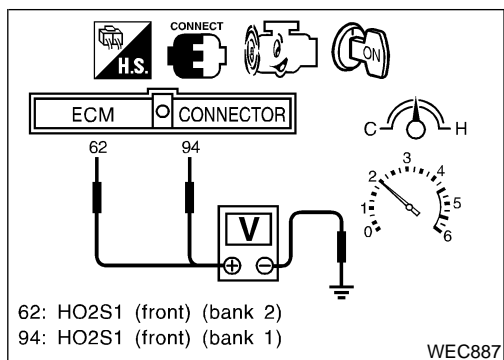
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DTC P1148, P1168 CLOSED LOOP CONTROL (BANK 1)/(BANK 2)

QG18DE (EXC CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed. NIEC0309

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 (heated oxygen sensor 1 signal) and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage should go above 0.70V at least once.
 - The voltage should go below 0.21V at least once.
- 4) If NG, go to "Diagnostic Procedure", EC-522.

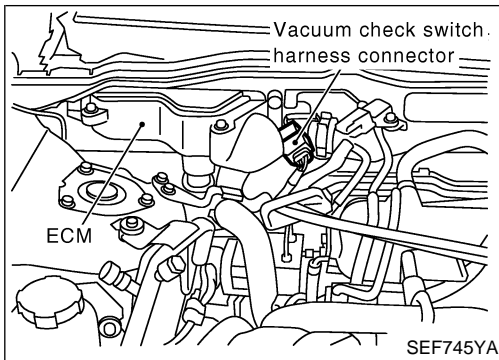
Diagnostic Procedure

Refer to "Diagnostic Procedure" for DTC P0133, EC-240. NIEC0310

DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

QG18DE (EXC CALIF CA)

Component Description

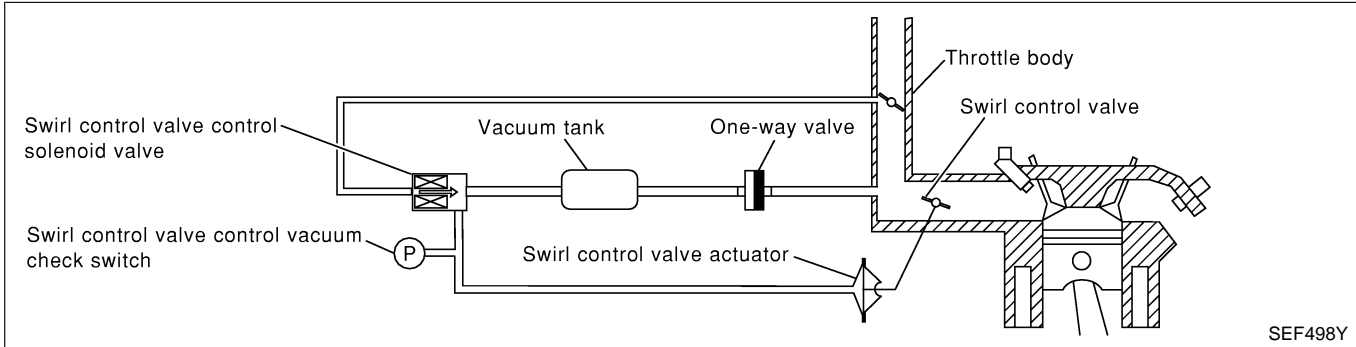


Component Description

The swirl control valve control vacuum check switch detects vacuum signal to the swirl control valve, and sends "ON" or "OFF" signal to the ECM.

When vacuum is supplied to the valve, the swirl control valve control vacuum check switch sends "OFF" signal to the ECM.

The swirl control valve control vacuum check switch is not used to control the engine system, it is used for on board diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
SWL CON VC SW	<ul style="list-style-type: none"> Engine speed: Idle Engine coolant temperature is between 15°C (59°F) to 55°C (131°F). 	OFF
	<ul style="list-style-type: none"> Engine speed: Idle Engine coolant temperature is above 55°C (131°F). 	ON

On Board Diagnosis Logic

Malfunction is detected when the swirl control valve control vacuum check switch remains "OFF" under specified engine conditions.

Possible Cause

- Harness or connectors (Swirl control valve control vacuum check switch circuit is open.)
- Hoses (Hoses are clogged or connected incorrectly.)
- Swirl control valve control solenoid valve
- Swirl control valve control vacuum check switch
- Swirl control valve actuator

DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC0704

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For best results, perform the test at a temperature above 5°C (41°F).

Ⓜ WITH CONSULT-II

NIEC0704S01

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II and wait at least 5 seconds.
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-526.

Ⓜ WITH GST

NIEC0704S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0705

EC-S/VCSW-01

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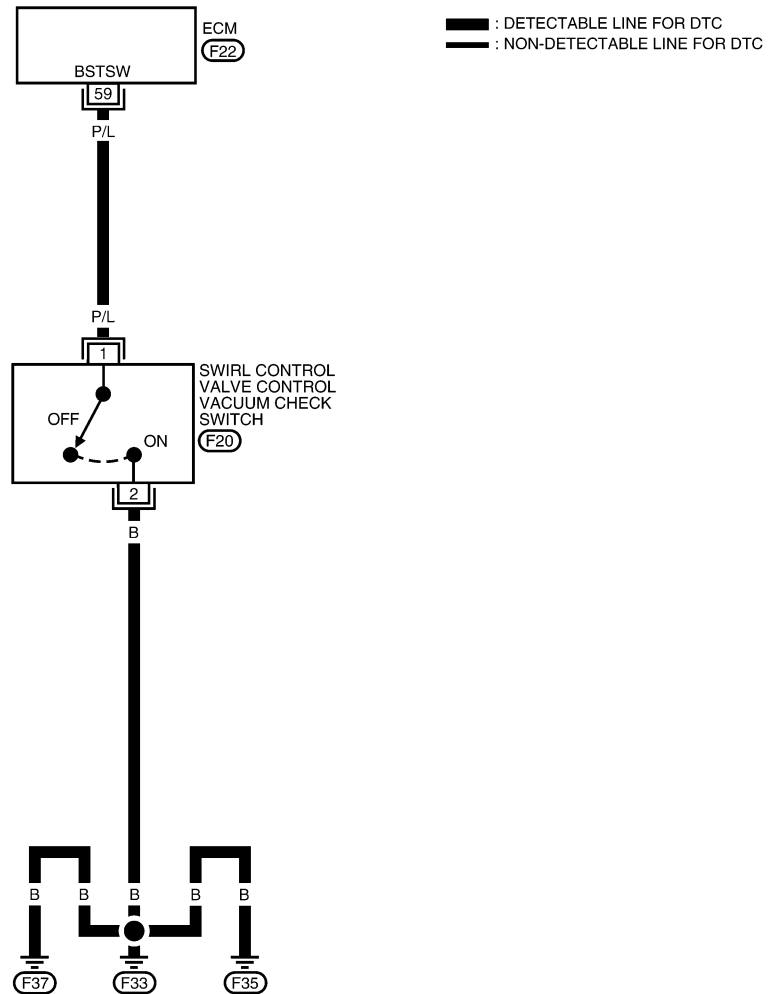
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103	104	11	12	13	14	15	16	17	18	19	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	111	112
105	106	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	113	114	115	116																
107	108	30	31	32	33	34	35	36	37	38	87	88	89	90	91	92	93	94	95	115	116																			



WEC626

HA

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
59	P/L	SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH	ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE BETWEEN 15°C (59°F) AND 50°C (122°F).	APPROX. 5V
			ENGINE RUNNING AT IDLE SPEED WITH ENGINE COOLANT TEMPERATURE ABOVE 55°C (131°F).	0 - 1V

SEF751YA

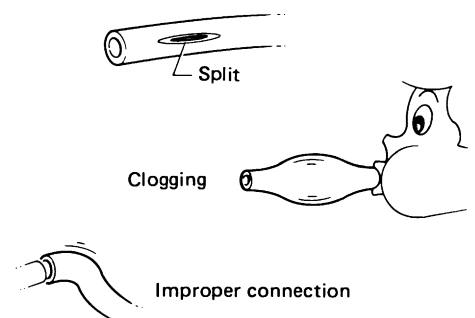
DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

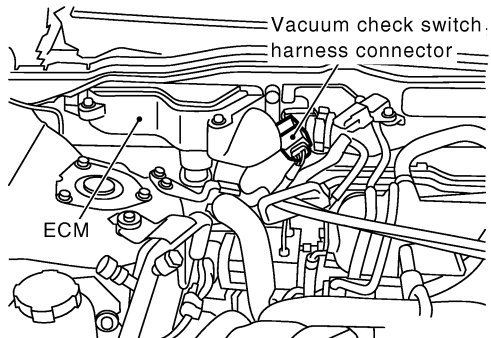
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0706

1	CHECK HOSES	<p>1. Turn ignition switch "OFF". 2. Check hose for clogging or improper connection.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF109L</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 2.
NG	▶	Repair or reconnect the hose.

2	CHECK SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Disconnect swirl control valve control vacuum check switch harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF881Z</p> <p>2. Check harness continuity between terminal 2 and ground. Refer to "Wiring Diagram", EC-525. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART	<p>Check the harness for open or short between swirl control valve control vacuum check switch and engine ground.</p> <p style="text-align: center;">▶</p> <p>Repair open circuit, short to power in harness connectors.</p>
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DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 59 and swirl control valve control vacuum check switch terminal 1. Refer to "Wiring Diagram", EC-525. Continuity should exist. 3. Also check harness for short to ground and short to power. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit, short to ground or short to power in harness connectors.

GI
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5	CHECK SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH									
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect vacuum hose connected to swirl control valve control vacuum check switch. 3. Attach vacuum pump to swirl control valve control vacuum check switch. 4. Turn ignition switch "ON". 5. Check voltage between ECM terminal 59 and ground under the following conditions. 										
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p style="font-size: small;">H.S. CONNECT</p> <p style="font-size: small;">Swirl control valve control vacuum check switch</p> <p style="font-size: small;">ECM CONNECTOR</p> <p style="font-size: small;">59</p> <p style="font-size: small;">Vacuum pump</p> <p style="font-size: small;">V</p> </div> <div style="flex: 1; margin-left: 20px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Applied pressure kPa (mmHg, inHg)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">More than -20.0 (-150, -5.91)</td> <td style="text-align: center;">Engine ground</td> </tr> <tr> <td style="text-align: center;">-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)</td> <td style="text-align: center;">Engine ground or Approx. 4.8</td> </tr> <tr> <td style="text-align: center;">Less than -23.0 (-172, -6.77)</td> <td style="text-align: center;">Approx. 4.8</td> </tr> </tbody> </table> </div> </div>			Applied pressure kPa (mmHg, inHg)	Voltage V	More than -20.0 (-150, -5.91)	Engine ground	-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8	Less than -23.0 (-172, -6.77)	Approx. 4.8
Applied pressure kPa (mmHg, inHg)	Voltage V									
More than -20.0 (-150, -5.91)	Engine ground									
-20.0 to -23.0 (-150 to -172, -5.91 to -6.77)	Engine ground or Approx. 4.8									
Less than -23.0 (-172, -6.77)	Approx. 4.8									
SEF894Z										
OK or NG										
OK	▶	GO TO 6.								
NG	▶	Replace swirl control valve control vacuum check switch.								

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DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

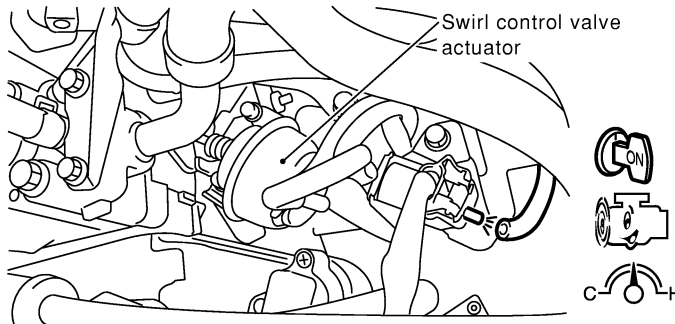
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6 CHECK SWIRL CONTROL VALVE CONTROL SOLENOID VALVE

With CONSULT-II

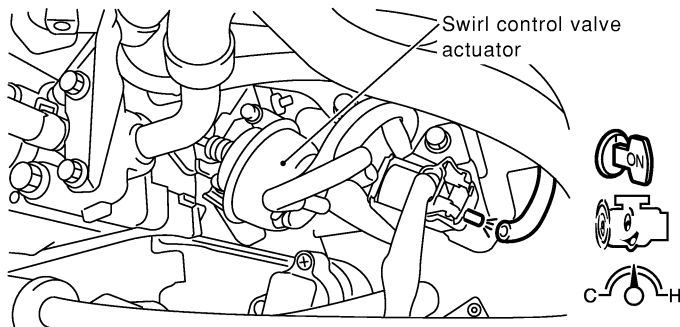
1. Reconnect the disconnected harness connectors.
2. Start engine and let it idle.
3. Remove vacuum hose connected to swirl control valve actuator.
4. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Touch "ON" and "OFF" on CONSULT-II screen.
6. Check vacuum existence and operation delay time under the following conditions.



SEF757Y

Without CONSULT-II

1. Reconnect ECM harness connector.
2. Remove vacuum hose connected to swirl control valve actuator.
3. Start engine and let it idle.
4. Apply 12V of direct current between swirl control valve control solenoid valve terminals 1 and 2.
5. Check vacuum existence and operation delay time under the following conditions.



Condition	Vacuum
12V direct current supply	Should exist.
No supply	Should not exist.

SEF195Z

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace swirl control valve control solenoid valve.

DTC P1165 SWIRL CONTROL VALVE CONTROL VACUUM CHECK SWITCH

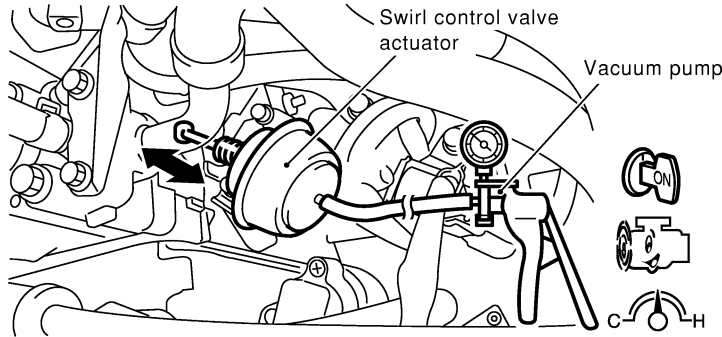
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7 CHECK SWIRL CONTROL VALVE ACTUATOR

With CONSULT-II

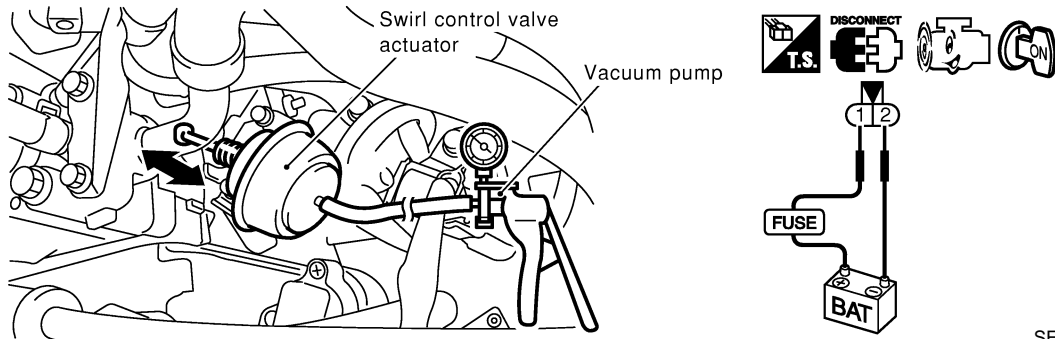
1. Reconnect vacuum hose between swirl control valve actuator and swirl control valve control solenoid valve.
2. Start engine and let it idle.
3. Select "SWIRL CONT SOL/V" in "ACTIVE TEST" mode.
4. Touch "ON" and "OFF" on CONSULT-II screen.
5. Make sure that swirl control valve actuator rod moves according to "SWIRL CONT SOL/V" indication.



SEF762Y

Without CONSULT-II

1. Reconnect vacuum hose between swirl control valve actuator and swirl control valve control solenoid valve.
2. Start engine and let it idle.
3. Apply 12V of direct current between swirl control valve control solenoid valve terminals 1 and 2.
4. Make sure that swirl control valve actuator rod moves according to 12V direct current being applied.



SEF761Y

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace swirl control valve and actuator.

8 CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

	▶	INSPECTION END
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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

System Description

System Description

NIEC0433

NIEC0433S01

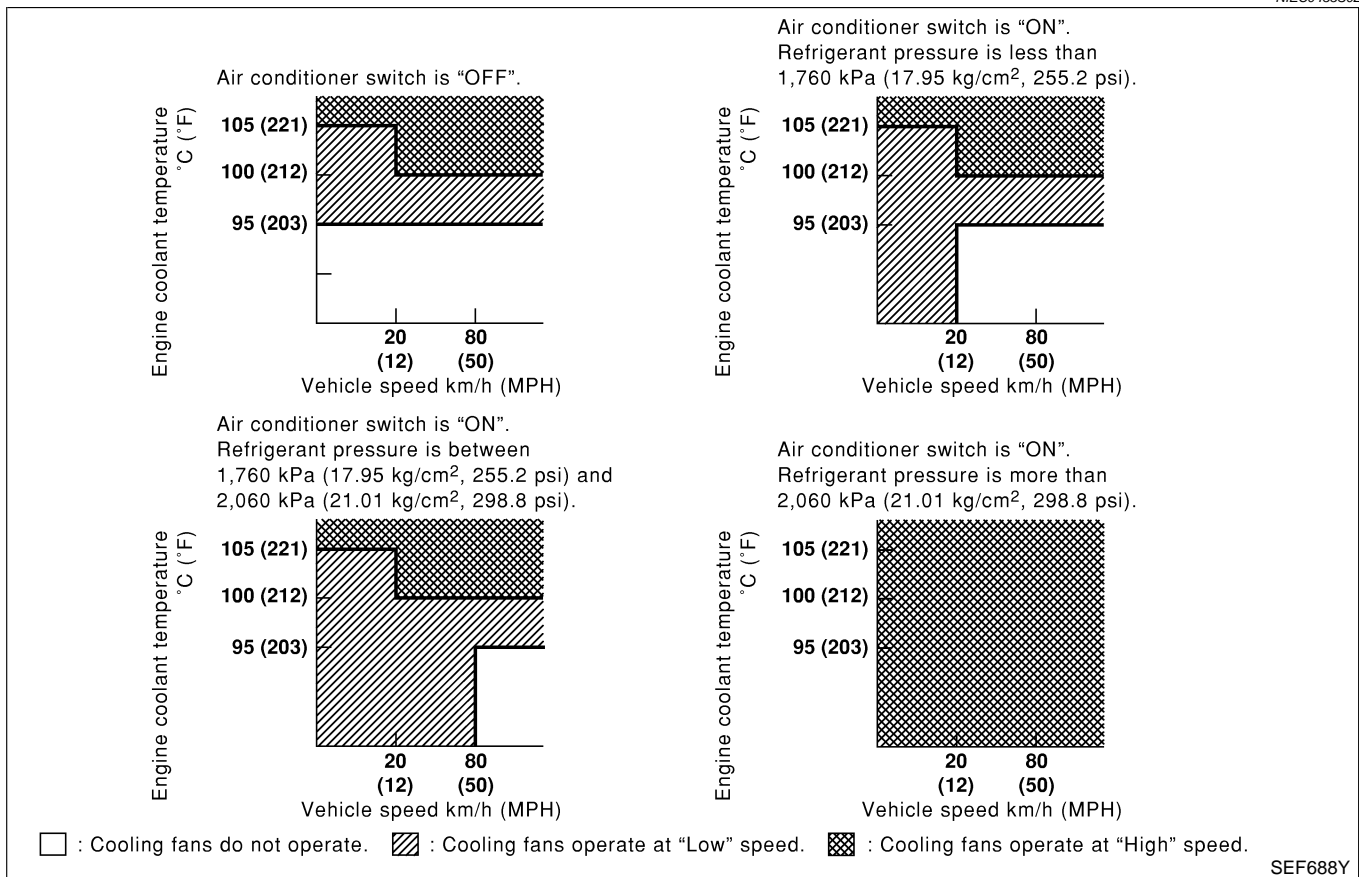
COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC0433S02



SEF688Y

CONSULT-II Reference Value in Data Monitor Mode

NIEC0486

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
	Air conditioner switch: ON (Compressor operates)	ON

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)
		Engine coolant temperature is 105°C (221°F) or more

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On Board Diagnosis Logic

NIEC0488

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

LC
EC

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1217	<ul style="list-style-type: none"> ● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. 	<ul style="list-style-type: none"> ● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat <p>For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-546.</p>

FE
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CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to *MA-17*, "Changing Engine Coolant". Also, replace the engine oil. Refer to *MA-20*, "Changing Engine Oil".

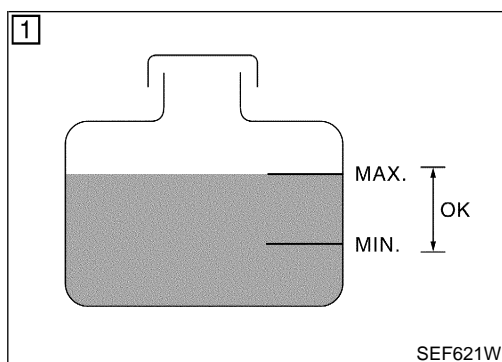
- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to *MA-15*, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

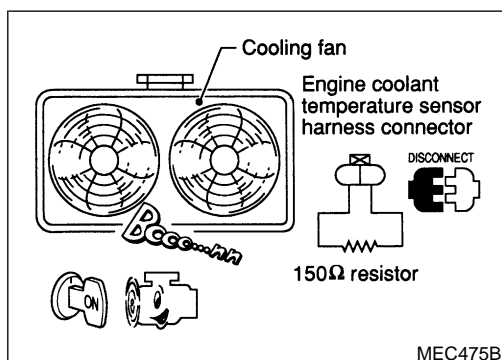
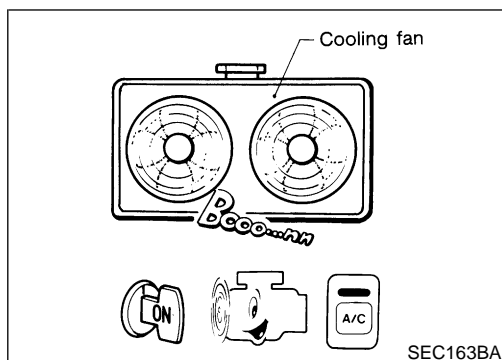
On Board Diagnosis Logic (Cont'd)



4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X



Overall Function Check

NIEC0489

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

With CONSULT-II

- 1) Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-535.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-535.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-535.

With GST

- 1) Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-535.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-535.
- 3) Start engine.
Be careful not to overheat engine.
- 4) Set temperature control lever to full cold position.
- 5) Turn air conditioner switch "ON".
- 6) Turn blower fan switch "ON".
- 7) Run engine at idle for a few minutes with air conditioner operating.
Be careful not to overheat engine.
- 8) Make sure that cooling fan operates at low speed.
If NG, go to "Diagnostic Procedure", EC-535.
If OK, go to the following step.
- 9) Turn ignition switch "OFF".
- 10) Turn air conditioner switch and blower fan switch "OFF".
- 11) Disconnect engine coolant temperature sensor harness connector.
- 12) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
- 13) Restart engine and make sure that cooling fan operates at higher speed than low speed.
Be careful not to overheat engine.
- 14) If NG, go to "Diagnostic Procedure", EC-535.

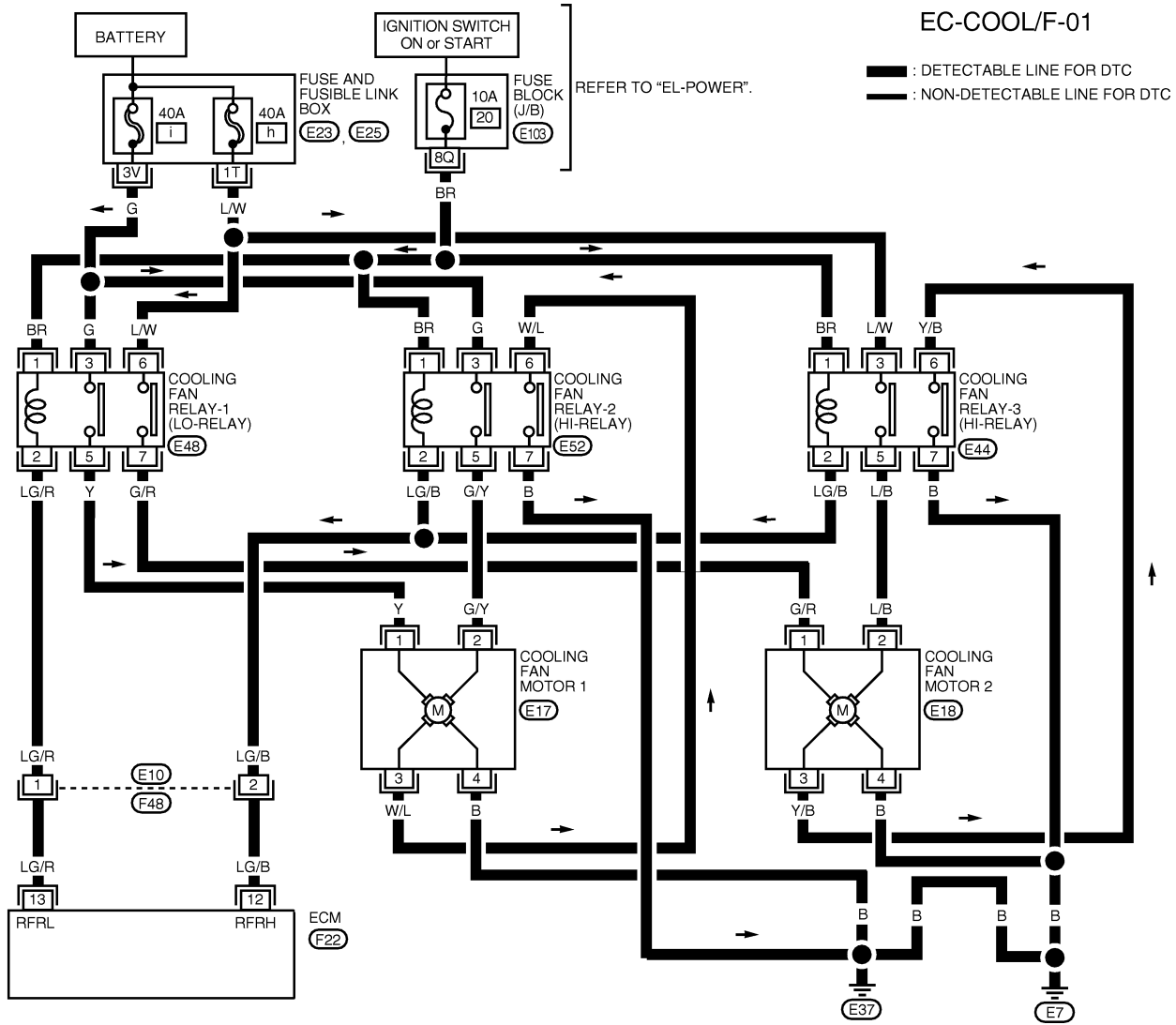
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

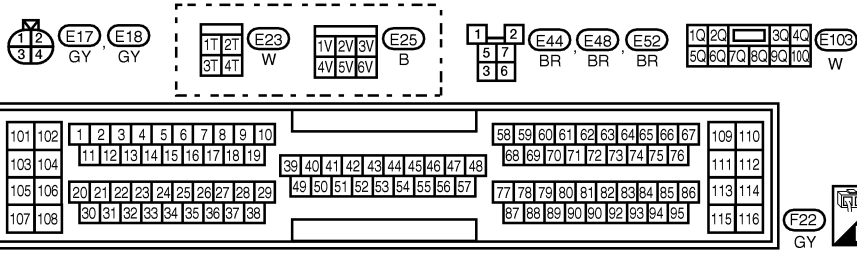
Wiring Diagram — Early Production

Wiring Diagram — Early Production

NIEC0490



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LEC222

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

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SEF571Y

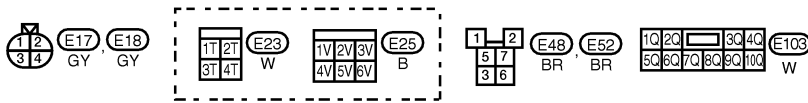
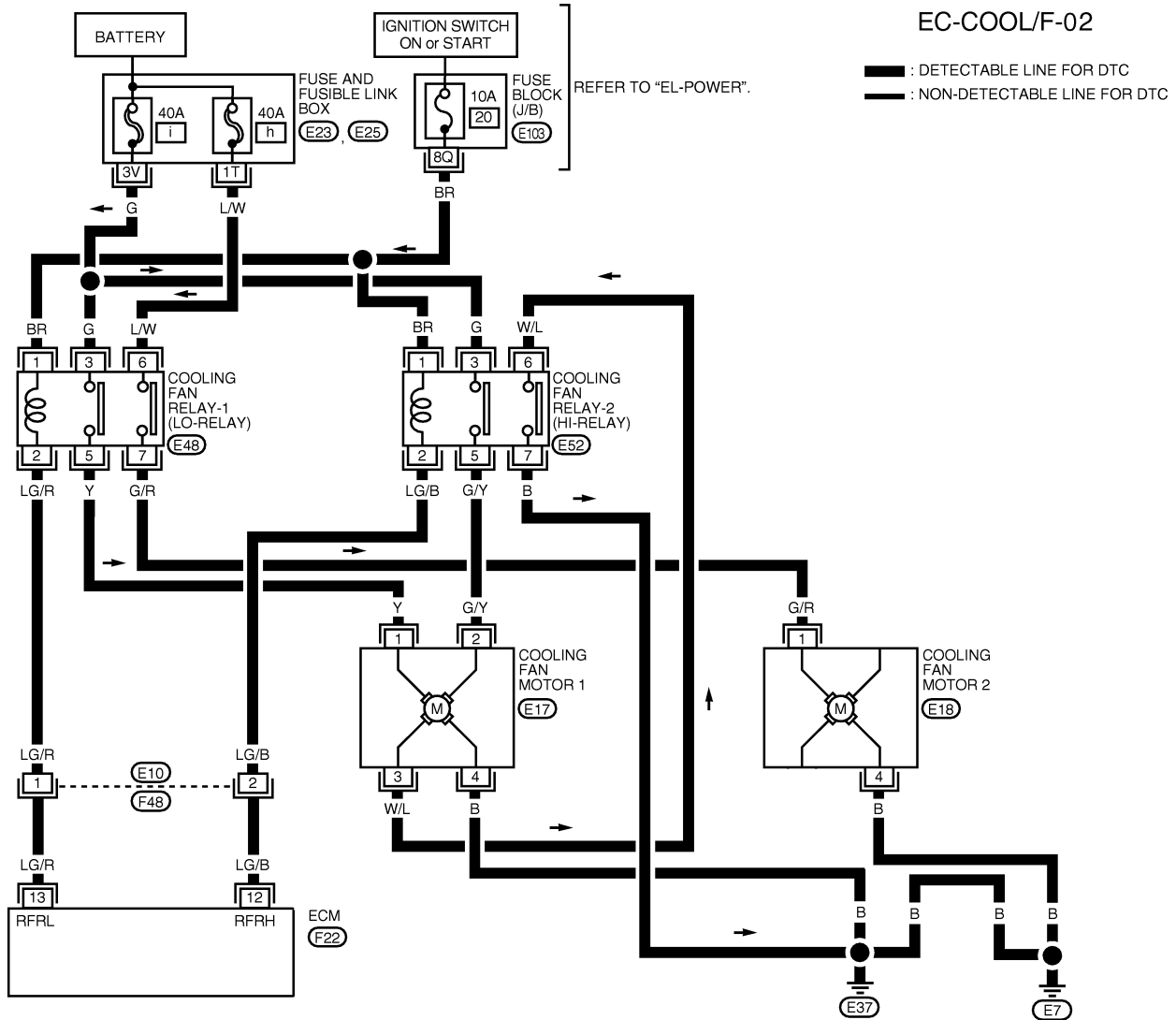
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

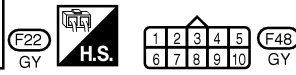
Wiring Diagram — Late Production

Wiring Diagram — Late Production

NIEC1733



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110
103	104	11	12	13	14	15	16	17	18	19				68	69	70	71	72	73	74	75	76	77	111	112
105	106	20	21	22	23	24	25	26	27	28	29			49	50	51	52	53	54	55	56	57	78	113	114
107	108	30	31	32	33	34	35	36	37	38				87	88	89	90	91	92	93	94	95	115	116	



WEC129A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SEF571Y

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0491

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

GI
MA
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2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p> With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3 (early production).</p> <div style="text-align: center;"> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	OFF																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to "PROCEDURE A", EC-541.)																								

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																									
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Disconnect cooling fan relay-1. 4. Turn ignition switch "ON". 5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
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OK or NG																										
OK	▶	GO TO 6.																								
NG	▶	Check cooling fan high speed control circuit. (Go to "PROCEDURE B", EC-544.)																								

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

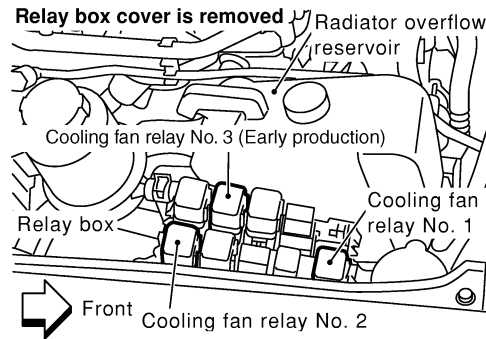
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

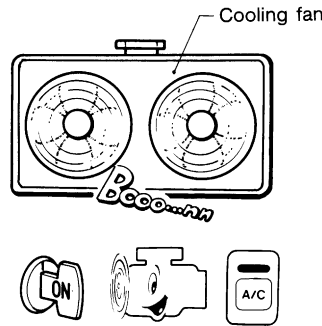
⊗ **Without CONSULT-II**

1. Disconnect cooling fan relays-2 and -3 (early production).



2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.

LEC130A



SEC163BA

OK or NG

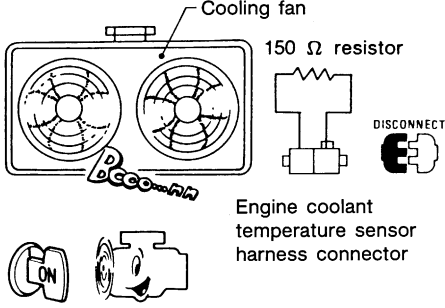
OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to "PROCEDURE A", EC-541.)

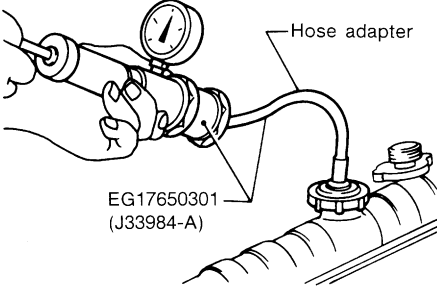
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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

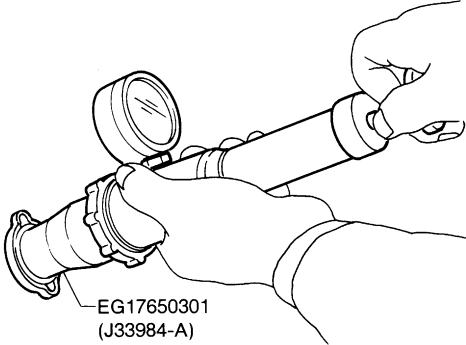
5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Disconnect cooling fan relay-1. 4. Turn air conditioner switch and blower fan switch "OFF". 5. Disconnect engine coolant temperature sensor harness connector. 6. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 7. Restart engine and make sure that cooling fans-1 and -2 (early production) operate at higher speed than low speed. 	
 <p style="text-align: right;">MEF613EA</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to "PROCEDURE B", EC-544.)

6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
 <p style="text-align: right;">SLC754A</p>	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Check the following for leak <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump Refer to LC-12 , "Water Pump".

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

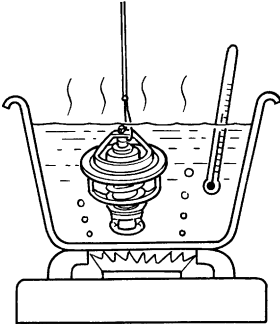
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK RADIATOR CAP		
Apply pressure to cap with a tester.			
			
<p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p>			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	Replace radiator cap.	

GI
 MA
 EM
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EC

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 CL

8	CHECK THERMOSTAT		
1. Check valve seating condition at normal room temperatures. It should seat tightly. 2. Check valve opening temperature and valve lift.			
			
<p>Valve opening temperature: 76.5°C (170°F) [standard] Valve lift: More than 9 mm/90°C (0.35 in/194°F)</p>			
3. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-13 , "Thermostat".			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace thermostat	

MT
 AT
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 RS
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 HA

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 EL
 IDX

9	CHECK ENGINE COOLANT TEMPERATURE SENSOR		
Refer to "COMPONENT INSPECTION", EC-212.			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Replace engine coolant temperature sensor.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK MAIN 12 CAUSES
If the cause cannot be isolated, go to "Main 12 Causes of Overheating", EC-546.	
▶	INSPECTION END

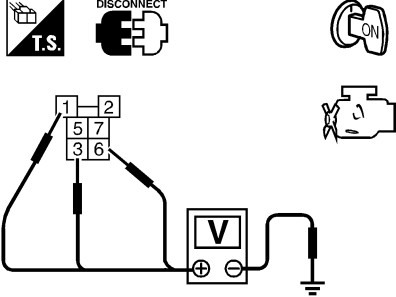
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC0491S01

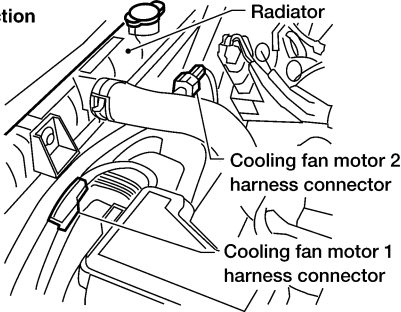
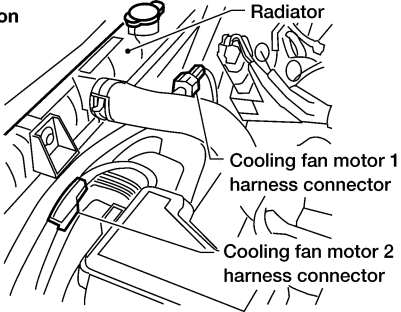
1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="color: blue; margin-top: 10px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	GI MA EM LC EC FE CL MT	
	OK	▶	GO TO 3.	
	NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible links ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 	AT AX SU BR ST RS BT HA SC EL IDX	
		▶	Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Early production</p>  </div> <div style="text-align: center;"> <p>Late production</p>  </div> </div>		
WEC131A		
<p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-533 or "Wiring Diagram — Late Production", EC-534. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-533 or "Wiring Diagram — Late Production", EC-534. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK OUTPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram — Early Production", EC-533 or "Wiring Diagram — Late Production", EC-534. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

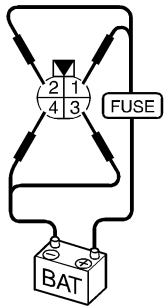

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness for open or short between cooling fan relay-1 and ECM 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK COOLING FAN RELAY-1	
Refer to "Component Inspection", EC-546.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace cooling fan relay.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK COOLING FAN MOTORS-1 AND -2																			
Supply battery voltage between the following terminals and check operation.																				
		 Cooling fan motor -1 or -2 harness connector	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2 (Early production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Cooling fan motor -2 (Late production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>		Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2 (Early production)	Low	1	4	High	1, 2	3, 4	Cooling fan motor -2 (Late production)	Low	1	4
	Speed	Terminals																		
		(+)	(-)																	
Cooling fan motor -1 or -2 (Early production)	Low	1	4																	
	High	1, 2	3, 4																	
Cooling fan motor -2 (Late production)	Low	1	4																	
OK or NG			LEC132A																	
OK	▶	GO TO 8.																		
NG	▶	Replace cooling fan motors.																		

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8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.			
	▶	INSPECTION END	

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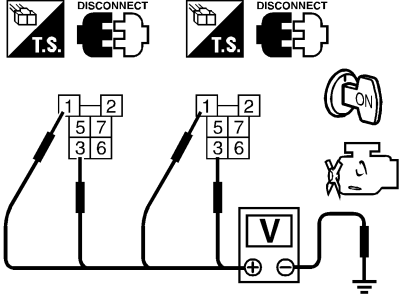
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC0491S02

1	CHECK POWER SUPPLY		
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3 (early production). 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 (early production) terminals 1, 3 and ground with CONSULT-II or tester.</p>			
			
Voltage: Battery voltage			
SEF593X			
OK or NG			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fuse ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fusible link 			
		▶	Repair harness or connectors.

3	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-533 or "Wiring Diagram — Late Production", EC-534. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. For early production models, check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-533. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK		▶	GO TO 4.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

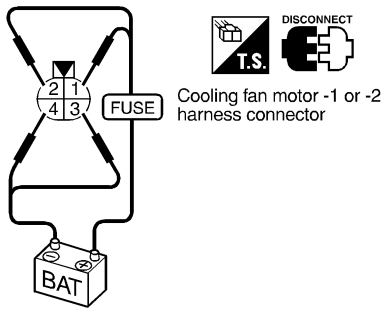
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK OUTPUT SIGNAL CIRCUIT		
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 (early production) terminal 2. Refer to "Wiring Diagram — Early Production", EC-533 or "Wiring Diagram — Late Production", EC-534. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

5	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness for open or short between cooling fan relays-2 and -3 (early production) and ECM 			
▶ Repair open circuit or short to ground or short to power in harness or connectors.			

6	CHECK COOLING FAN RELAYS-2 AND -3 (EARLY PRODUCTION)		
Refer to "Component Inspection", EC-546.			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Replace cooling fan relays.	

7	CHECK COOLING FAN MOTORS		
Supply battery voltage between the following terminals and check operation.			
			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	Replace cooling fan motors.	

	Speed	Terminals	
		(+)	(-)
Cooling fan motor -1 or -2 (Early production)	Low	1	4
	High	1, 2	3, 4
Cooling fan motor -2 (Late production)	Low	1	4

LEC132A

8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.			
▶ INSPECTION END			

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (EXC CALIF CA)

Main 12 Causes of Overheating

Main 12 Causes of Overheating

NIEC0492

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-10 , "System Check".
ON* ²	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-10 , "System Check".
ON* ²	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-13 , "Thermostat", and LC-15 , "Radiator".
ON* ¹	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for "DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)", EC-530
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON* ³	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF* ⁴	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight edge, feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-34 , "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-55 , "Inspection".

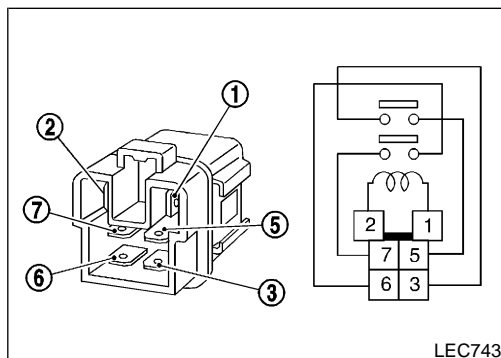
*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to **LC-19**, "OVERHEATING CAUSE ANALYSIS".



Component Inspection

COOLING FAN RELAYS-1, -2 AND -3 (EARLY PRODUCTION)

NIEC0493

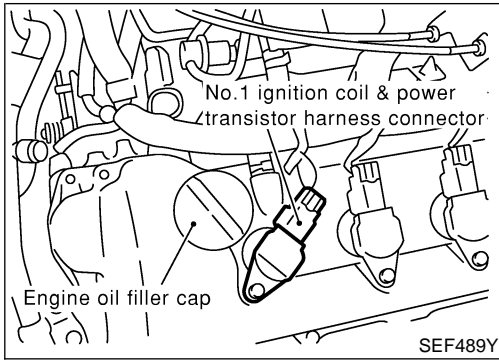
NIEC0493S01

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.

EC-546



Component Description

IGNITION COIL & POWER TRANSISTOR

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.

NIEC0707

NIEC0707S01

GI

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On Board Diagnosis Logic

Malfunction is detected when the ignition signal in the primary circuit is not sent to ECM during engine cranking or running.

NIEC0708

EC

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MT

Possible Cause

- Harness or connectors (The ignition primary circuit is open or shorted.)
- Power transistor unit built into ignition coil
- Condenser
- Crankshaft position sensor (POS)
- Crankshaft position sensor (POS) circuit
- Camshaft position sensor (PHASE)
- Camshaft position sensor (PHASE) circuit

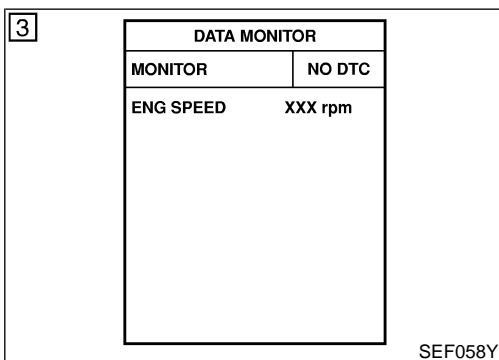
NIEC0709

AT

AX

SU

BR



DTC Confirmation Procedure

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- If DTC P1320 is displayed with DTC P0335, P0340 or P1336, perform trouble diagnosis for DTC P0335, P0340 or P1336 first. Refer to EC-354, EC-359 or EC-558.

NIEC0710

ST

RS

BT

WITH CONSULT-II

NIEC0710S01

HA

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine. (If engine does not run, turn ignition switch to "START" for at least 5 seconds.)
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-551.

SC

EL

WITH GST

NIEC0710S02

IDX

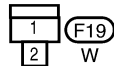
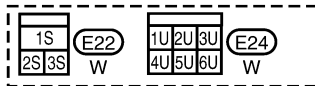
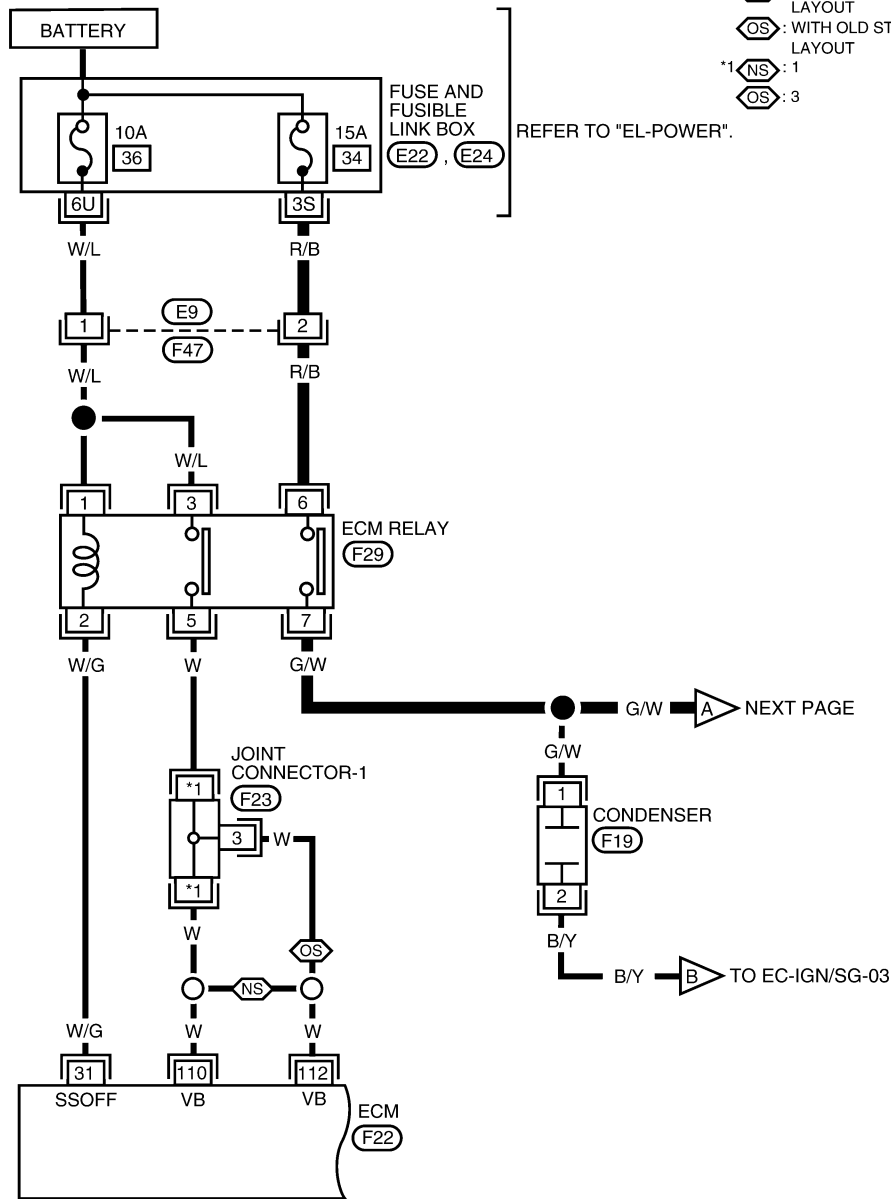
Follow the procedure "WITH CONSULT-II" above.

Wiring Diagram

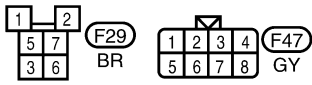
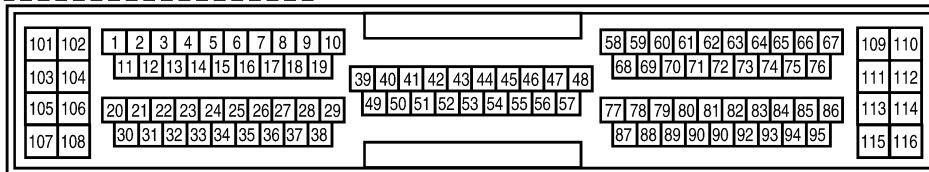
NIEC0711

EC-IGN/SG-01

- : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC
- (NS) : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- (OS) : WITH OLD STYLE JOINT CONNECTOR LAYOUT
- *1 (NS) : 1
- (OS) : 3



REFER TO THE FOLLOWING.
(F23) - JOINT CONNECTOR



DTC P1320 IGNITION SIGNAL

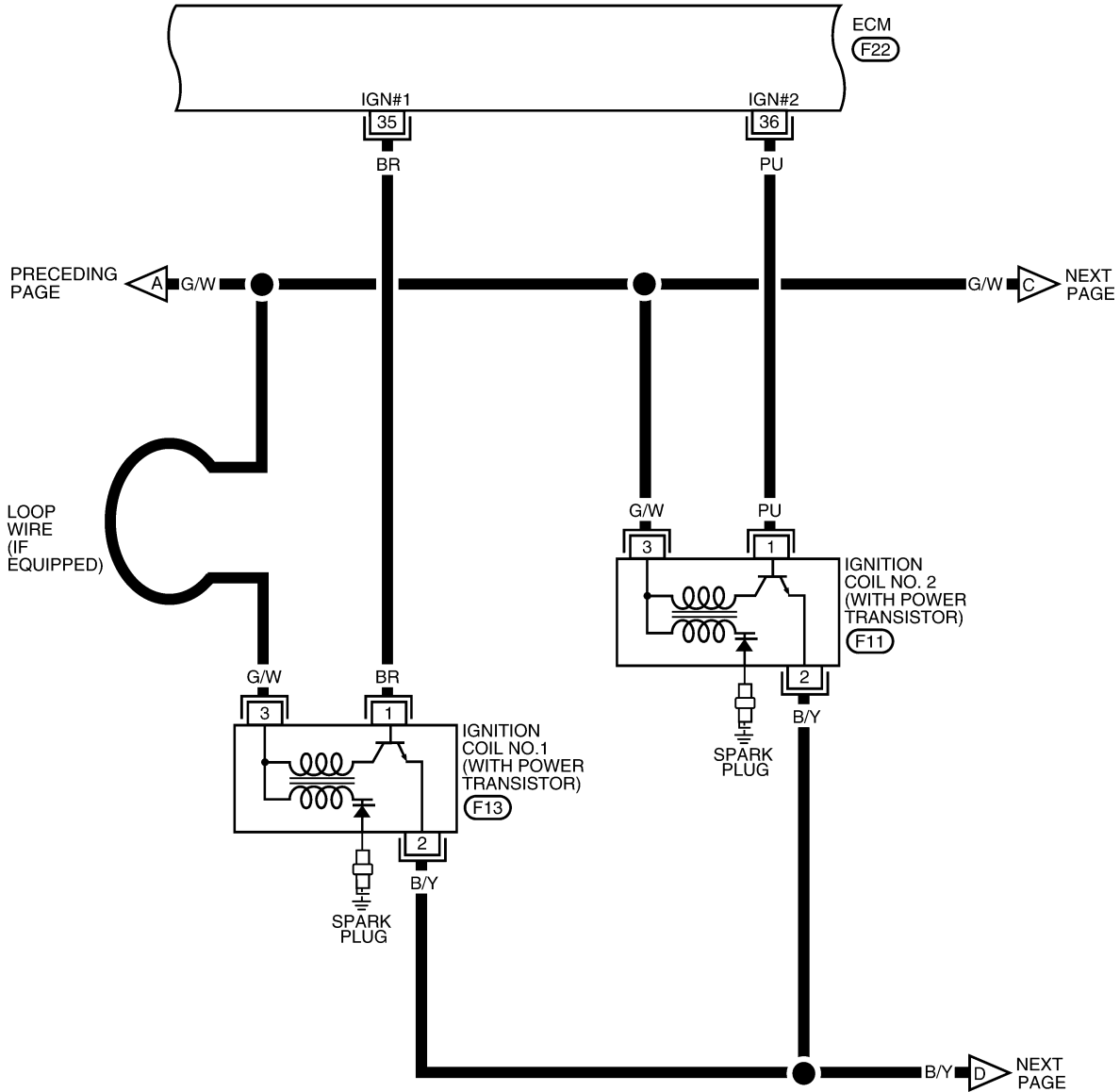
QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

EC-IGN/SG-02

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DT

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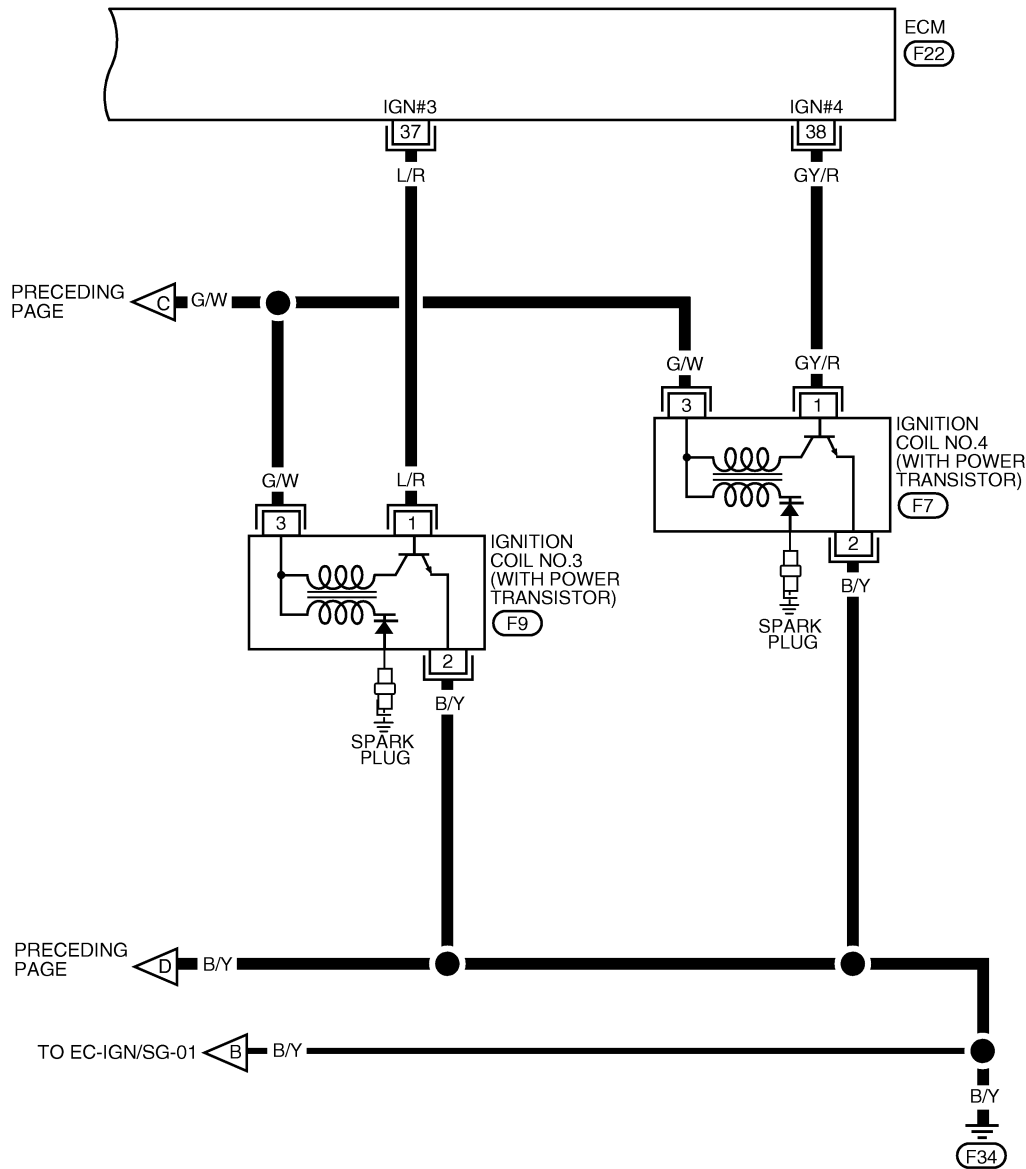
101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38																					115	116



WEC133A

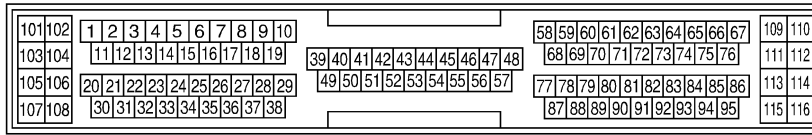
EC-IGN/SG-03

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110							
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	





SEF970W

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
35	B/R	IGNITION SIGNAL NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	Approximately 0.3V ★
36	PU	IGNITION SIGNAL NO. 2		
37	L/R	IGNITION SIGNAL NO. 3	ENGINE RUNNING AT 2,000 RPM	Approximately 0.5V ★
38	GY/R	IGNITION SIGNAL NO. 4		

★ : AVERAGE VOLTAGE FOR PULSE SIGNAL (ACTUAL PULSE SIGNAL CAN BE CONFIRMED BY OSCILLOSCOPE.)

SEF746YA

Diagnostic Procedure

NIEC0712

1	CHECK ENGINE START	
Turn ignition switch "OFF", and restart engine.		
Is engine running?		
Yes or No		
Yes (With CONSULT-II)	▶	GO TO 2.
Yes (Without CONSULT-II)	▶	GO TO 12.
No	▶	GO TO 3.

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2	SEARCH FOR MALFUNCTIONING CIRCUIT																
<p>With CONSULT-II</p> <ol style="list-style-type: none"> Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. Search for circuit which does not produce a momentary engine speed drop. 																	
<table border="1" style="margin: auto;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
SEF190Y																	
▶	GO TO 12.																

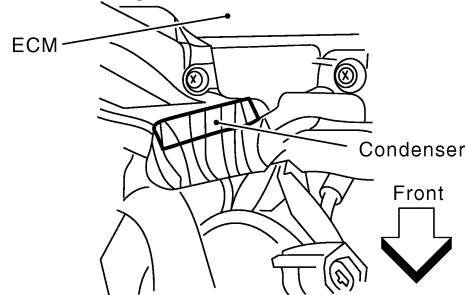
3	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I
<ol style="list-style-type: none"> Turn ignition switch ON. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester. 	
<p style="text-align: right;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
SEF366X	
OK	▶ GO TO 4.
NG	▶ Go to TROUBLE DIAGNOSIS FOR POWER SUPPLY, EC-168.

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4 CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II

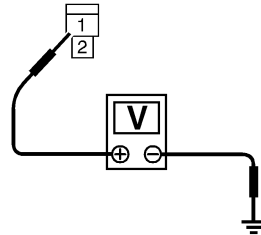
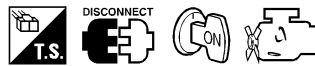
1. Turn ignition switch OFF.
2. Disconnect condenser harness connector.

View with engine harness disconnected



SEF896Z

3. Turn ignition switch ON.
4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

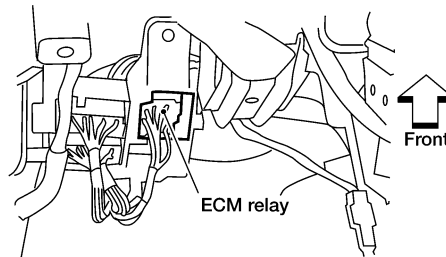
SEF367X

- | | | |
|----|---|-----------|
| OK | ▶ | GO TO 10. |
| NG | ▶ | GO TO 5. |

5 CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III

1. Turn ignition switch OFF.
2. Disconnect ECM relay.

View with glove box removed



WEC690

3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1. Refer to "Wiring Diagram", EC-548.
Continuity should exist.
4. Also check harness for short to ground and short to power.

OK or NG

- | | | |
|----|---|----------|
| OK | ▶ | GO TO 7. |
| NG | ▶ | GO TO 6. |

6	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and condenser.	
	Repair open circuit or short to ground or short to power in harness or connectors.


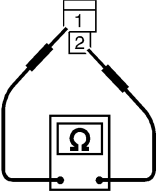
7	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV
Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.	
<p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	
SEF368X	
OK	GO TO 9.
NG	GO TO 8.

8	DETECT MALFUNCTIONING PART
Check the following.	
<ul style="list-style-type: none"> ● 15A fuse ● Harness for open and short between ECM relay and fuse 	
	Repair or replace harness or connectors.

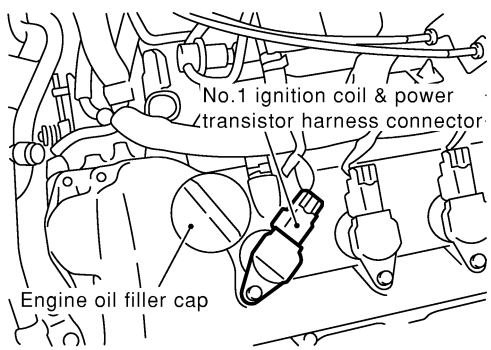
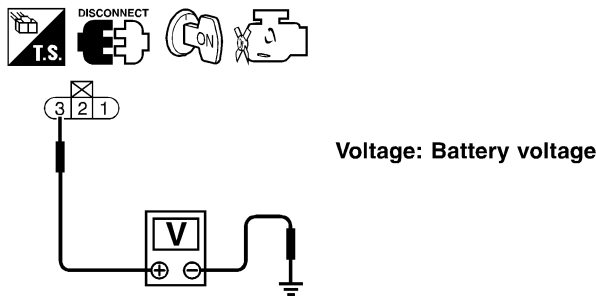
9	CHECK ECM RELAY						
<ol style="list-style-type: none"> 1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7. 							
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition	Continuity	12V direct current supply between terminals 1 and 2	Yes	OFF	No
Condition	Continuity						
12V direct current supply between terminals 1 and 2	Yes						
OFF	No						
SEF296X							
OK or NG							
OK	GO TO 17.						
NG	Replace ECM relay.						

10	CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch OFF.</p> <p>2. Check harness continuity between condenser terminal 2 and engine ground. Refer to "Wiring Diagram", EC-548. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Repair open circuit or short to power in harness or connectors.

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11	CHECK CONDENSER	
<p>Check resistance between condenser terminals 1 and 2.</p> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> <p style="text-align: center;">Resistance: Above 1MΩ at 25°C (77°F)</p> <p style="text-align: right;">SEF369X</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG	▶	Replace condenser.

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12	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V
<p>1. Turn ignition switch OFF. 2. Reconnect harness connectors disconnected. 3. Disconnect ignition coil harness connector.</p>	
 <p style="text-align: center;">No.1 ignition coil & power transistor harness connector</p> <p style="text-align: center;">Engine oil filler cap</p>	
<p>4. Turn ignition switch ON. 5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.</p>	
 <p style="text-align: center;">Voltage: Battery voltage</p>	
OK or NG	
OK	▶ GO TO 14.
NG	▶ GO TO 13.

SEF489Y

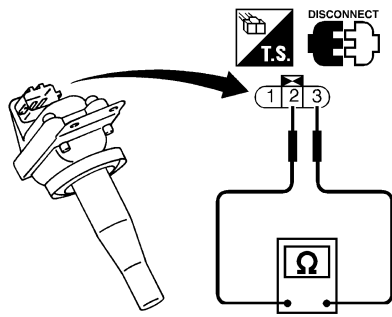
SEF370X

13	DETECT MALFUNCTIONING PART
<p>Check the harness for open or short between ignition coil and ECM relay.</p>	
▶	Repair or replace harness or connectors.

14	CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch OFF. 2. Check harness continuity between ignition coil terminal 2 and engine ground. Refer to "Wiring Diagram", EC-548. Continuity should exist. 3. Also check harness for short to power.</p>	
OK or NG	
OK	▶ GO TO 15.
NG	▶ Repair open circuit or short to power in harness or connectors.

15	CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminals 35, 36, 37, 38 and ignition coil terminal 1. Refer to "Wiring Diagram", EC-548 Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 16.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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16	CHECK IGNITION COIL WITH POWER TRANSISTOR									
<p>Check resistance between ignition coil terminals 2 and 3.</p>										
										
<table border="1" style="margin: auto;"> <thead> <tr> <th>Terminals</th> <th>Resistance</th> <th>Result</th> </tr> </thead> <tbody> <tr> <td rowspan="2" style="text-align: center;">2 and 3</td> <td style="text-align: center;">Not 0Ω</td> <td style="text-align: center;">OK</td> </tr> <tr> <td style="text-align: center;">0Ω</td> <td style="text-align: center;">NG</td> </tr> </tbody> </table>			Terminals	Resistance	Result	2 and 3	Not 0Ω	OK	0Ω	NG
Terminals	Resistance	Result								
2 and 3	Not 0Ω	OK								
	0Ω	NG								
SEF371X										
OK or NG										
OK	▶	GO TO 17.								
NG	▶	Replace ignition coil with power transistor.								

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17	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

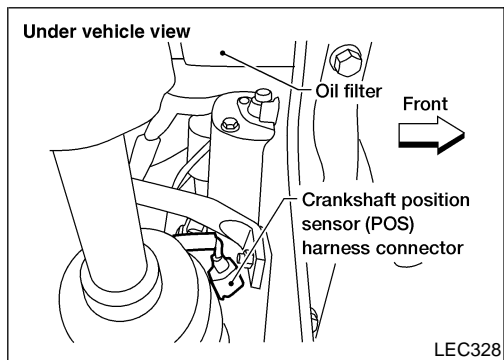
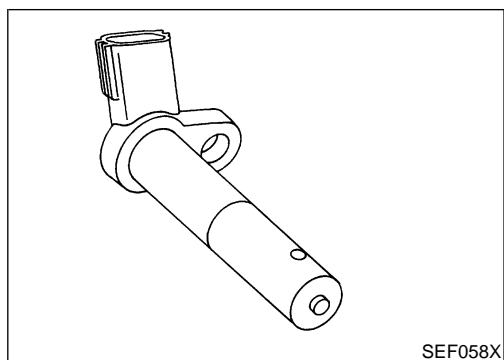
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DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (POS) (COG)

QG18DE (EXC CALIF CA)

Component Description



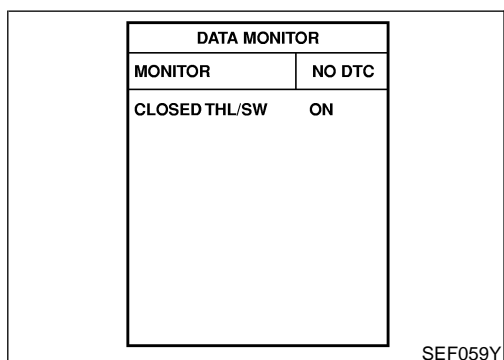
Component Description

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of signal plate at end of crankshaft drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet and hall IC. When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes. The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1336	<ul style="list-style-type: none"> A chipping of the signal plate gear tooth (cog) is detected by the ECM. 	<ul style="list-style-type: none"> Harness or connectors Crankshaft position sensor (POS) Signal plate



DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 4 minutes at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-560.

With GST

Follow the procedure "With CONSULT-II" above.

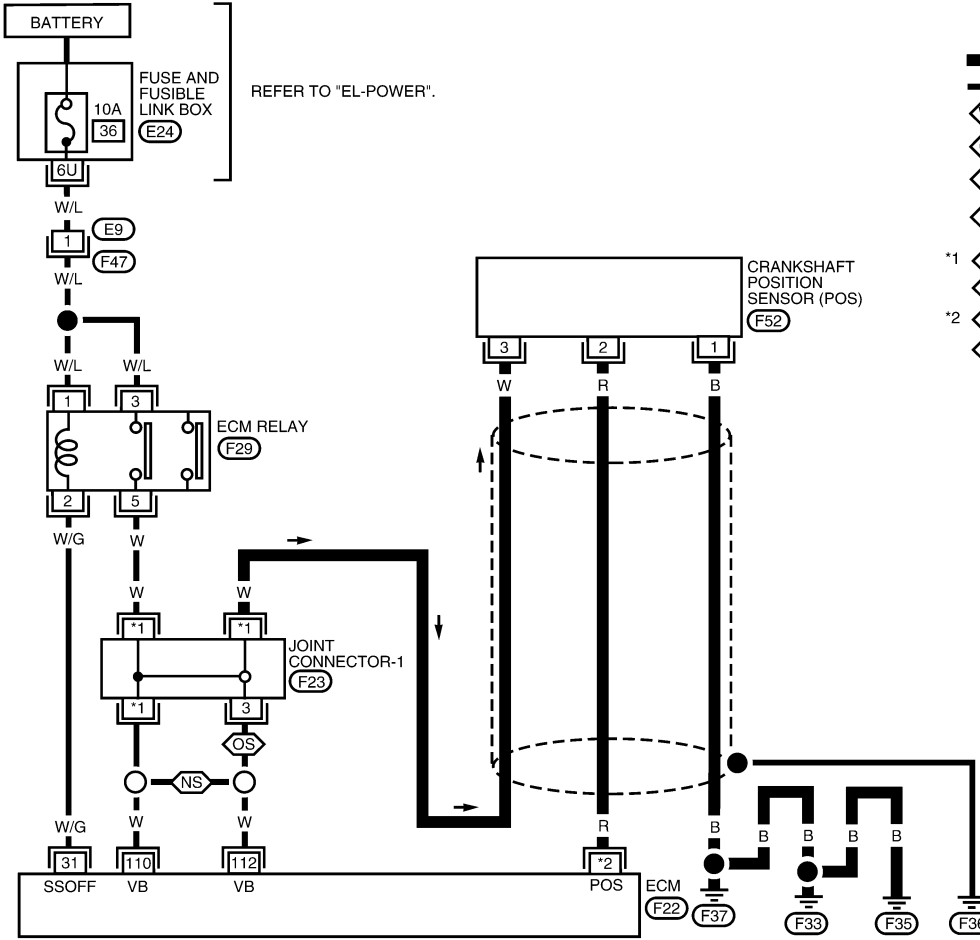
DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (POS) (COG)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

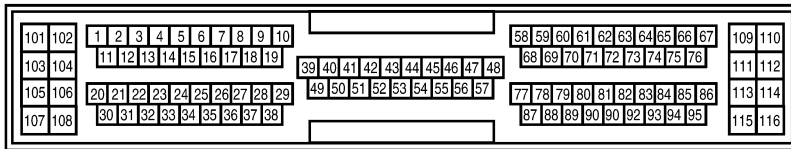
NIEC0331



EC-POS-01

- : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC
- ◊WN : WITH NVIS (NATS)
- ◊ON : WITHOUT NVIS (NATS)
- ◊NS : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- ◊OS : WITH OLD STYLE JOINT CONNECTOR LAYOUT
- *1 ◊NS : 1
- *2 ◊WN : 85
- ◊ON : 75

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REFER TO THE FOLLOWING.
◊F23 - JOINT CONNECTOR

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WEC941

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
75 WITHOUT NVIS (NATS)	R	CRANKSHAFT POSITION SENSOR (POS)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 3.0V - 4.0V
85 WITH NVIS (NATS)			ENGINE RUNNING AT 2,000 RPM	APPROX. 3.0V - 4.0V

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DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (POS) (COG)

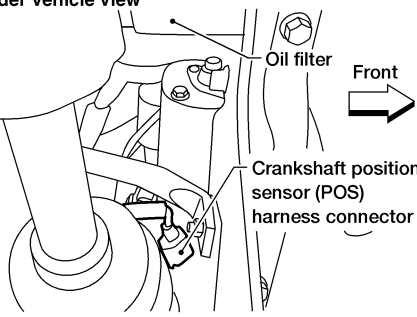
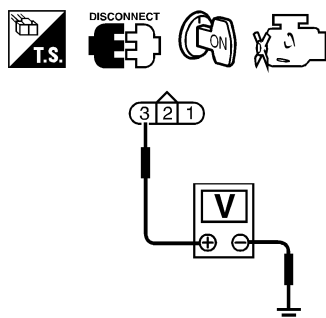
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0332

1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
	GO TO 2.

2	CHECK POWER SUPPLY
1. Disconnect crankshaft position sensor (POS) harness connector F52 and ECM harness connectors.	
<p>Under vehicle view</p> 	
LEC328	
2. Check voltage between crankshaft position sensor (POS) harness connector F52 terminal 3 and ground with CONSULT-II or tester.	
	
SEF479Y	
3. Also check harness for short to ground and short to power.	
OK or NG	
OK	GO TO 4.
NG	GO TO 3.

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between ECM relay and crankshaft position sensor (POS) 	
	Repair open circuit or short to ground or short to power in harness or connectors.

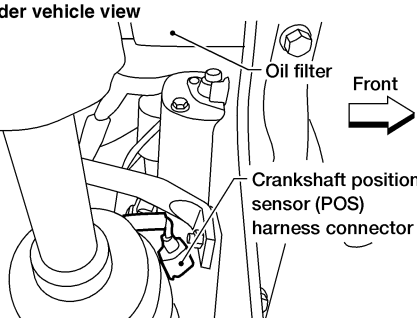
4	CHECK GROUND CIRCUIT
1. Reconnect ECM harness connectors. 2. Check harness continuity between crankshaft position sensor (POS) terminal 1 and engine ground. Refer to "Wiring Diagram", EC-559. Continuity should exist.	
3. Also check harness for short to power.	
OK or NG	
OK	GO TO 6.
NG	GO TO 5.

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (POS) (COG)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the harness for open or short between crankshaft position sensor (POS) and ECM.	
▶	Repair open circuit or short to power in harness or connectors.

6	CHECK INPUT SIGNAL CIRCUIT									
1. Disconnect crankshaft position sensor (POS) and ECM harness connectors.										
<p>Under vehicle view</p> 										
2. Check continuity between ECM terminal and sensor terminal as follows. Refer to "Wiring Diagram", EC-559.										
<table border="1" style="margin: auto;"> <thead> <tr> <th>ECM terminals</th> <th>Sensor terminal</th> <th>Model</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">75</td> <td style="text-align: center;">2</td> <td>Without NVIS (NATS)</td> </tr> <tr> <td style="text-align: center;">85</td> <td style="text-align: center;">2</td> <td>With NVIS (NATS)</td> </tr> </tbody> </table>		ECM terminals	Sensor terminal	Model	75	2	Without NVIS (NATS)	85	2	With NVIS (NATS)
ECM terminals	Sensor terminal	Model								
75	2	Without NVIS (NATS)								
85	2	With NVIS (NATS)								
<p>Continuity should exist.</p>										
3. Also check harness for short to ground and short to power.										
OK or NG										
OK	▶ GO TO 8.									
NG	▶ GO TO 7.									

7	DETECT MALFUNCTIONING PART
Check the harness for open or short between crankshaft position sensor (POS) and ECM.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK IMPROPER INSTALLATION
Loosen and retighten the fixing bolt of the crankshaft position sensor (POS). Then retest.	
▶	Trouble is not fixed. GO TO 9.

9	CHECK CRANKSHAFT POSITION SENSOR (POS)
Refer to "Component Inspection", EC-562.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace crankshaft position sensor (POS).

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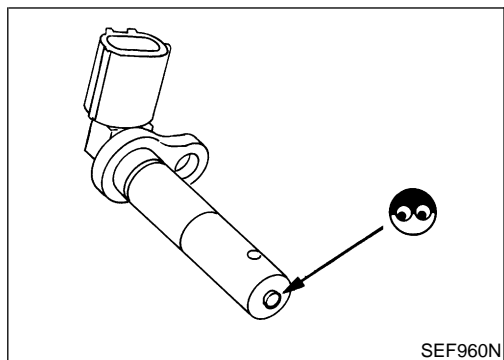
DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (POS) (COG)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK SIGNAL PLATE TOOTH	
Visually check for chipping signal plate tooth (cog).		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace the signal plate. Refer to EM-54 , "PISTON AND CRANKSHAFT".

11	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶ INSPECTION END		

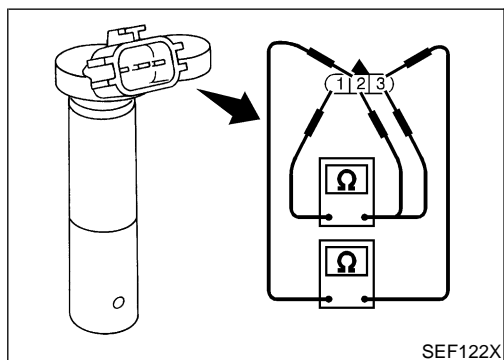


Component Inspection CRANKSHAFT POSITION SENSOR (POS)

NIEC0333

NIEC0333S01

1. Disconnect crankshaft position sensor (POS) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.



5. Check resistance as shown in the figure.

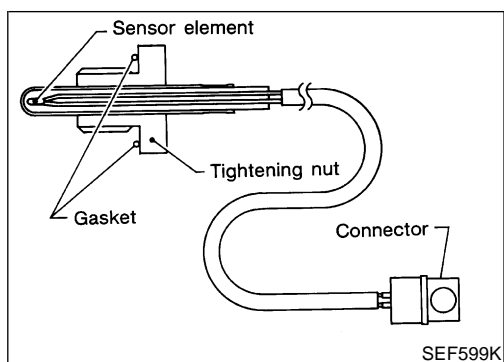
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
2 (+) - 1 (-)	
3 (+) - 2 (-)	

If NG, replace crankshaft position sensor (POS).

DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

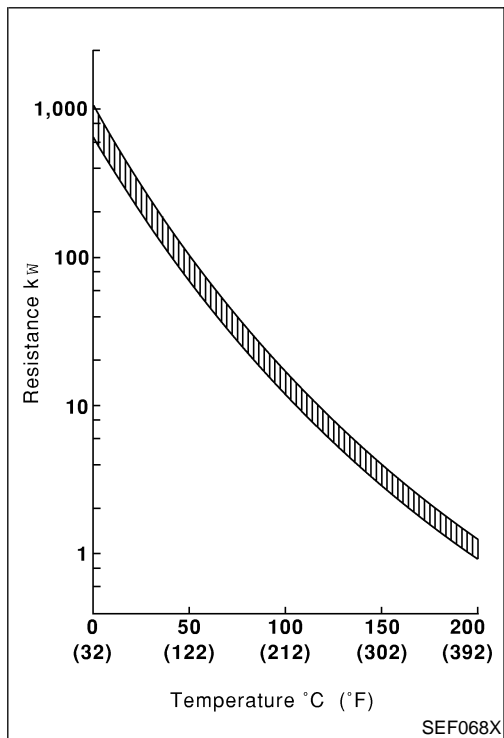
Component Description



Component Description

The EGR temperature sensor detects temperature changes in the EGR passageway. When the EGR volume control valve opens, hot exhaust gases flow, and the temperature in the passageway changes. The EGR temperature sensor is a thermistor that modifies a voltage signal sent from the ECM. This modified signal then returns to the ECM as an input signal. As the temperature increases, EGR temperature sensor resistance decreases. This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

NIEC0572



<Reference data>

EGR temperature °C (°F)	Voltage* V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

*: These data are reference values and are measured between ECM terminal 72 (EGR temperature sensor) and ECM terminal ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead the ECM's transistor damage. Use ground other than ECM, such as body ground.

When EGR system is operating.
Voltage: 0 - 1.5V

On Board Diagnosis Logic

Malfunction is detected when

(Malfunction A) an excessively low voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is low.

(Malfunction B) an excessively high voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is high.

Possible Cause

MALFUNCTION A

- Harness or connectors (The EGR temperature sensor circuit is shorted.)
- EGR temperature sensor
- Malfunction of EGR function

MALFUNCTION B

- Harness or connectors (The EGR temperature sensor circuit is open.)
- EGR temperature sensor

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- Malfunction of EGR function

DTC Confirmation Procedure

Perform “PROCEDURE FOR MALFUNCTION A” first. If 1st trip DTC cannot be confirmed, perform “PROCEDURE FOR MALFUNCTION B”.

NIEC0575

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION A

NIEC0575S01

With CONSULT-II

NIEC0575S0101

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Verify that “COOLAN TEMP/S” is less than 50°C (122°F).
If the engine coolant temperature is above the range, cool the engine down.
- 4) Start engine and let it idle for at least 8 seconds.
- 5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-567.

With GST

NIEC0575S0102

Follow the procedure “With CONSULT-II” above.

DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

ACTIVE TEST	
EGR VOL CONT/V	50 step
MONITOR	
ENG SPEED	XXX rpm
EGR TEMP SEN	XXX V

SEF200Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF201Y

PROCEDURE FOR MALFUNCTION B

NIEC0575S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

Always perform the test at a temperature above -10°C (14°F).

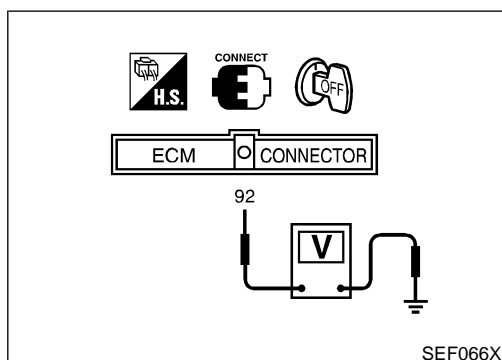
Ⓜ With CONSULT-II

NIEC0575S0201

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- 3) Hold engine speed at 1,500 rpm.
- 4) Touch "Qu" and set the EGR volume control valve opening to 50 step and check EGR TEMP SEN.
EGR TEMP SEN should decrease to less than 1.0V.
If the check result is NG, go to "Diagnostic Procedure", EC-567.
If the check result is OK, go to the following step.
- 5) Turn ignition switch "OFF" and wait at least 5 seconds then turn "ON".
- 6) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 7) Start engine and maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,200 - 3,600 rpm
VHCL SPEED SE	10 km/h (6 MPH) or more
B/FUEL SCHDL	4.5 - 8.0 msec
Selector lever	Suitable position

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-567.



SEF066X

Ⓜ With GST

NIEC0575S0202

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 3) Select "MODE 1" with GST and maintain the following conditions for at least 5 consecutive seconds.

Engine speed	1,200 - 3,600 rpm
Vehicle speed	10 km/h (6 MPH) or more
Selector lever	Suitable position

- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-567.

DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

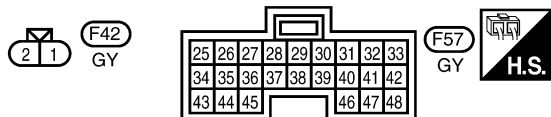
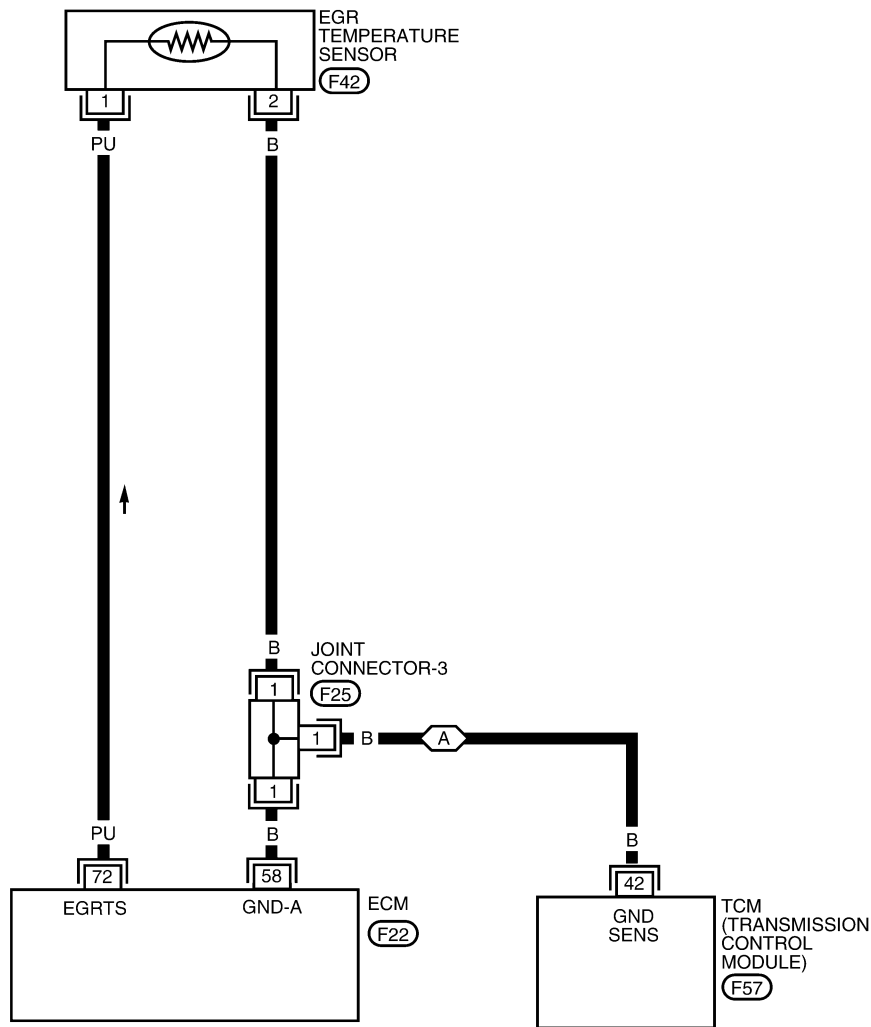
Wiring Diagram

Wiring Diagram

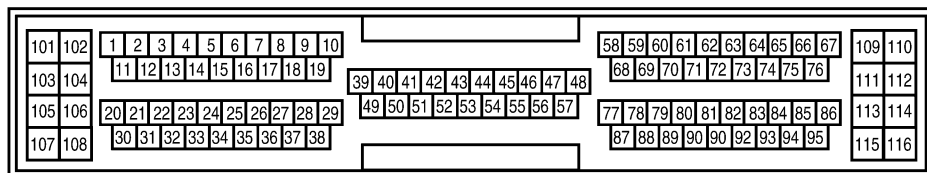
NIEC0576

EC-EGR/TS-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE FOR DTC
- A** : WITH A/T



REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR



F22
GY **H.S.**

WEC596

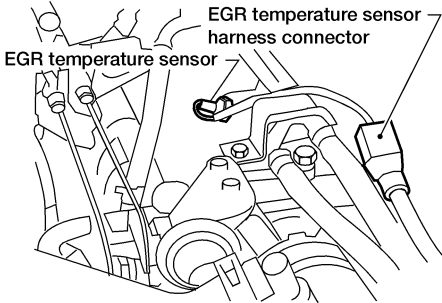
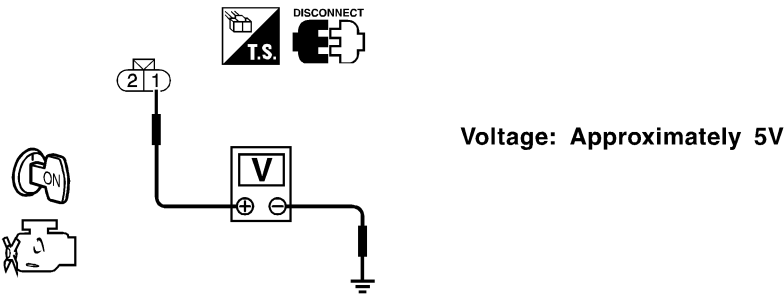
DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0577

1	CHECK EGR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect EGR temperature sensor harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EGR temperature sensor terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> <p>OK or NG</p> </div>	
WEC261	
SEF197Z	
OK	▶ GO TO 2.
NG	▶ Repair or replace harness or connectors.

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2	CHECK EGR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EGR temperature sensor terminal 2 and engine ground. Refer to "Wiring Diagram", EC-566. Continuity should exist. 3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and EGR temperature sensor ● Harness for open or short between TCM (Transmission control module) and EGR temperature sensor 	
▶	Repair open circuit or short to power in harness or connector.

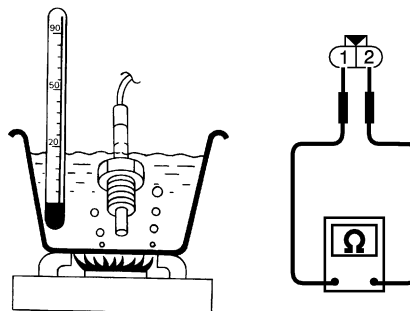
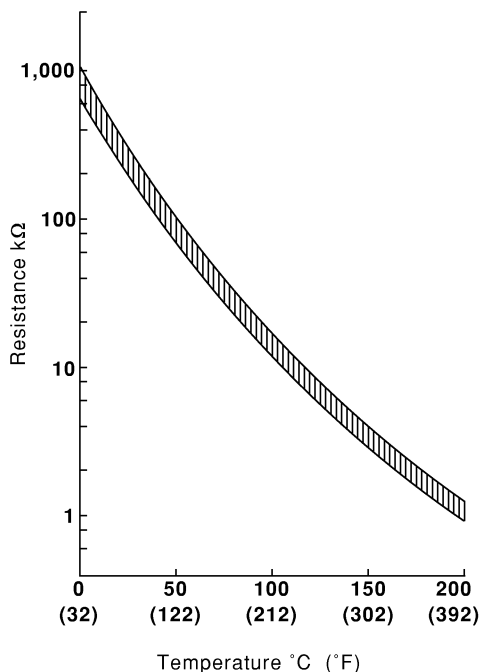
DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

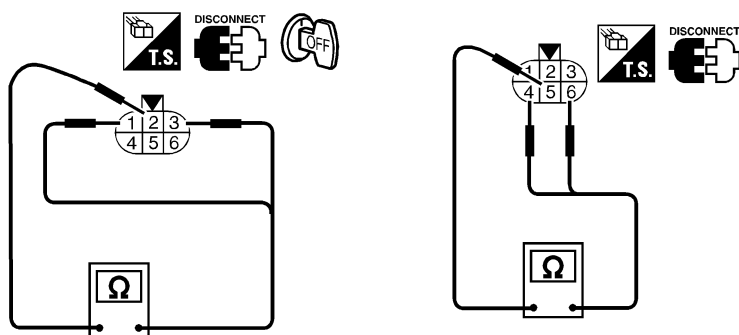
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

5 CHECK EGR VOLUME CONTROL VALVE-I

1. Disconnect EGR volume control valve.
2. Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

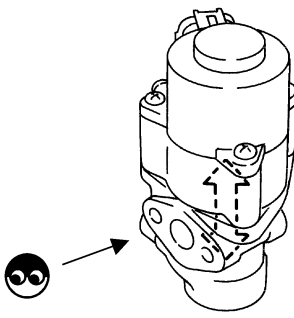
OK or NG

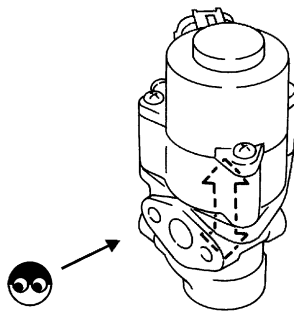
- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 6. |
| OK (Without CONSULT-II) | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P1401 EGR TEMPERATURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK EGR VOLUME CONTROL VALVE-II																									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON. 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
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SEF491Y																										
OK or NG																										
OK	▶	GO TO 8.																								
NG	▶	Replace EGR volume control valve.																								

7	CHECK EGR VOLUME CONTROL VALVE-II	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON and OFF. 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
		
SEF560W		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EGR volume control valve.

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

Description

Description SYSTEM DESCRIPTION

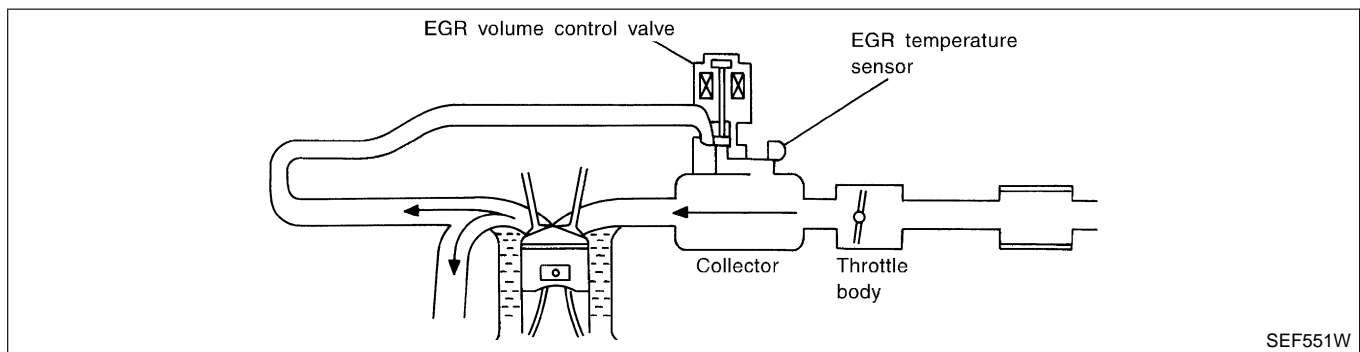
NIEC0578

NIEC0578S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	EGR volume control	EGR volume control valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
Park/Neutral position switch	Park/Neutral position		
TCM (Transmission control module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR bypass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

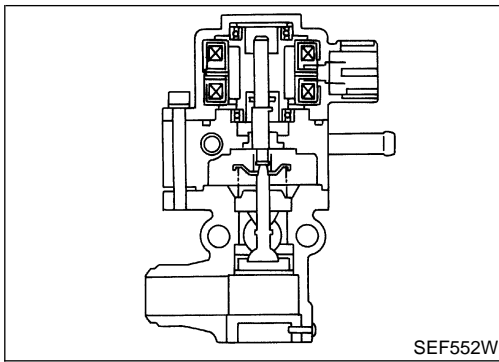


SEF551W

DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

Description (Cont'd)



COMPONENT DESCRIPTION

EGR Volume Control Valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC0578S02

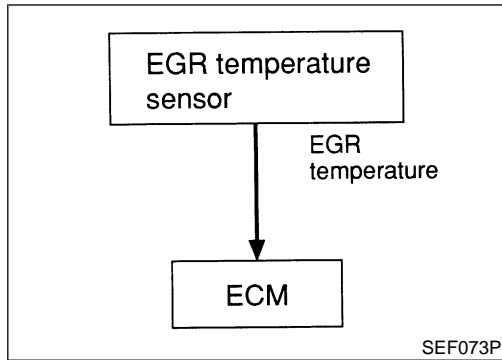
NIEC0578S0201

CONSULT-II Reference Value in Data Monitor Mode

NIEC0579

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 steps



On Board Diagnosis Logic

If the EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Malfunction is detected when EGR flow is detected under condition that does not call for EGR.

NOTE:

Diagnosis for this DTC will occur when engine coolant temperature is below 50 to 60°C (122 to 140°F). Therefore, it will be better to turn ignition switch "ON" (start engine) at the engine coolant temperature below 30°C (86°F) when starting DTC confirmation procedure.

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve leaking or stuck open
- EGR temperature sensor

NIEC0581

DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
EGR TEMP SEN	XXX V

SEF202Y

4

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XX %
A/F ALPHA-B2	XX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	X. XX V

SEF677Y

4

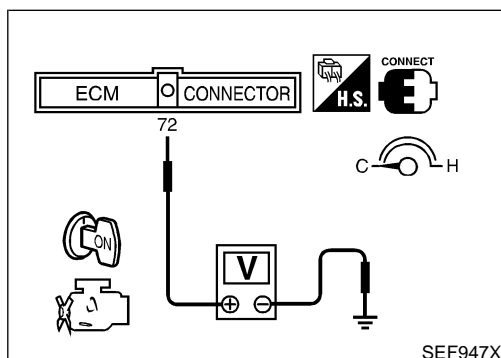
DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
FUEL T/TMP SE	XXX °C

SEF194Y

4

EGR SYSTEM P1402	
COMPLETED	

SEF236Y



DTC Confirmation Procedure

NIEC0582

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform the test at a temperature above -10°C (14°F).
- Engine coolant temperature and EGR temperature must be verified in “DATA MONITOR” mode with CONSULT-II before starting DTC WORK SUPPORT test. If it is out of range below, the test cannot be conducted.

COOLAN TEMP/S: -10 to 50°C (14 to 122°F)*

EGR TEMP SEN: Less than 4.8V

If the values are out of the ranges indicated above, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to reduce the engine coolant temperature or EGR temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

*: Although CONSULT-II screen displays “ -10 to 40°C (14 to 104°F)” as a range of engine coolant temperature, ignore it.

WITH CONSULT-II

NIEC0582S01

- 1) Turn ignition switch “OFF”, and wait at least 5 seconds, and then turn “ON”.
- 2) Select “EGR SYSTEM P1402” of “EGR SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 3) Touch “START”.
- 4) Start engine and let it idle until “TESTING” on CONSULT-II screen is turned to “COMPLETED”. (It will take 80 seconds or more.)
If “TESTING” is not displayed after 5 minutes, turn ignition “OFF” and cool the engine coolant temperature to the range of -10 to 50°C (14 to 122°F). Retry from step 1.
- 5) Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to “Diagnostic Procedure”, EC-574.

WITH GST

NIEC0582S02

- 1) Turn ignition switch “ON” and select “MODE 1” with GST.
 - 2) Check that engine coolant temperature is within the range of -10 to 50°C (14 to 122°F).
 - 3) Check that voltage between ECM terminal 72 (EGR temperature sensor signal) and ground is less than 4.8V.
 - 4) Start engine and let it idle for at least 80 seconds.
 - 5) Stop engine.
 - 6) Perform from step 1 to 4.
 - 7) Select “MODE 3” with GST.
 - 8) If DTC is detected, go to “Diagnostic Procedure”, EC-574.
- When using GST, “DTC Confirmation Procedure” should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

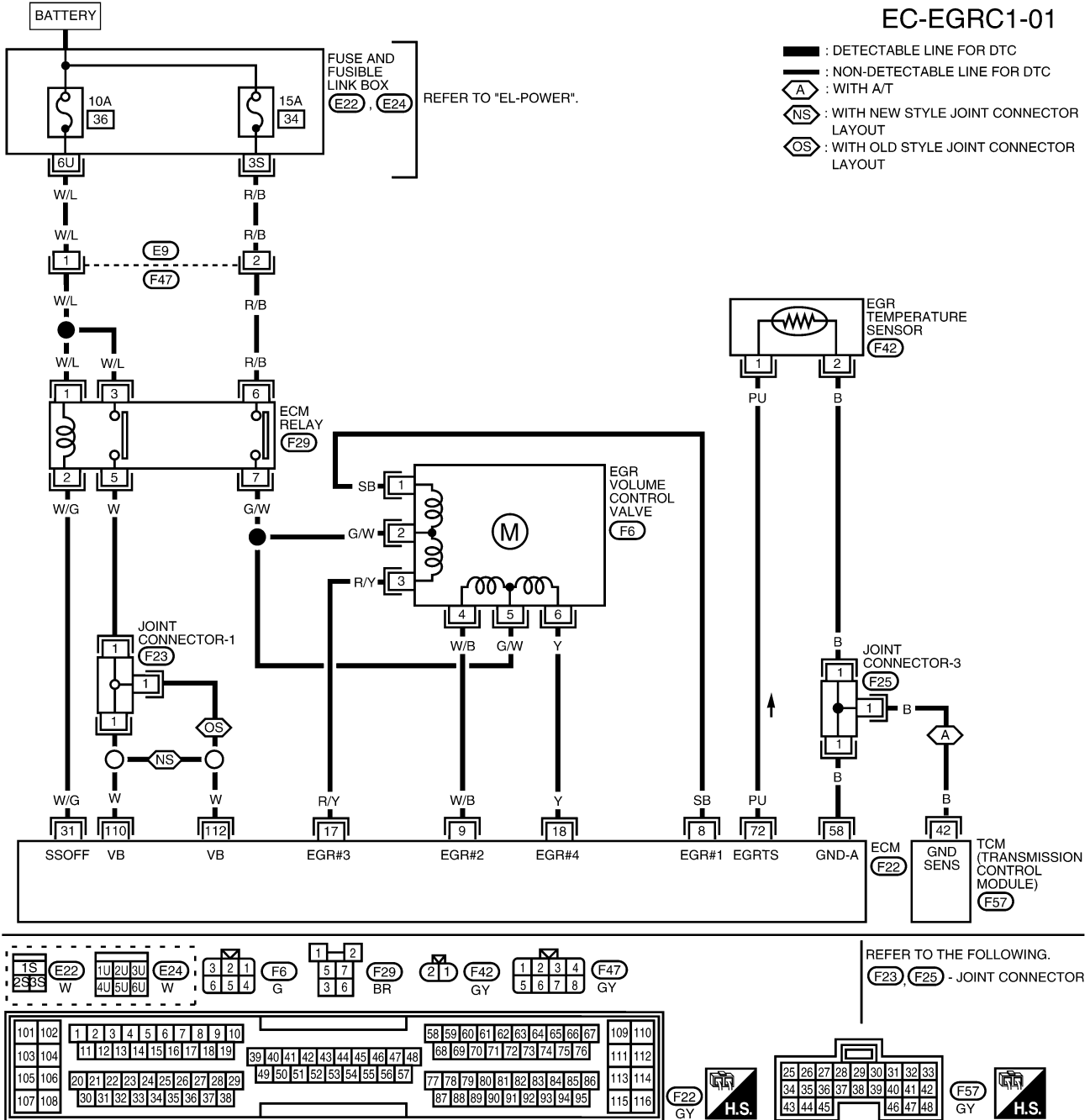
DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0583



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

WEC942

SEF196ZA

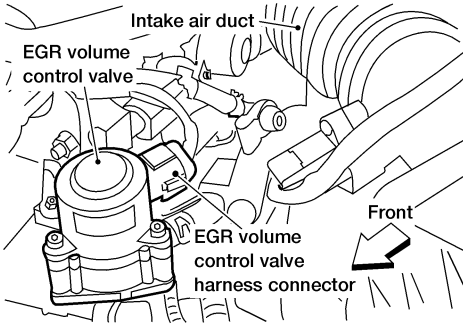
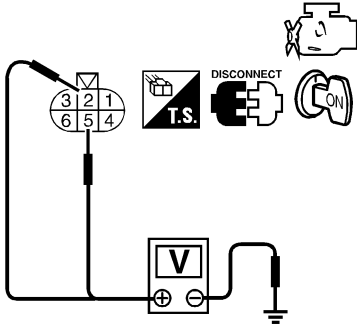
DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0584

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC333</p> <p>2. Turn ignition switch ON. 3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">SEF327X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>		OK	▶	GO TO 3.	NG	▶	GO TO 2.
OK	▶	GO TO 3.					
NG	▶	GO TO 2.					

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and EGR volume control valve.	
▶	Repair harness or connectors.

3	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																
<p>1. Turn ignition switch OFF. 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-573.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0571</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	EGR volume control valve																
8	1																
9	4																
17	3																
18	6																
OK	▶	GO TO 4.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

DTC P1402 EGR FUNCTION (OPEN)

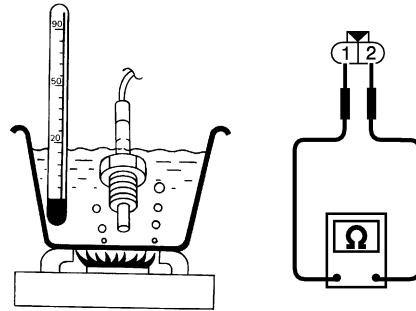
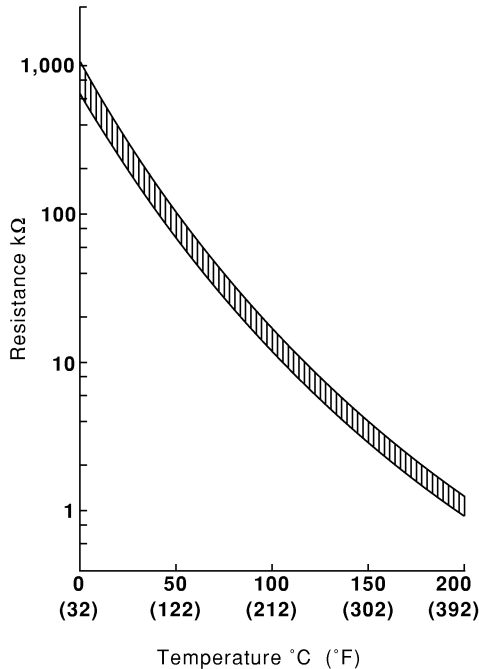
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

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4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

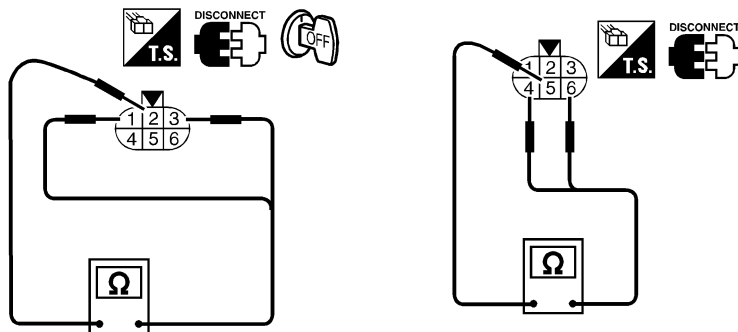
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

5 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 6. |
| OK (Without CONSULT-II) | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P1402 EGR FUNCTION (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK EGR VOLUME CONTROL VALVE-II																									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
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SEF491Y																										
OK or NG																										
OK	▶	GO TO 8.																								
NG	▶	Replace EGR volume control valve.																								

7	CHECK EGR VOLUME CONTROL VALVE-II	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON and OFF. 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
SEF560W		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EGR volume control valve.

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0585

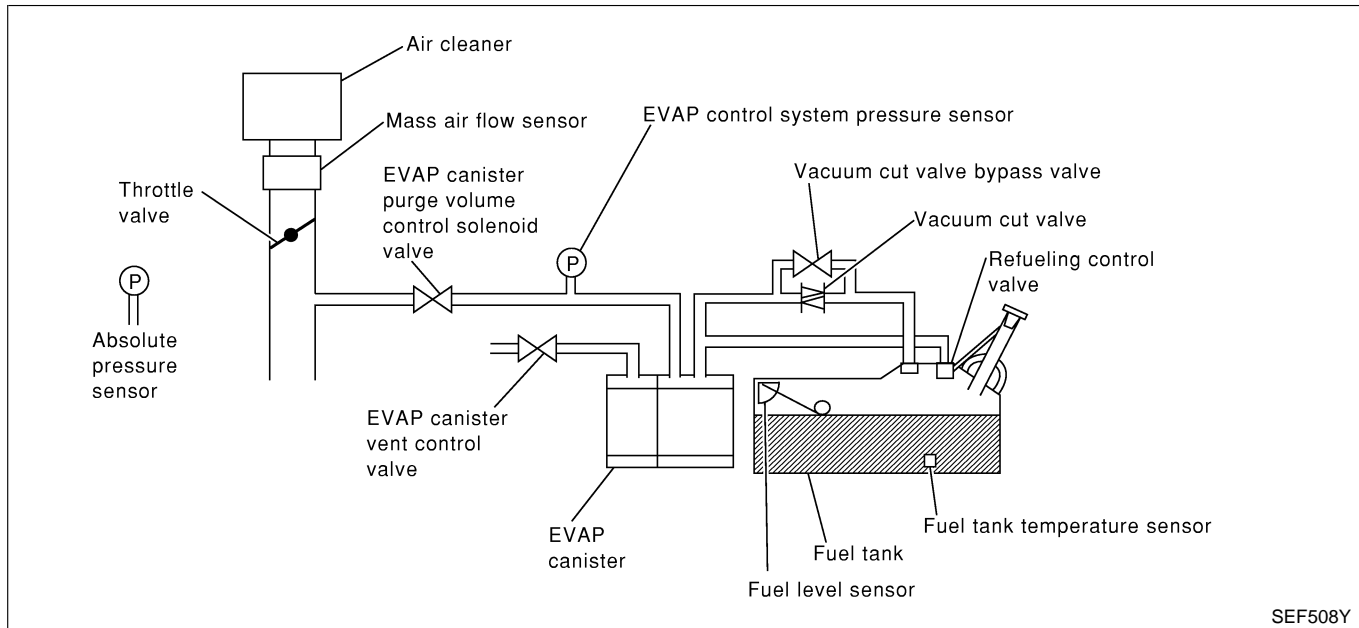
NOTE:

If DTC P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-627.)

This diagnosis detects leaks in the EVAP purge line using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



SEF508Y

Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC0586

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close
- Foreign matter caught in fuel filler cap
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve
- Foreign matter caught in EVAP canister vent control valve
- EVAP canister
- EVAP purge line (pipe and rubber tube) leaks

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve
- Absolute pressure sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged
- Water separator
- EVAP canister is saturated with water
- Fuel level sensor and the circuit
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks
- Foreign matter caught in EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

Refer to "P1441 EVAP CONTROL SYSTEM (VERY SMALL LEAK)
(NEGATIVE PRESSURE)", EC-579. ^{NIEC0587}

Diagnostic Procedure

Refer to "P1441 EVAP CONTROL SYSTEM (VERY SMALL LEAK)
(NEGATIVE PRESSURE)", EC-579. ^{NIEC0588}

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

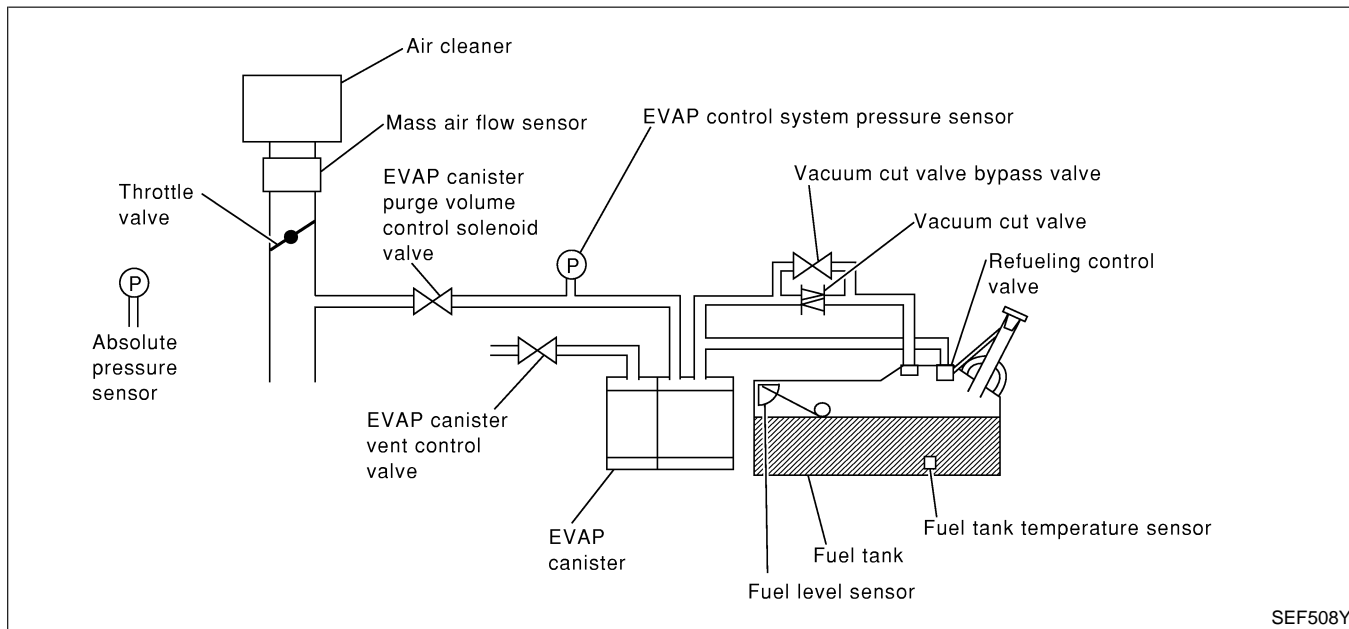
NIEC0713

This diagnosis detects very small leaks in the EVAP line between fuel tank and EVAP canister purge volume control solenoid valve, using the intake manifold same as a conventional EVAP small leak diagnosis.

If ECM judges a leak which corresponds to a very small leak, the very small leak P1441 will be detected.

If ECM judges a leak equivalent to a small leak, EVAP small leak P0440 will be detected.

If ECM judges there are no leaks, the diagnosis will be OK.



SEF508Y

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1441	<ul style="list-style-type: none"> ● EVAP system has a very small leak. ● EVAP system does not operate properly. 	<ul style="list-style-type: none"> ● Incorrect fuel tank vacuum relief valve. ● Incorrect fuel filler cap used. ● Fuel filler cap remains open or fails to close ● Foreign matter caught in fuel filler cap. ● Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve. ● Foreign matter caught in EVAP canister vent control valve. ● EVAP canister or fuel tank leaks. ● EVAP purge line (Pipe and rubber tube) leaks. ● EVAP purge line rubber tube bent. ● Blocked or bent rubber tube to EVAP control system pressure sensor. ● Loose or disconnected rubber tube. ● EVAP canister vent control valve and the circuit. ● EVAP canister purge volume control valve and the circuit ● EVAP canister purge volume control solenoid valve ● Absolute pressure sensor ● O-ring of EVAP canister vent control valve is missing or damaged. ● Water separator ● EVAP canister saturated with water ● EVAP control system pressure sensor ● Refueling control valve ● ORVR system leaks ● Fuel level sensor and the circuit


DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

EVAP V/S LEAK P1441	
CHECK FUEL LEVEL SENSOR(V). SEE SERVICE MANUAL FOR SPECIFICATION. IS THE VOLTAGE WITHIN THE SPECIFICATION?	
MONITOR	
FUEL LEVEL SE	XXX V

SEF881X

EVAP V/S LEAK P1441		
MAINTAIN 1800-2800 RPM UNTIL FINAL RESULT APPEARS.		
		
1800 rpm	2300 rpm	2800 rpm

SEF882X

EVAP V/S LEAK P1441	
OK	

SEF883X

DTC Confirmation Procedure

NIEC0714

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- If DTC P1441 is displayed with P0440, perform TROUBLE DIAGNOSIS FOR DTC P1441 first.
- If “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.
- After repair, make sure that the hoses and clips are installed properly.

TESTING CONDITION:

- Open engine hood before conducting following procedure.
- If any of following conditions are met just before the DTC confirmation procedure, leave the vehicle for more than 1 hour.
 - a) Fuel filler cap is removed.
 - b) Refilled or drained the fuel.
 - c) EVAP component parts is/are removed.
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Ⓜ With CONSULT-II

- 1) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 2) Make sure the following conditions are met.
FUEL LEVEL SE: 0.25 - 1.15V
COOLAN TEMP/S: 0 - 32°C (32 - 90°F)
FUEL T/TMP SE: 0 - 32°C (32 - 90°F)
INT A/TEMP SE: More than 0°C (32°F)
If NG, turn ignition switch “OFF” and leave the vehicle in a cool place (soak the vehicle) or refilling/draining fuel until the output voltage condition of the “FUEL LEVEL SE” meets within the range above and leave the vehicle for more than 1 hour. Then start from step 1).
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON”.
- 5) Select “EVAP VERY/SML LEAK P1441” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, refer to “Diagnostic Procedure”, EC-582.

NOTE:

- If the engine speed cannot be maintained within the range displayed on CONSULT-II screen, go to “Basic inspection”, EC-127.
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

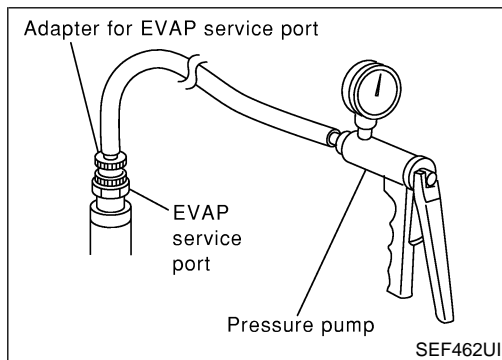
Overall Function Check

Overall Function Check

NIEC0715

With GST

Use this procedure to check the overall function of the EVAP very small leak function. During this check, a 1st trip DTC might not be confirmed.



CAUTION:

- **Never use compressed air, doing so may damage the EVAP system.**
- **Do not start engine.**
- **Do not exceeded 4.12 kPa (0.042 kg/cm², 0.6 psi).**

- 1) Attach the EVAP service port adapter securely to the EVAP service port.
- 2) Set the pressure pump and a hose.
- 3) Also set a vacuum gauge via 3-way connector and a hose.
- 4) Turn ignition switch "ON".
- 5) Connect GST and select mode 8.
- 6) Using mode 8 control the EVAP canister vent control valve (close) and vacuum cut valve bypass valve (open).
- 7) Apply pressure and make sure the following conditions are satisfied.

Pressure to be applied: 2.7 kPa (20 mmHg, 0.79 inHg)

Time to be waited after the pressure drawn in to the EVAP system and the pressure to be dropped: 60 seconds and the pressure should not be dropped more than 0.4 kPa (3 mmHg, 0.12 inHg).

If NG, go to diagnostic procedure, EC-582.

If OK, go to next step.

- 8) Disconnect GST.
- 9) Start engine and warm it up to normal operating temperature.
- 10) Turn ignition switch "OFF" and wait at least 10 seconds.
- 11) Restart engine and let it idle for 90 seconds.
- 12) Keep engine speed at 2,000 rpm for 30 seconds.
- 13) Turn ignition switch "OFF".

NOTE:

For more information, refer to GST instruction manual.

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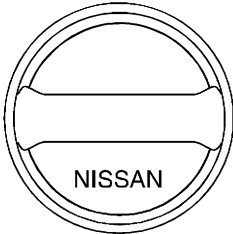
DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0716

1	CHECK FUEL FILLER CAP DESIGN	
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p>		
		
SEF915U		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 4.

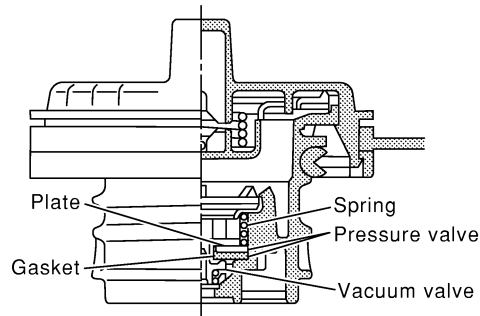
DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

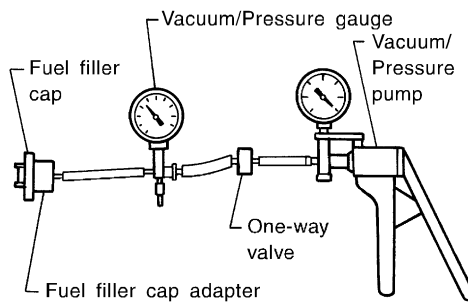
Diagnostic Procedure (Cont'd)

4 CHECK FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.



SEF445Y



SEF943S

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

CAUTION:

Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.

OK or NG

OK ► GO TO 5.

NG ► Replace fuel filler cap with a genuine one.

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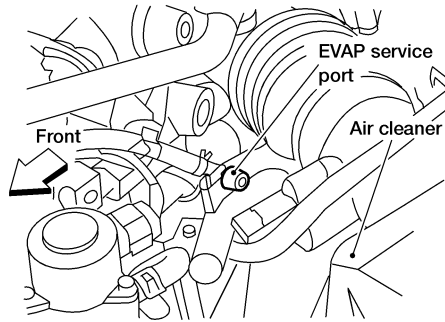
DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

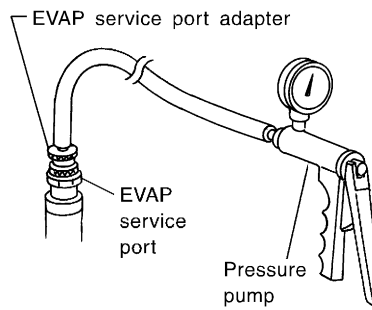
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



LEC256



SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II ►	GO TO 6.
Models without CON- SULT-II ►	GO TO 7.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

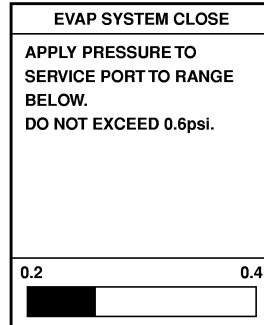
6 CHECK FOR EVAP LEAK

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

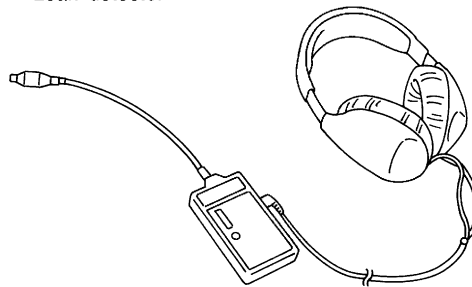
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

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DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

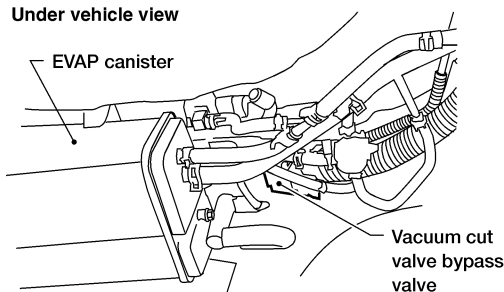
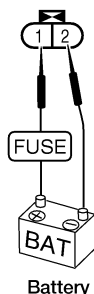
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



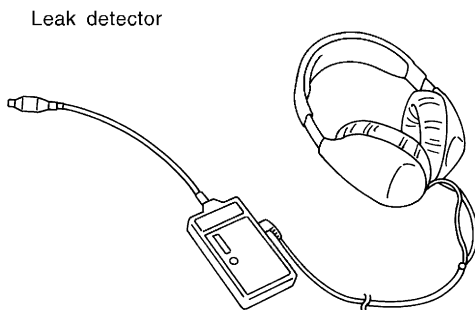
WEC334

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

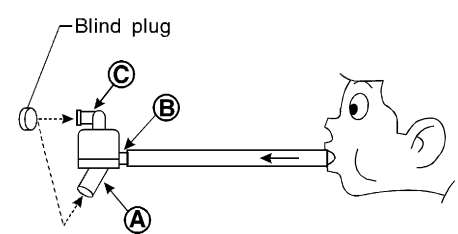
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	RELEASE EVAP LINE PRESSURE
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 	
▶ GO TO 9.	

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9	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
 <p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
SEF829T	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. 	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace water separator.

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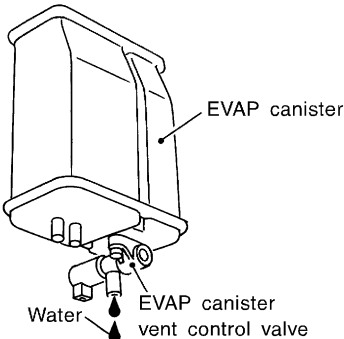
10	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-628.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

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DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister?</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 12.
No (With CONSULT-II)	▶	GO TO 14.
No (Without CONSULT-II)	▶	GO TO 15.

12	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶		Repair hose or replace EVAP canister.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>A/F ALPHA-B2</td><td>XX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>X.XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X.XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X.XX V																					
Vacuum should exist.																						
SEF673Y																						
OK or NG																						
OK	▶	GO TO 17.																				
NG	▶	GO TO 16.																				

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue;">Vacuum should exist.</p>		
OK or NG		
OK	▶	GO TO 19.
NG	▶	GO TO 16.

16	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-42.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 17.
OK (Without CONSULT-II)	▶	GO TO 18.
NG	▶	Repair or reconnect the hose.

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DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><td colspan="2" style="text-align: center;">ACTIVE TEST</td></tr> <tr><td style="text-align: center;">PURG VOL CONT/V</td><td style="text-align: center;">XXX %</td></tr> <tr><td colspan="2" style="text-align: center;">MONITOR</td></tr> <tr><td style="text-align: center;">ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td style="text-align: center;">A/F ALPHA-B1</td><td style="text-align: center;">XX %</td></tr> <tr><td style="text-align: center;">A/F ALPHA-B2</td><td style="text-align: center;">XX %</td></tr> <tr><td style="text-align: center;">HO2S1 MNTR (B1)</td><td style="text-align: center;">LEAN</td></tr> <tr><td style="text-align: center;">HO2S1 MNTR (B2)</td><td style="text-align: center;">LEAN</td></tr> <tr><td style="text-align: center;">THRTL POS SEN</td><td style="text-align: center;">X. XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
SEF677Y																						
OK or NG																						
OK	▶	GO TO 19.																				
NG	▶	GO TO 18.																				

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

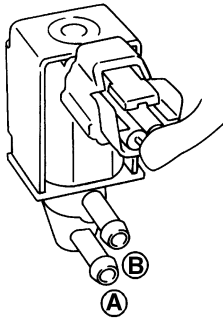
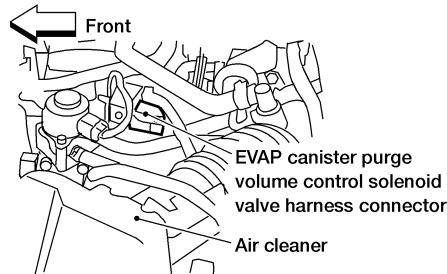
Diagnostic Procedure (Cont'd)

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18 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



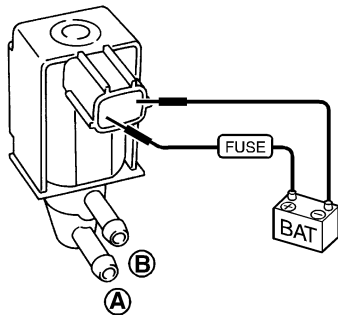
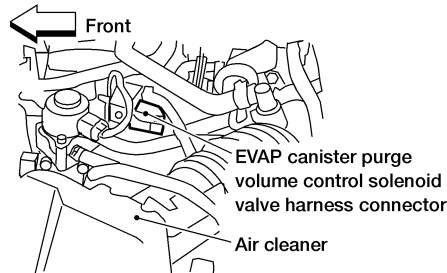
WEC254

Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



WEC254

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X



OK or NG

OK	▶	GO TO 19.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

19	CHECK ABSOLUTE PRESSURE SENSOR	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure" for absolute pressure sensor. See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-183. 5. Is the 1st trip DTC P0105 displayed? 		
Yes or No		
Yes	▶	GO TO 20.
No	▶	GO TO 21.

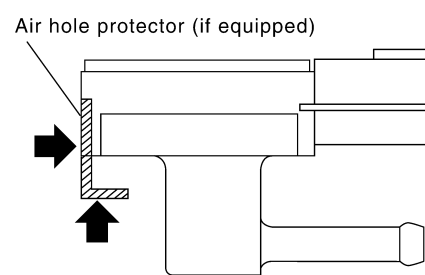
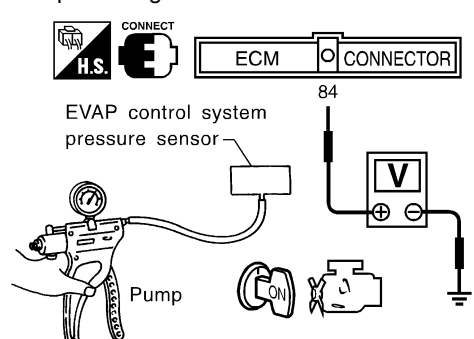
20	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-100. 3. Perform "Idle Air Volume Learning", EC-83. Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	GO TO 21.
INCMP	▶	Follow the instruction of "Idle Air Volume Learning", then GO TO 21.

21	CHECK FUEL TANK TEMPERATURE SENSOR	
<ol style="list-style-type: none"> 1. Remove fuel level sensor unit. 2. Check fuel tank temperature sensor. Refer to EC-323, "Component Inspection". 		
OK or NG		
OK	▶	GO TO 22.
NG	▶	Replace fuel level sensor unit.

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

22	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. <div style="text-align: center;">  </div> <p style="text-align: right;">SEF799W</p> <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> </div> </div> <p style="text-align: right;">SEF342X</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. <p style="text-align: center;">OK or NG</p>	Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
Pressure (Relative to atmospheric pressure)	Voltage V								
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6								
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6								
OK	▶	GO TO 23.							
NG	▶	Replace EVAP control system pressure sensor.							

23	CHECK EVAP PURGE LINE	<p>Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-48.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 24.	
NG	▶	Repair or reconnect the hose.	

24	CLEAN EVAP PURGE LINE	<p>Clean EVAP purge line (pipe and rubber tube) using air blower.</p>	
	▶	GO TO 25.	

DTC P1441 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM (VERY SMALL LEAK)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

25	CHECK FUEL LEVEL SENSOR
Refer to <i>EL-102</i> , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 26.
NG	▶ Replace fuel level sensor unit.

26	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Description

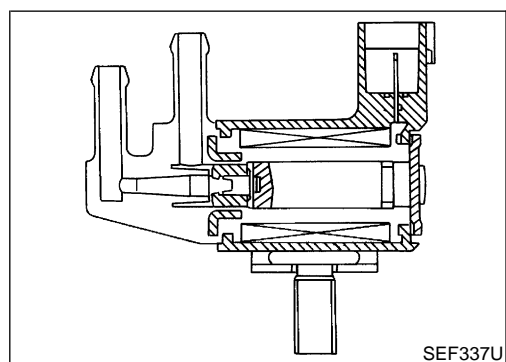
Description SYSTEM DESCRIPTION

NIEC0589

NIEC0589S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Throttle position switch	Closed throttle position		
Heated oxygen sensors 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor bypass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



COMPONENT DESCRIPTION

NIEC0589S02

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0590

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load	Idle (Vehicle stopped)
		2,000 rpm
		0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

Malfunction is detected when the canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed. NIEC0591

Possible Cause

- EVAP control system pressure sensor NIEC0592
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses
(Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NIEC0593

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or more.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center; padding: 2px;">PURG VOL CN/V P1444</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 10px;">OUT OF CONDITION</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">MONITOR</td> </tr> <tr> <td style="padding: 2px;">ENG SPEED</td> <td style="padding: 2px;">XXX rpm</td> </tr> <tr> <td style="padding: 2px;">B/FUEL SCHDL</td> <td style="padding: 2px;">XXX msec</td> </tr> <tr> <td style="padding: 2px;">THRTL POS SEN</td> <td style="padding: 2px;">XXX V</td> </tr> </table>	PURG VOL CN/V P1444		OUT OF CONDITION		MONITOR		ENG SPEED	XXX rpm	B/FUEL SCHDL	XXX msec	THRTL POS SEN	XXX V
PURG VOL CN/V P1444													
OUT OF CONDITION													
MONITOR													
ENG SPEED	XXX rpm												
B/FUEL SCHDL	XXX msec												
THRTL POS SEN	XXX V												

SEF747Y

6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center; padding: 2px;">DATA MONITOR</td> </tr> <tr> <td style="text-align: center; padding: 2px;">MONITOR</td> <td style="text-align: center; padding: 2px;">NO DTC</td> </tr> <tr> <td style="padding: 2px;">ENG SPEED</td> <td style="padding: 2px;">XXX rpm</td> </tr> <tr> <td style="padding: 2px;">COOLAN TEMP/S</td> <td style="padding: 2px;">XXX °C</td> </tr> <tr> <td style="padding: 2px;">B/FUEL SCHDL</td> <td style="padding: 2px;">XXX msec</td> </tr> <tr> <td style="padding: 2px;">PW/ST SIGNAL</td> <td style="padding: 2px;">OFF</td> </tr> <tr> <td style="padding: 2px;">VHCL SPEED SE</td> <td style="padding: 2px;">XXX km/h</td> </tr> </table>	DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	COOLAN TEMP/S	XXX °C	B/FUEL SCHDL	XXX msec	PW/ST SIGNAL	OFF	VHCL SPEED SE	XXX km/h
DATA MONITOR															
MONITOR	NO DTC														
ENG SPEED	XXX rpm														
COOLAN TEMP/S	XXX °C														
B/FUEL SCHDL	XXX msec														
PW/ST SIGNAL	OFF														
VHCL SPEED SE	XXX km/h														

SEF196Y

6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td colspan="2" style="text-align: center; padding: 2px;">PURG VOL CN/V P1444</td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 10px;">COMPLETED</td> </tr> </table>	PURG VOL CN/V P1444		COMPLETED	
PURG VOL CN/V P1444					
COMPLETED					

SEF237Y

④ WITH CONSULT-II

NIEC0593S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 5) Touch "START".
- 6) Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-599.

④ WITH GST

NIEC0593S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 20 seconds.
- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-599.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

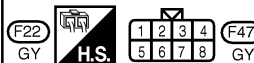
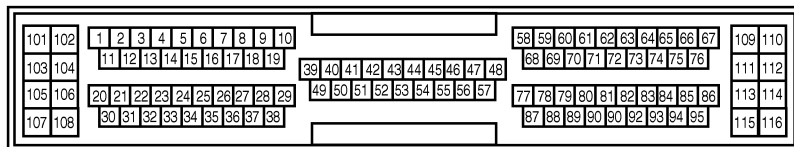
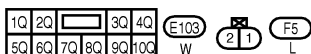
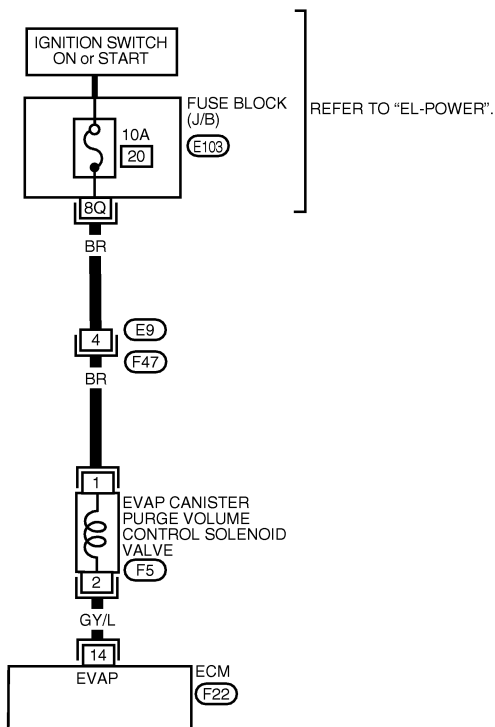
Wiring Diagram

Wiring Diagram

NIEC0594

EC-PGC/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC401

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	GY/L	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE (V)
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE (V)

SEF576Y

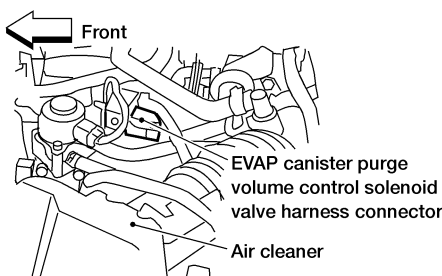
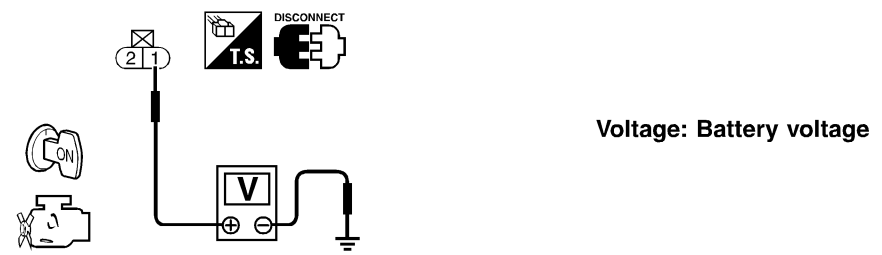
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0595

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>EVAP canister purge volume control solenoid valve harness connector Air cleaner</p> </div> <p style="text-align: right;">WEC254</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF948X</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-598. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

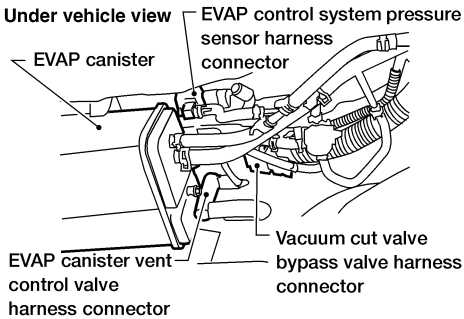
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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the harness for open or short between EVAP canister purge volume control solenoid valve and ECM.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
	
WEC255	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair it.

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector. 2. Check connectors for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

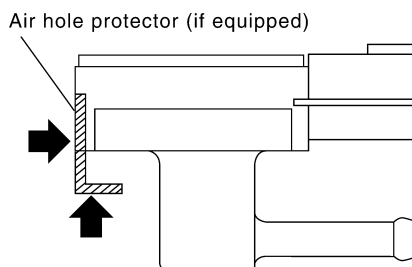
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7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

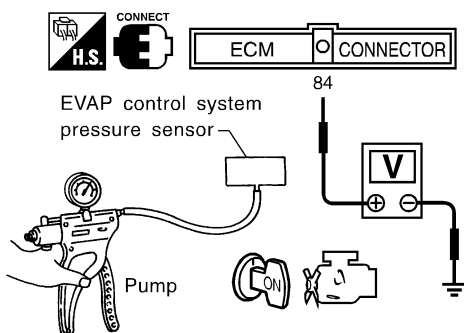
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

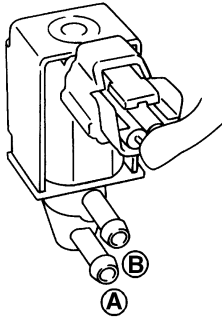
OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	Replace EVAP control system pressure sensor.

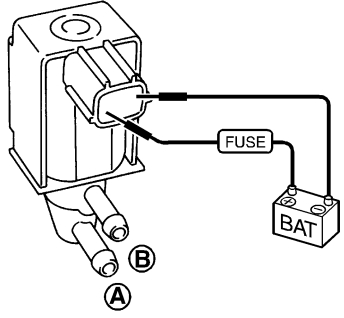
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect harness connectors disconnected. 3. Start engine. 4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>A/F ALPHA-B2</td><td>XX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>X. XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
A/F ALPHA-B2	XX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X. XX V																					
SEF677Y																						
OK or NG																						
OK	▶	GO TO 10.																				
NG	▶	GO TO 9.																				

9	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE							
<p>With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition PURG VOL CONT/V value</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>			Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B							
100.0%	Yes							
0.0%	No							
SEF334X								

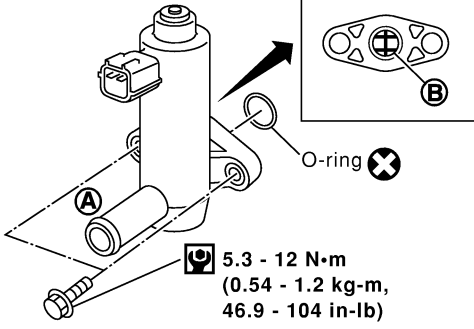
<p>Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>			Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B							
12V direct current supply between terminals 1 and 2	Yes							
No supply	No							
SEF335X								
OK or NG								
OK	▶	GO TO 10.						
NG	▶	Replace EVAP canister purge volume control solenoid valve.						

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Clean the rubber tube using an air blower.

11	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister vent control valve.

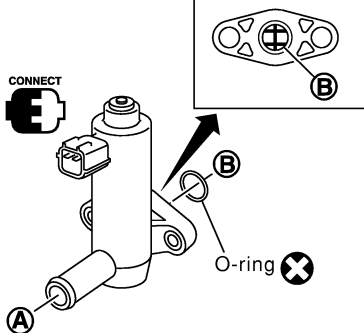
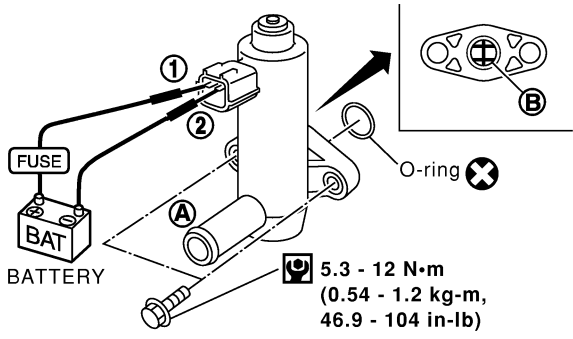
SEF376Z

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

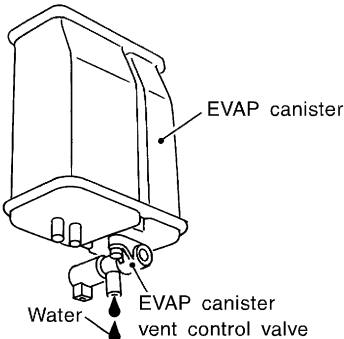
12	CHECK EVAP CANISTER VENT CONTROL VALVE-II																				
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																					
<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VENT CONTROL/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> </tbody> </table>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	XXX V		
ACTIVE TEST																					
VENT CONTROL/V	OFF																				
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VENT CONTROL/V OFF	Yes																				
SEF377Z																					
<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																					
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12V direct current supply between terminals 1 and 2	No																				
OFF	Yes																				
SEF378Z																					
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																					
OK	▶	GO TO 14.																			
NG	▶	GO TO 13.																			

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III		
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform procedure 10 again. 			
OK or NG			
OK	▶	GO TO 14.	
NG	▶	Replace EVAP canister vent control valve.	

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 15.
No	▶	GO TO 18.

GI

MA

EM

LC

EC

FE

CL

15	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

MT

AT

AX

16	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶		Repair hose or replace EVAP canister.

SU

BR

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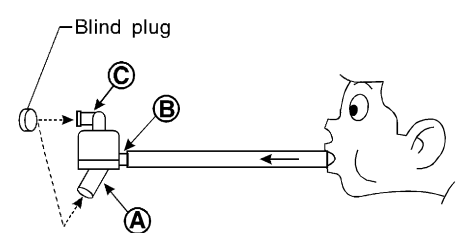
EL

IDX

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

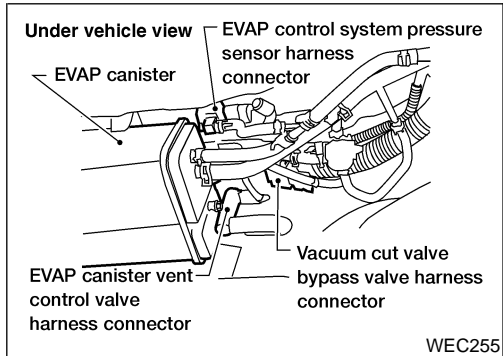
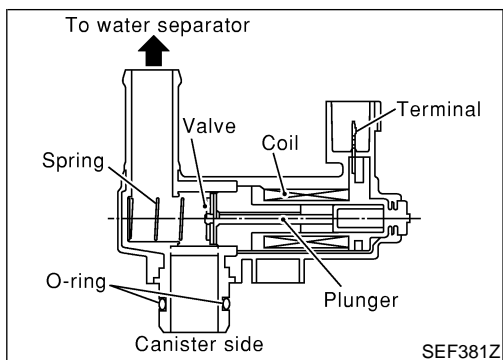
17	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: • Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0596

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak, Gross Leak, Very Small Leak)" diagnosis.

GI

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LC

EC

FE

CL

MT

AT

CONSULT-II Reference Value in Data Monitor Mode

NIEC0597

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

NIEC0598

Malfunction is detected when EVAP canister vent control valve remains closed under specified driving conditions.

ST

RS

BT

HA

Possible Cause

NIEC0599

- EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water

SC

EL

IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h
	THRTL POS SEN	XXX V
	B/FUEL SCHDL	XXX msec

SEF201Y

DTC Confirmation Procedure

NIEC0600

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-II

NIEC0600S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-610.

Ⓜ WITH GST

NIEC0600S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

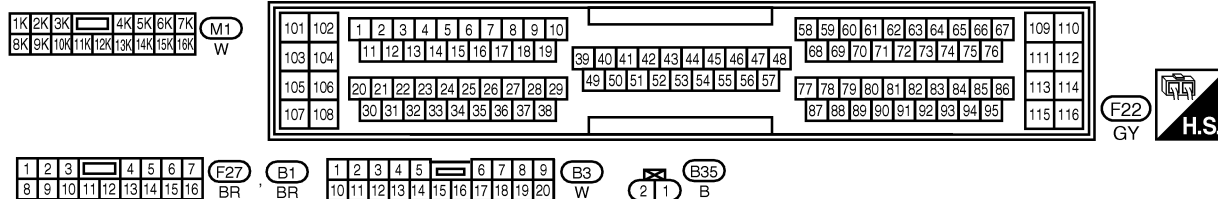
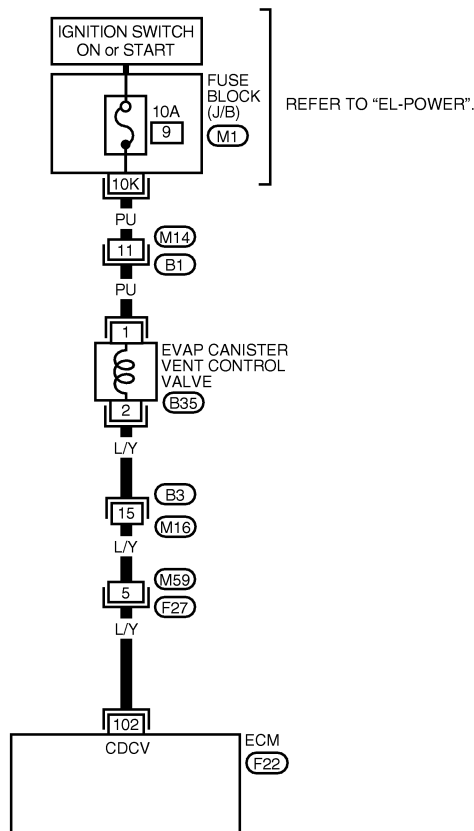
Wiring Diagram

Wiring Diagram

NIEC0601

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

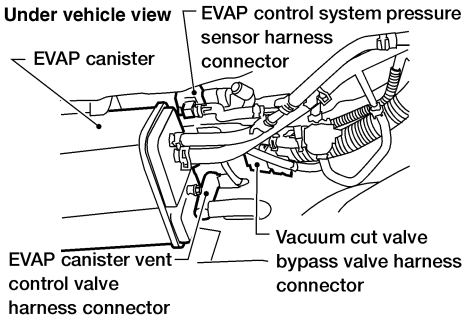
DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

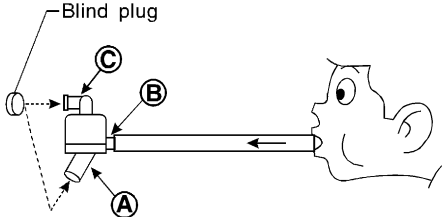
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0602

1	CHECK RUBBER TUBE	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. 		
		
WEC255		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
<ul style="list-style-type: none"> ● Do not disassemble water separator. 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Clean or replace water separator.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-I

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

**5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)**

OK or NG

OK	▶	GO TO 4.
NG	▶	Replace EVAP canister vent control valve.

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4 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

- Turn ignition switch ON.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	XXX V

**5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)**

Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

**5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)**

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

Make sure new O-ring is installed properly.

OK or NG

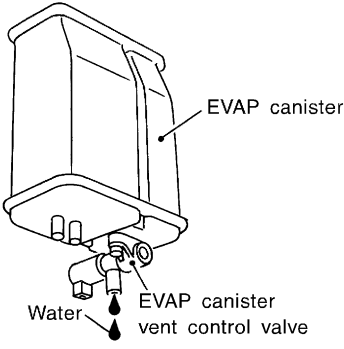
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace EVAP canister vent control valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 7.
No	▶	GO TO 9.

7	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶ Repair hose or replace EVAP canister.		

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair it.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;"> </div>		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

WEC255

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DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace EVAP control system pressure sensor.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

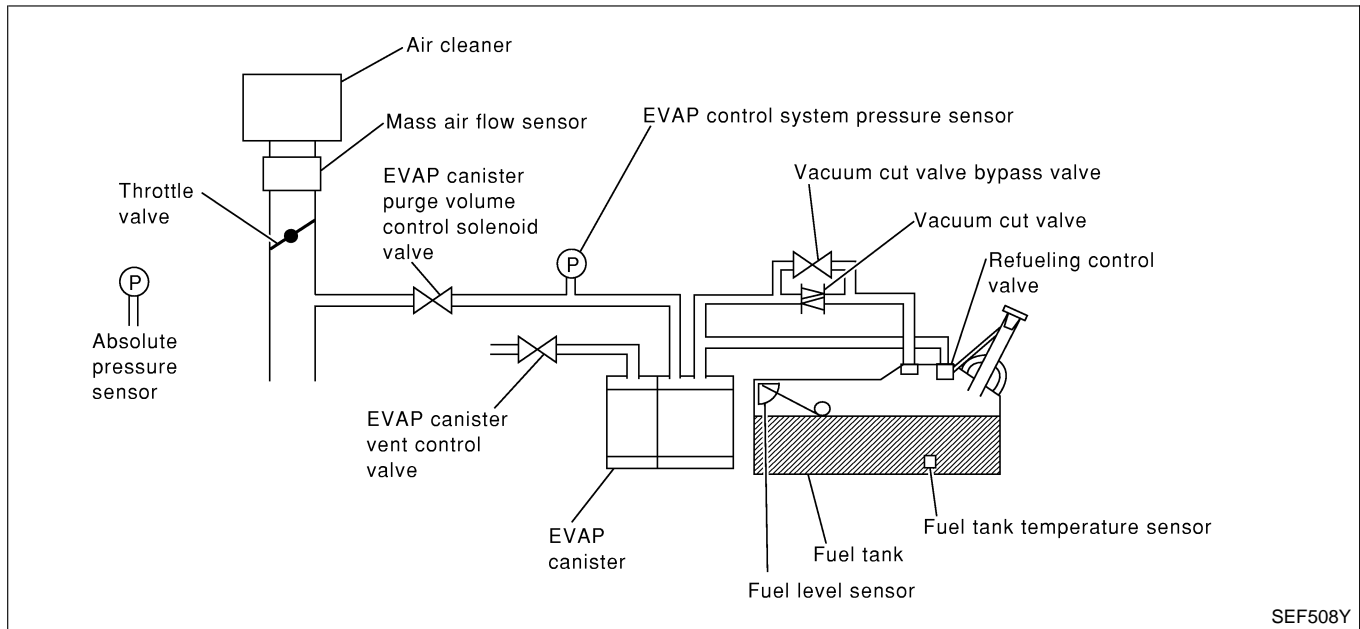
System Description

System Description

NIEC0603

NOTE:

If DTC P1447 is displayed with P0510, perform trouble diagnosis for DTC P0510 first. (See EC-461.)



SEF508Y

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

NIEC0604

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Malfunction is detected when EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.

Possible Cause

NIEC0605

- EVAP canister purge volume control solenoid valve stuck closed
- EVAP control system pressure sensor and the circuit
- Loose, disconnected or improper connection of rubber tube
- Blocked rubber tube
- Cracked EVAP canister
- EVAP canister purge volume control solenoid valve circuit
- Closed throttle position switch
- Blocked purge port

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Possible Cause (Cont'd)

- EVAP canister vent control valve

5	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	CLSD THL/P SW	ON

SEF197Y

6	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h
	THRTL POS SEN	XXX V

SEF198Y

6	PURG FLOW P1447
	COMPLETED

SEF238Y

DTC Confirmation Procedure

NIEC0606

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or more.

WITH CONSULT-II

NIEC0606S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 70 seconds.
- 4) Select "PURG FLOW P1447" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
- 5) Touch "START".
If "COMPLETED" is displayed, go to step 7.
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 6.2 msec
Engine coolant temperature	More than 70°C (158°F)

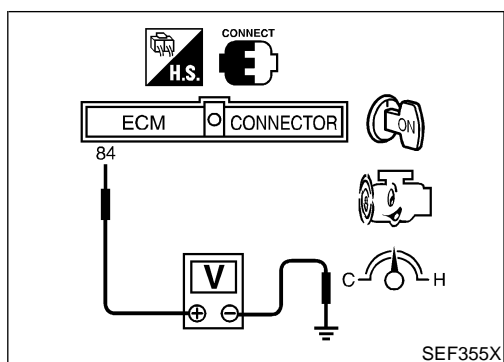
If "TESTING" is not changed for a long time, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-618.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

- 1) Lift up drive wheels.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Start engine and wait at least 70 seconds.
- 5) Set voltmeter probes to ECM terminals 84 (EVAP control system pressure sensor signal) and ground.
- 6) Check EVAP control system pressure sensor value at idle speed and note it.
- 7) Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Steering wheel	Fully turned
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"

- 8) Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
- 9) If NG, go to "Diagnostic Procedure", EC-618.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

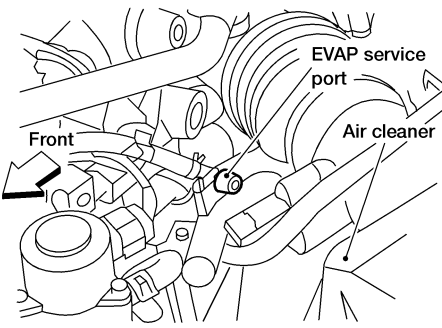
QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC0608

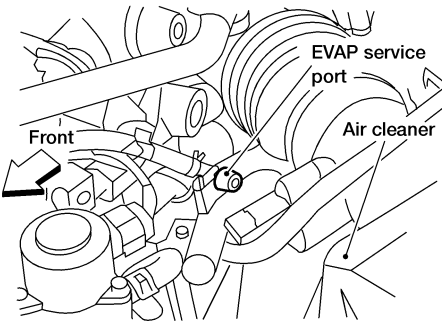
1	CHECK EVAP CANISTER	
1. Turn ignition switch "OFF". 2. Check EVAP canister for cracks.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 2.
OK (Without CONSULT-II)	▶	GO TO 3.
NG	▶	Replace EVAP canister.

2	CHECK PURGE FLOW																											
(P) With CONSULT-II 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.																												
																												
LEC256																												
2. Start engine and let it idle. 3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 4. Rev engine up to 2,000 rpm. 5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.																												
<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr><th colspan="2">ACTIVE TEST</th></tr> </thead> <tbody> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr><th>PURG VOL CONT/V</th><th>VACUUM</th></tr> </thead> <tbody> <tr><td>100.0%</td><td>Should exist</td></tr> <tr><td>0.0%</td><td>Should not exist</td></tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	LEAN	THRTL POS SEN	XXX V							PURG VOL CONT/V	VACUUM	100.0%	Should exist	0.0%	Should not exist
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PURG VOL CONT/V	VACUUM																											
100.0%	Should exist																											
0.0%	Should not exist																											
SEF691Y																												
OK or NG																												
OK	▶	GO TO 7.																										
NG	▶	GO TO 4.																										

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK PURGE FLOW	<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. <div style="text-align: center; margin: 20px 0;">  </div> <ol style="list-style-type: none"> 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum gauge indication when revving engine up to 2,000 rpm. Vacuum should exist. 6. Release the accelerator pedal fully and let idle. Vacuum should not exist. <p style="text-align: right; margin-right: 50px;">LEC256</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>	OK	▶	GO TO 7.	NG	▶	GO TO 4.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 7.							
NG	▶	GO TO 4.							

4	CHECK EVAP PURGE LINE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check EVAP purge line for improper connection or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair it.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair it.	<p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 5.							
NG	▶	Repair it.							

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)


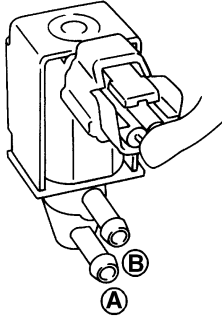

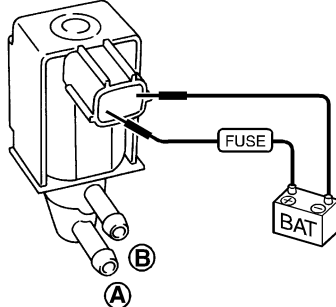
5	CHECK EVAP PURGE HOSE AND PURGE PORT
<p>1. Disconnect purge hoses connected to EVAP service port A and EVAP canister purge volume control solenoid valve B.</p>	
<p>2. Blow air into each hose and EVAP purge port C.</p> <p>3. Check that air flows freely.</p>	
SEF367U	
OK or NG	
OK (With CONSULT-II) ▶	GO TO 6.
OK (Without CONSULT-II) ▶	GO TO 7.
NG ▶	Repair or clean hoses and/or purge port.

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XX %</td> </tr> <tr> <td>A/F ALPHA-B2</td> <td>XX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	A/F ALPHA-B2	XX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X. XX V		
ACTIVE TEST																					
PURG VOL CONT/V	XXX %																				
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HO2S1 MNTR (B1)	LEAN																				
HO2S1 MNTR (B2)	LEAN																				
THRTL POS SEN	X. XX V																				
SEF677Y																					
OK or NG																					
OK ▶	GO TO 8.																				
NG ▶	GO TO 7.																				

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
<p> With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF334X		
<p> Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF335X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Repair it.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;"> </div>		
WEC255		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
<p>Refer to "DTC Confirmation Procedure" for DTC P0450, EC-414.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

11	CHECK RUBBER TUBE FOR CLOGGING	
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG	▶	Clean the rubber tube using an air blower.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="text-align: center;"> </div>		
SEF376Z		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

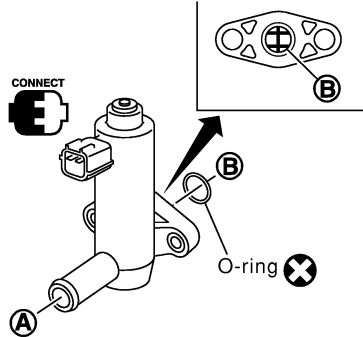
Diagnostic Procedure (Cont'd)

13 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	XXX V



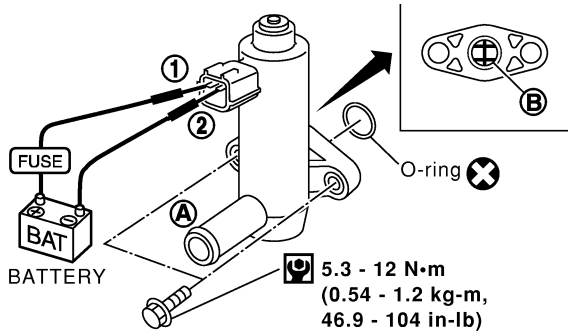
Condition	Air passage continuity between A and B
VENT CONTROL/V	
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF377Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	GO TO 14.

14 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 13 again.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

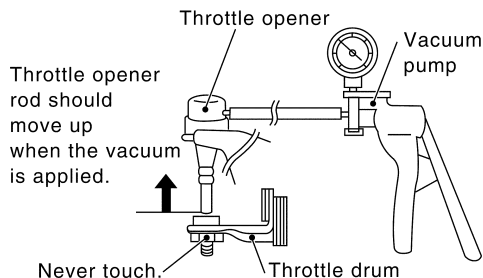
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

15 CHECK THROTTLE POSITION SWITCH

With CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Turn ignition switch "ON".
8. Select "DATA MONITOR" mode with CONSULT-II.
9. Check indication of "CLSD THL/P SW" under the following conditions.
Measurement must be made with throttle position switch installed in vehicle.

Throttle valve conditions	CLSD THL/P SW
Completely closed	ON
Partially open or completely open	OFF

MTBL0355

OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 17.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

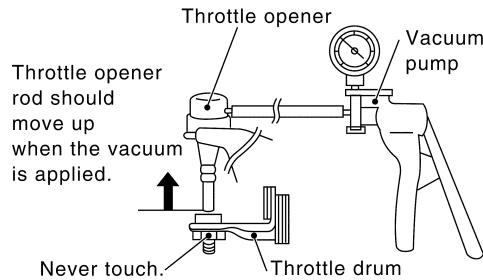
Diagnostic Procedure (Cont'd)

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16 CHECK THROTTLE POSITION SWITCH

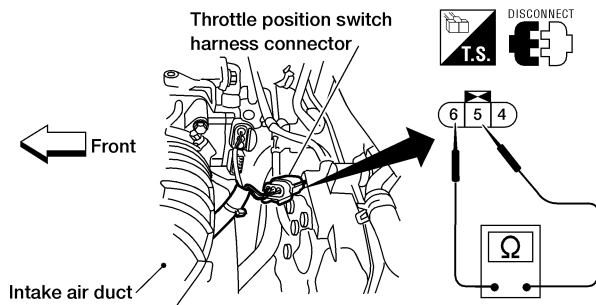
⊗ Without CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Disconnect closed throttle position switch harness connector.
8. Check continuity between closed throttle position switch terminals 5 and 6 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve condition	Continuity
Completely closed	Yes
Partially open	No
Completely open	No

LEC337

OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 17.

17 ADJUST THROTTLE POSITION SWITCH

Check the following items. Refer to "Basic Inspection", EC-127.

Items	Specifications
Ignition timing	9°±2° BTDC
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF
Target idle speed	M/T: 650±50 rpm A/T: 800±50 rpm (in "P" or "N" position)

MTBL0440

Is it possible to adjust closed throttle position switch?

Yes or No

Yes	▶	GO TO 18.
No	▶	Replace throttle position switch.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

18	CHECK EVAP PURGE LINE
Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-53.	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace it.

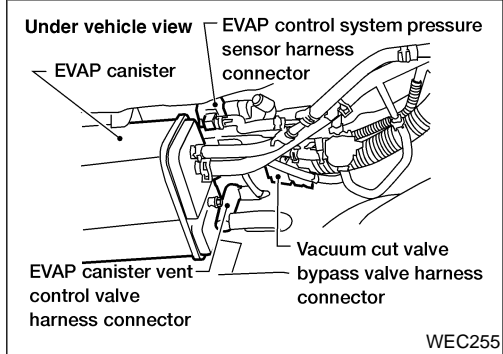
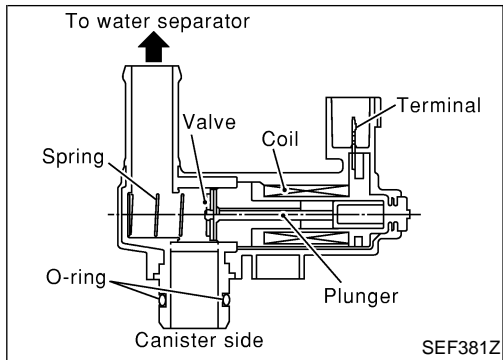
19	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 20.

20	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0609

NOTE:

If DTC P1448 is displayed with P0440, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

GI

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CONSULT-II Reference Value in Data Monitor Mode

NIEC0610

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

NIEC0611

Malfunction is detected when EVAP canister vent control valve remains opened under specified driving conditions.

ST

RS

BT

HA

Possible Cause

NIEC0612

- EVAP canister vent control valve
- EVAP control system pressure sensor and circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water
- Vacuum cut valve

SC

EL

IDX

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC0613

NOTE:

- If DTC P1448 is displayed with P0440 or P1440, perform trouble diagnosis for DTC P1448 first.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
 -FUEL LEVEL: 1/4-3/4
 -AMBIENT TEMP: 0-30 C(32-86F)
 -OPEN ENGINE HOOD.
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
 3)TOUCH START.

SEF565X

EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING
AT IDLE SPEED.

SEF566X

EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

ACTIVE TEST

VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

CONNECT

SEF379Z

WITH CONSULT-II

NIEC0613S01

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting following procedure.
 - 1) Turn ignition switch “ON”.
 - 2) Turn ignition switch “OFF” and wait at least 10 seconds.
 - 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
 - 4) Make sure that the following conditions are met.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- 5) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-127.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, go to the following step.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- 7) Stop engine and wait at least 5 seconds, then turn “ON”.
- 8) Disconnect hose from water separator.
- 9) Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10) Touch “ON” and “OFF” alternately.

- 11) Make sure the following.

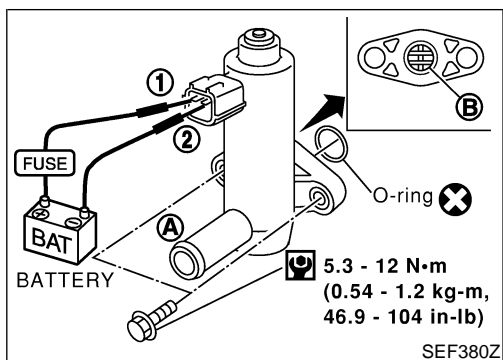
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to “Diagnostic Procedure”, EC-631.
If the result is OK, go to “Diagnostic Procedure” for DTC P0440, EC-387.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

- 1) Disconnect hose from water separator.
- 2) Disconnect EVAP canister vent control valve harness connector.
- 3) Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to "Diagnostic Procedure", EC-631.
If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-387.

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DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

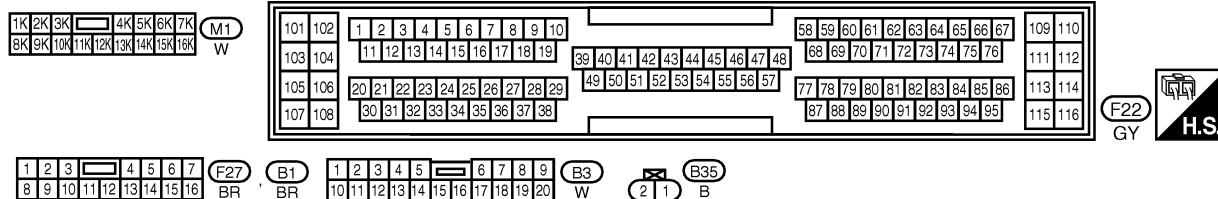
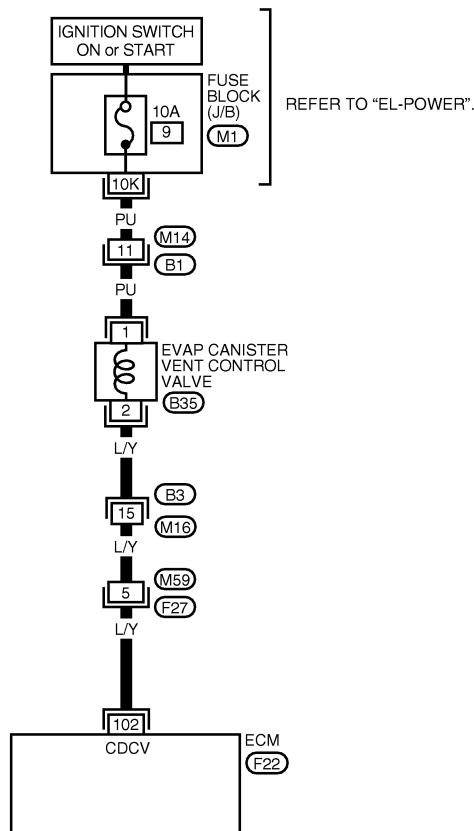
Wiring Diagram

Wiring Diagram

NIEC0615

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF204ZA

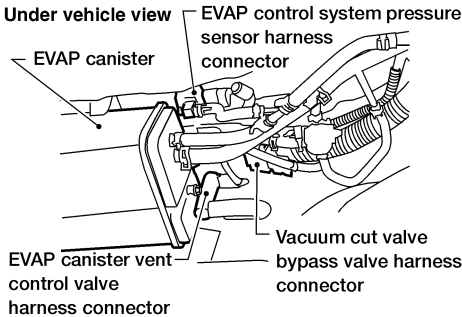
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0616

1	CHECK RUBBER TUBE		
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. 	
			WEC255
		OK or NG	
	OK	▶	GO TO 2.
	NG	▶	Clean rubber tube using an air blower.

GI

MA

EM

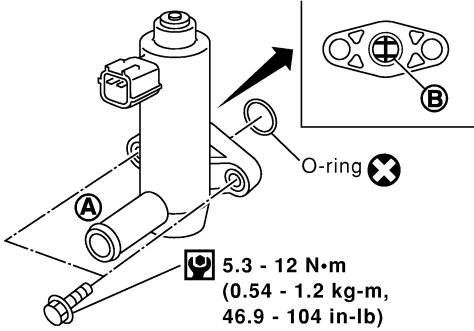
LC

EC

FE

CL

MT

2	CHECK EVAP CANISTER VENT CONTROL VALVE-I		
		<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. 	
			SEF376Z
		OK or NG	
	OK	▶	GO TO 3.
	NG	▶	Replace EVAP canister vent control valve.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

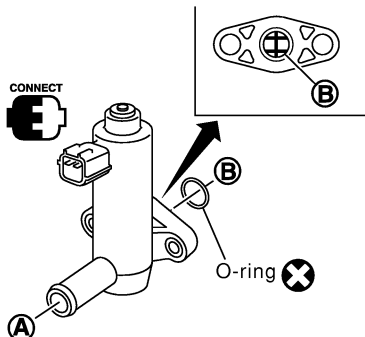
Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-II

Ⓜ With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	XXX V



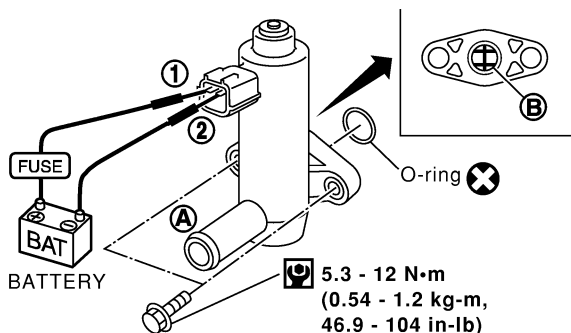
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF377Z

ⓧ Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 5.
NG	▶	GO TO 4.

4 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 3 again.

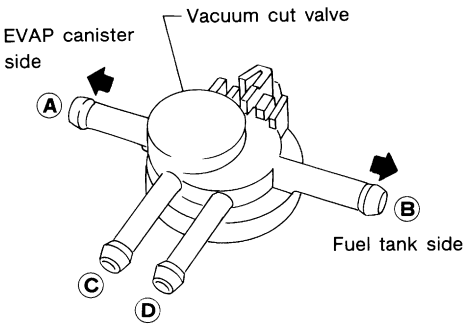
OK or NG

OK	▶	GO TO 5.
NG	▶	Replace EVAP canister vent control valve.

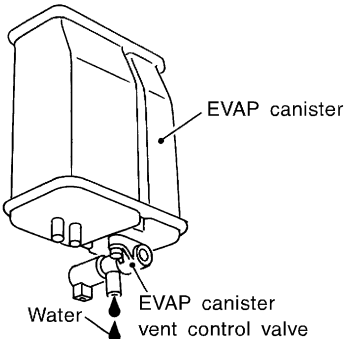
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE	<p>1. Turn ignition switch OFF. 2. Remove vacuum cut valve. 3. Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div> <p>a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace vacuum cut valve.	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA SC EL IDX
OK	▶	GO TO 6.							
NG	▶	Replace vacuum cut valve.							

SEF379Q

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 9.</td> </tr> </table>	Yes	▶	GO TO 7.	No	▶	GO TO 9.	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA SC EL IDX
Yes	▶	GO TO 7.							
No	▶	GO TO 9.							

SEF596U

7	CHECK EVAP CANISTER	<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 9.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 8.</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	GO TO 8.	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA SC EL IDX
OK	▶	GO TO 9.							
NG	▶	GO TO 8.							

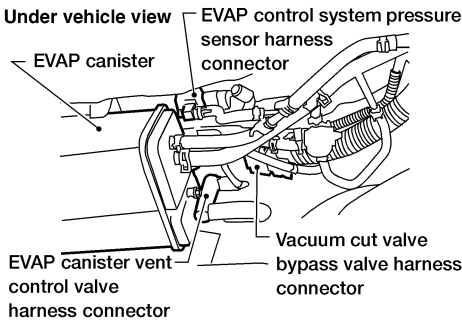
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 	
▶	Repair hose or replace EVAP canister.

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Repair it.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector.	
 <p style="text-align: center;">Under vehicle view</p> <p style="text-align: center;">EVAP control system pressure sensor harness connector</p> <p style="text-align: center;">EVAP canister</p> <p style="text-align: center;">EVAP canister vent control valve harness connector</p> <p style="text-align: center;">Vacuum cut valve bypass valve harness connector</p>	
2. Check connectors for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace EVAP control system pressure sensor.

WEC255

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

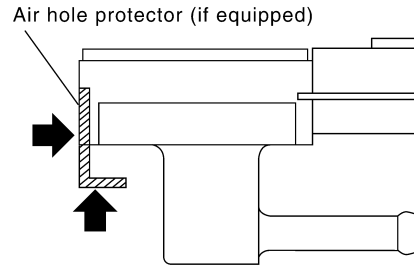
GI
MA
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BR
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RS
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IDX

11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

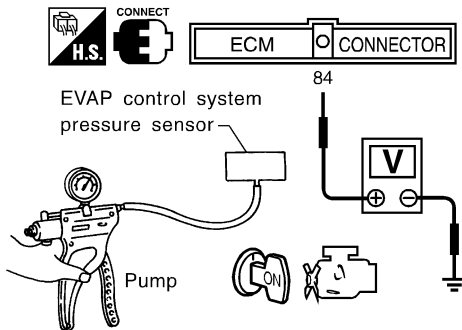
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12 CHECK INTERMITTENT INCIDENT

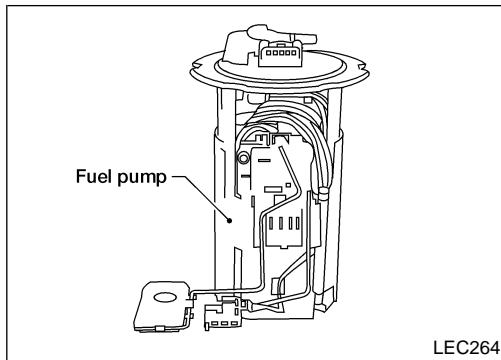
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.

▶ **INSPECTION END**

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0617} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor. ^{NIEC0618}

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction. Malfunction is detected when a high voltage from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.) ^{NIEC0619}

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC0620}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓜ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC0620S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-638.

Ⓜ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC0620S02}

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

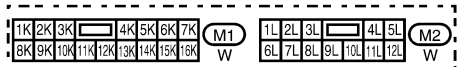
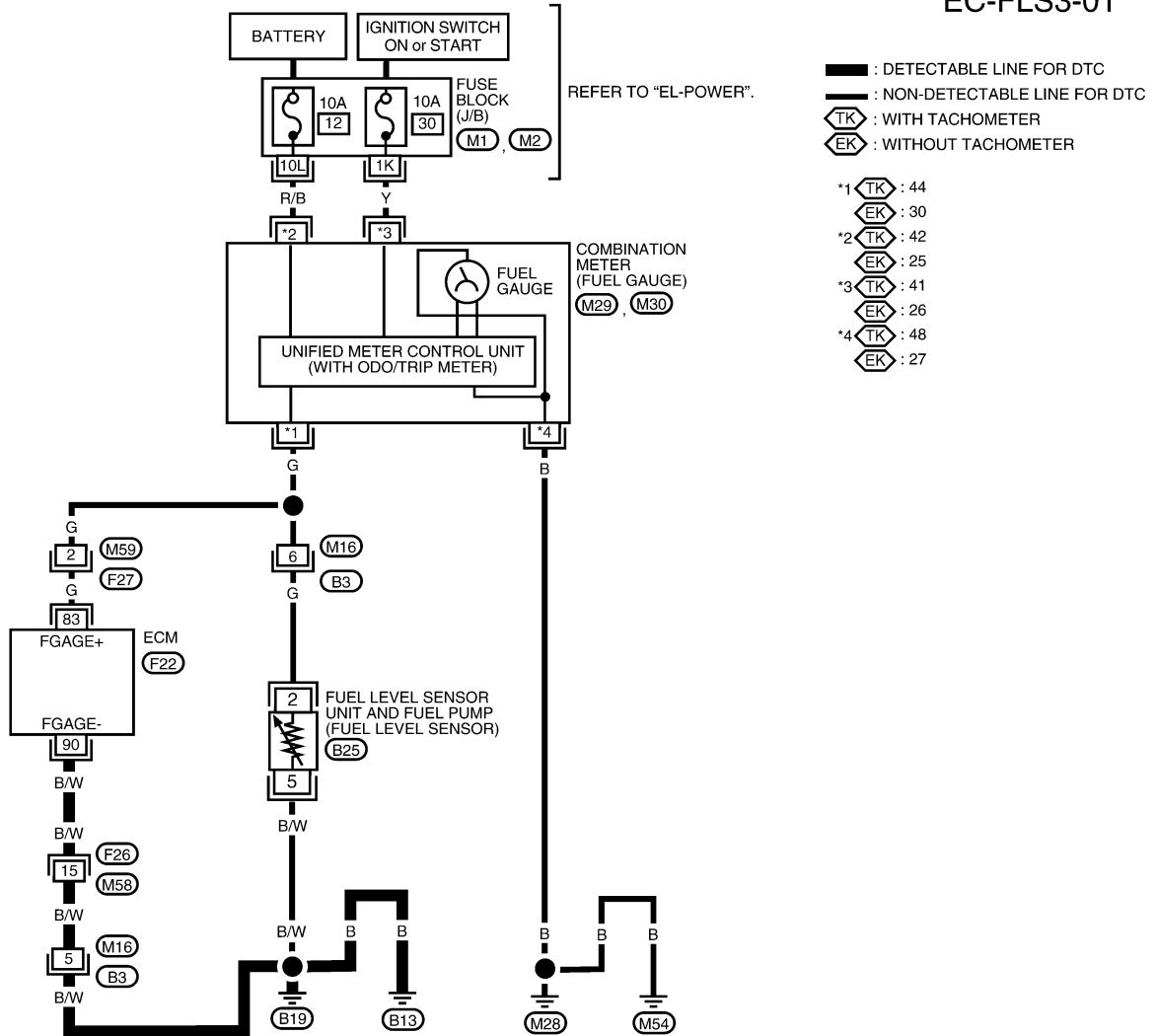
QG18DE (EXC CALIF CA)

Wiring Diagram

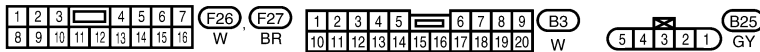
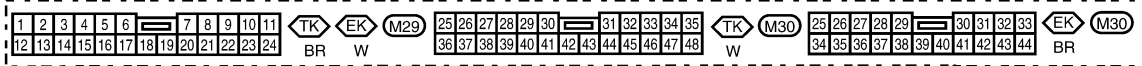
Wiring Diagram

NIEC0621

EC-FLS3-01



REFER TO THE FOLLOWING.
F22 - ELECTRICAL UNITS



WEC142A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC0622

1	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 90 and body ground. Refer to "Wiring Diagram", EC-637. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
1. Check the following. <ul style="list-style-type: none">● Harness connectors F26, M58● Harness connectors M16, B3● Harness for open and short between ECM and body ground	
	▶ Replace open circuit or short to power in harness or connectors.

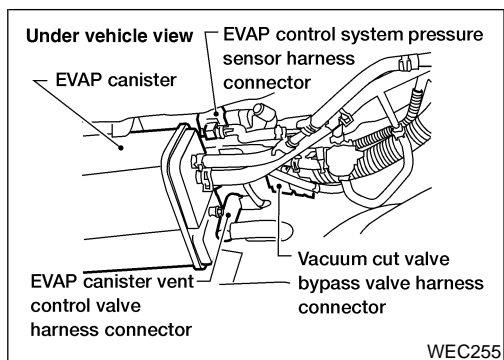
3	CHECK FUEL LEVEL SENSOR
Refer to EL-102 , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Replace fuel level sensor unit.

4	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167	
OK or NG	
	▶ INSPECTION END

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Description



Description

=NIEC0623

COMPONENT DESCRIPTION

NIEC0623S01

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis. The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0624

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

NIEC0625

Malfunction is detected when an improper voltage signal is sent to ECM through vacuum cut valve bypass valve.

Possible Cause

NIEC0626

- Harness or connectors
(The vacuum cut valve bypass valve circuit is open or shorted.)
- Vacuum cut valve bypass valve

DTC Confirmation Procedure

NIEC0627

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC0627S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-642.

WITH GST

NIEC0627S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

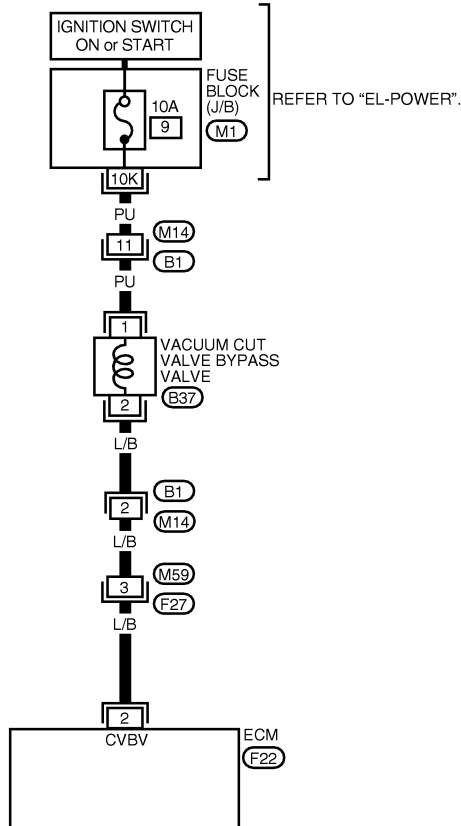
Wiring Diagram

Wiring Diagram

=NIEC0628

EC-BYPS/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

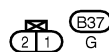
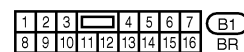
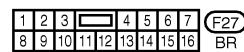
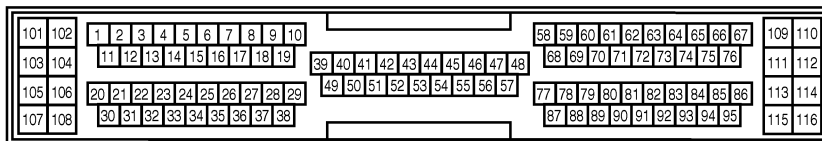
ST

RS

BT

LEC211

HA



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
2	L/B	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

EL

IDX

SEF585Y

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC0629

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

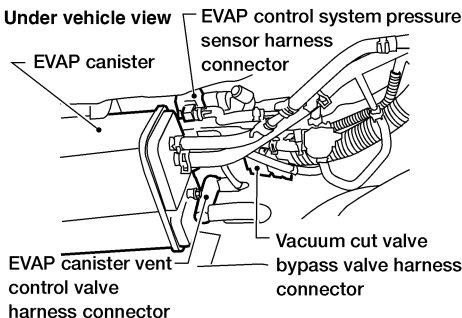
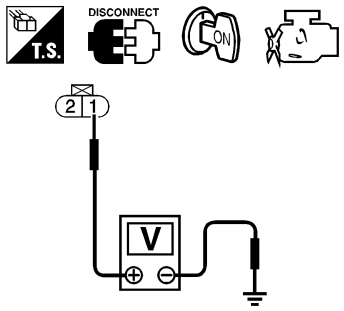
2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and then "ON". 2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON/OFF" on CONSULT-II screen. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>VC/V BYPASS/V</td><td>OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA- B1</td><td>XXX %</td></tr> <tr><td>A/F ALPHA- B2</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>HO2S1 MNTR (B2)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>X.XX V</td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA- B1	XXX %	A/F ALPHA- B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X.XX V		
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA- B1	XXX %																					
A/F ALPHA- B2	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
HO2S1 MNTR (B2)	LEAN																					
THRTL POS SEN	X.XX V																					
<p>4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.</p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

SEF694Y

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect vacuum cut valve bypass valve harness connector.</p> <div style="text-align: center;">  <p style="font-size: small;">Under vehicle view</p> <p style="font-size: small;">EVAP control system pressure sensor harness connector</p> <p style="font-size: small;">EVAP canister</p> <p style="font-size: small;">EVAP canister vent control valve harness connector</p> <p style="font-size: small;">Vacuum cut valve bypass valve harness connector</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="font-size: small;">DISCONNECT</p> <p style="font-size: small;">T.S.</p> <p style="font-size: small;">ON</p> <p style="font-size: small;">Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>	<p>WEC255</p> <p>SEF356X</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 5.		
NG	▶	GO TO 4.		

4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between vacuum cut valve bypass valve and fuse <p style="text-align: right;">▶ Repair harness or connectors.</p>		<p>BR</p> <p>ST</p> <p>RS</p>
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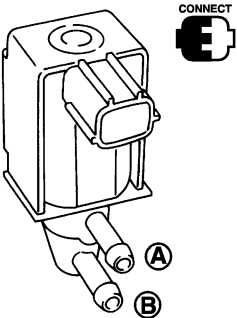
5	CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 2 and vacuum cut valve bypass valve terminal 2. Refer to "Wiring Diagram", EC-641.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 7.		
NG	▶	GO TO 6.		

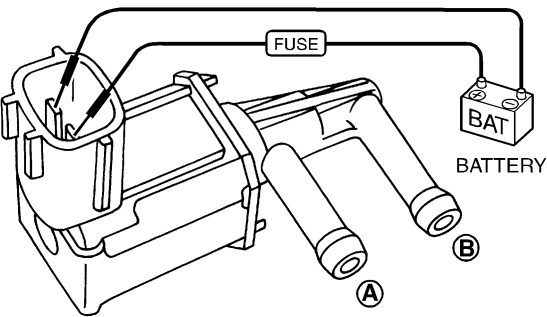
DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M57, F27 ● Harness for open or short between vacuum cut valve bypass valve and ECM 	
	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK VACUUM CUT VALVE BYPASS VALVE																										
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time under the following conditions. 																											
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VC/V BYPASS/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B2</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B2)</td> <td style="text-align: center;">LEAN</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">X.XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Condition VC/V BYPASS/V</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F ALPHA-B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X.XX V			Condition VC/V BYPASS/V	Air passage continuity between A and B	ON	Yes	OFF	No
ACTIVE TEST																											
VC/V BYPASS/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
A/F ALPHA-B2	XXX %																										
HO2S1 MNTR (B1)	LEAN																										
HO2S1 MNTR (B2)	LEAN																										
THRTL POS SEN	X.XX V																										
Condition VC/V BYPASS/V	Air passage continuity between A and B																										
ON	Yes																										
OFF	No																										
SEF641Y																											

<p> Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
OK or NG							
SEF358X							

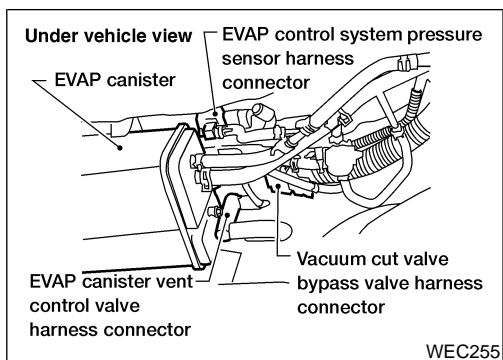
OK		GO TO 8.
NG		Replace vacuum cut valve bypass valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	INSPECTION END

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Description



WEC255

Description

COMPONENT DESCRIPTION

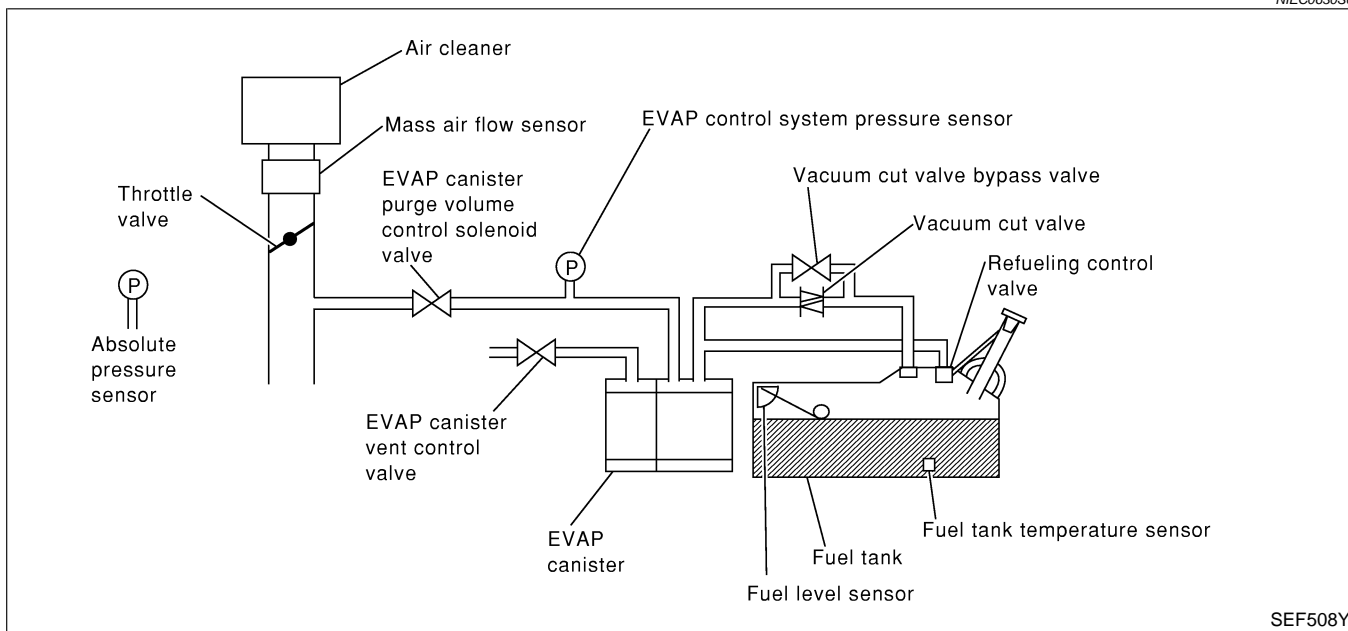
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM



SEF508Y

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC0631

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

Malfunction is detected when vacuum cut valve bypass valve does not operate properly.

NIEC0632

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Possible Cause

Possible Cause

NIEC0633

- Vacuum cut valve bypass valve
- Vacuum cut valve
- Bypass hoses for clogging
- EVAP control system pressure sensor and circuit
- EVAP canister vent control valve
- Hose between fuel tank and vacuum cut valve clogged
- Hose between vacuum cut valve and EVAP canister clogged
- EVAP canister
- EVAP purge port of fuel tank for clogging

7	VC CUT/V BP/V P1491	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	VHCL SPEED SE	XXX km/h

SEF748Y

DTC Confirmation Procedure

NIEC0634

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or higher.

7	VC CUT/V BP/V P1491	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	VHCL SPEED SE	XXX km/h

SEF749Y

WITH CONSULT-II

NIEC0634S01

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 30 seconds.)

7	VC CUT/V BP/V P1491	
	COMPLETED	

SEF239Y

ENG SPEED	1,000 - 3,800 rpm
Selector lever	Suitable position
Vehicle speed	36 - 120 km/h (22 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.2 msec

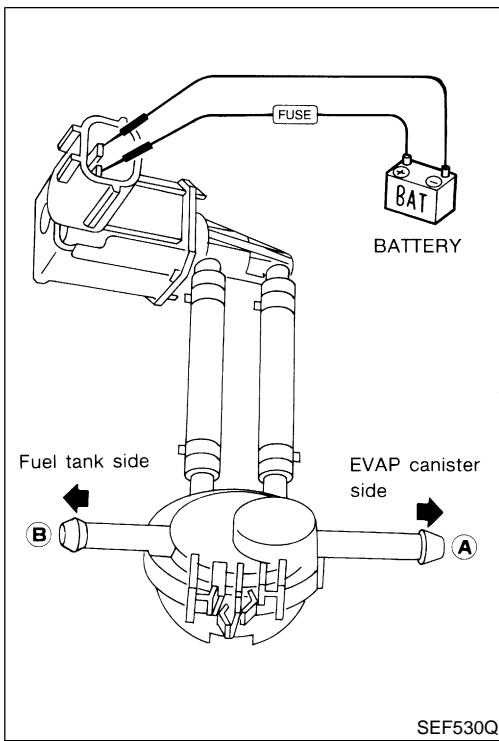
If "TESTING" is not displayed after 5 minutes, retry from step 3.

- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-647.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Overall Function Check



Overall Function Check

NIEC0635

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

WITH GST

NIEC0635S01

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 2) Apply vacuum to port **A** and check that there is no suction from port **B**.
- 3) Apply vacuum to port **B** and check that there is suction from port **A**.
- 4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
- 5) Supply battery voltage to the terminal.
- 6) Blow air in port **A** and check that air flows freely out of port **B**.
- 7) Blow air in port **B** and check that air flows freely out of port **A**.
- 8) If NG, go to "Diagnostic Procedure", EC-647.

Diagnostic Procedure

NIEC0637

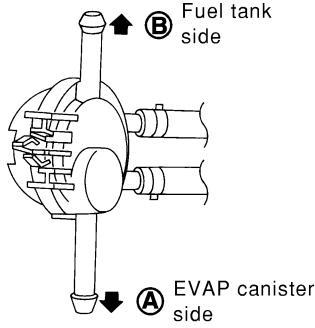
1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

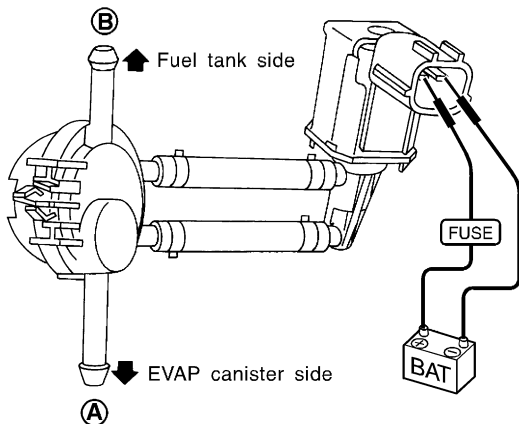
GI
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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION																				
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Turn ignition switch "ON". 7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON". 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 																					
																					
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA- B1</td> <td>XXX %</td> </tr> <tr> <td>A/F ALPHA- B2</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>HO2S1 MNTR (B2)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X.XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA- B1	XXX %	A/F ALPHA- B2	XXX %	HO2S1 MNTR (B1)	LEAN	HO2S1 MNTR (B2)	LEAN	THRTL POS SEN	X.XX V		
ACTIVE TEST																					
VC/V BYPASS/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA- B1	XXX %																				
A/F ALPHA- B2	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
HO2S1 MNTR (B2)	LEAN																				
THRTL POS SEN	X.XX V																				
SEF695Y																					
OK or NG																					
OK	▶ GO TO 4.																				
NG	▶ GO TO 5.																				

3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Disconnect vacuum cut valve bypass valve harness connector. 7. Supply battery voltage to the terminal. 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 	
	
SEF914U	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 7.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK EVAP PURGE LINE	
Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair it.

GI

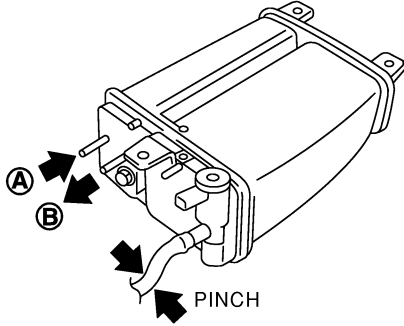
MA

EM

5	CHECK EVAP PURGE PORT	
Check EVAP purge port of fuel tank for clogging.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Clean EVAP purge port.

LC

EC

6	CHECK EVAP CANISTER	
<ol style="list-style-type: none"> 1. Pinch the fresh air hose. 2. Blow air into port A and check that it flows freely out of port B. 		
		
SEF494Y		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister.

FE

CL

MT

AT

AX

SU

BR

7	CHECK BYPASS HOSE	
Check bypass hoses for clogging.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace hoses.

ST

RS

BT

HA

SC

EL

IDX

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

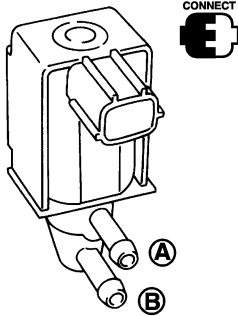
QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

8 CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	X.XX V

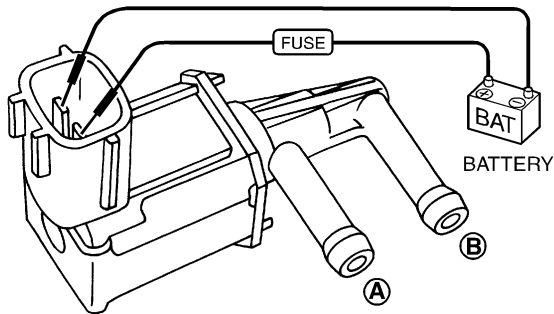
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

**Operation takes less
than 1 second.**

SEF641Y

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

**Operation takes less
than 1 second.**

SEF358X

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace vacuum cut valve bypass valve.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK VACUUM CUT VALVE	<p>Check vacuum cut valve as follows:</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF379Q</p> <ol style="list-style-type: none"> a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 10.	NG	▶	Replace vacuum cut valve.	GI MA EM LC EC FE CL MT AT
OK	▶	GO TO 10.							
NG	▶	Replace vacuum cut valve.							

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 11.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair or replace.</td> </tr> </table>	OK	▶	GO TO 11.	NG	▶	Repair or replace.	AX SU BR
OK	▶	GO TO 11.							
NG	▶	Repair or replace.							

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	<ol style="list-style-type: none"> 1. Disconnect EVAP control system pressure sensor harness connector. <div style="text-align: center;"> </div> <p style="text-align: right;">WEC255</p> <ol style="list-style-type: none"> 2. Check connectors for water. Water should not exist. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 12.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace EVAP control system pressure sensor.</td> </tr> </table>	OK	▶	GO TO 12.	NG	▶	Replace EVAP control system pressure sensor.	ST RS BT HA SC EL IDX
OK	▶	GO TO 12.							
NG	▶	Replace EVAP control system pressure sensor.							

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

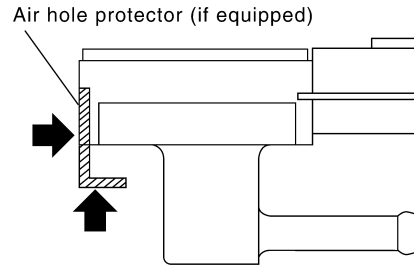
Diagnostic Procedure (Cont'd)

12 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

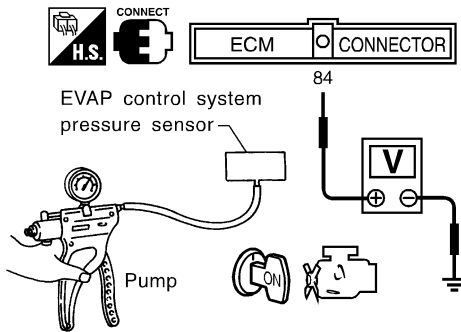
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 13.
NG	▶	Replace EVAP control system pressure sensor.

13 CHECK RUBBER TUBE FOR CLOGGING

1. Disconnect rubber tube connected to EVAP canister vent control valve.

2. Check the rubber tube for clogging.

OK or NG

OK	▶	GO TO 14.
NG	▶	Clean the rubber tube using an air blower.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

14 CHECK EVAP CANISTER VENT CONTROL VALVE-I

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

**5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)**

OK or NG

OK	▶	GO TO 15.
NG	▶	Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC

15 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

- Reconnect harness disconnected connectors.
- Turn ignition switch ON.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F ALPHA-B2	XXX %
HO2S1 MNTR (B1)	LEAN
HO2S1 MNTR (B2)	LEAN
THRTL POS SEN	XXX V

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

**5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)**

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 17.
NG	▶	GO TO 16.

FE
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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

System Description

NIEC0418

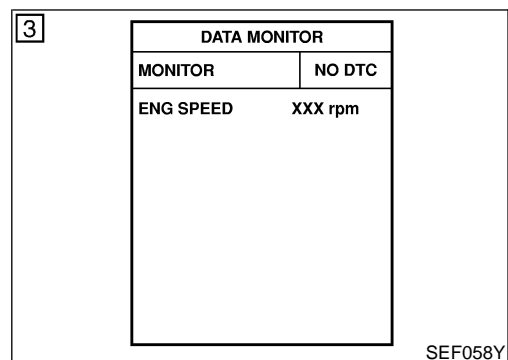
The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from TCM (Transmission control module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM (Transmission Control Module) but also ECM after the A/T related repair.

On Board Diagnosis Logic

NIEC0420

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1605	<ul style="list-style-type: none"> ● An incorrect signal from TCM (Transmission control module) is sent to ECM. 	<ul style="list-style-type: none"> ● Harness or connectors [The communication line circuit between ECM and TCM (Transmission Control Module) is open or shorted.] ● Dead (Weak) battery ● TCM (Transmission Control Module)

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DTC Confirmation Procedure

NIEC0421

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that the battery voltage is more than 10.5V with the ignition switch "ON".

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-657.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

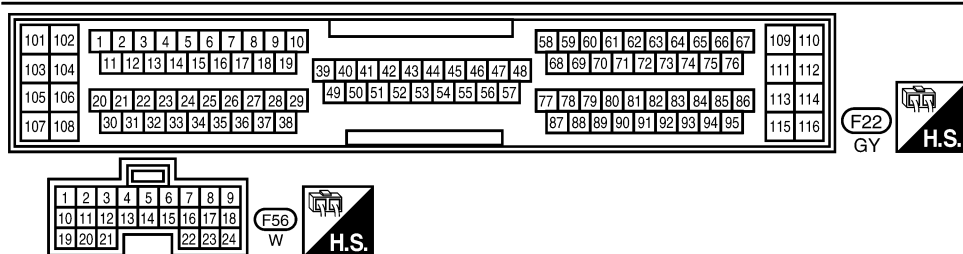
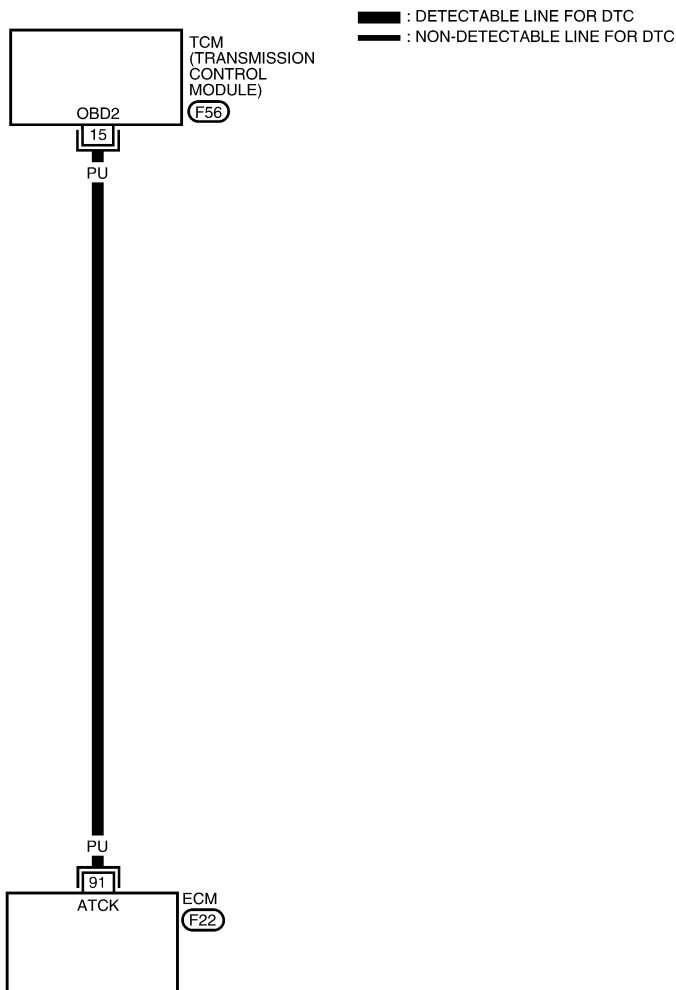
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1191

EC-ATDIAG-01



WEC598

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

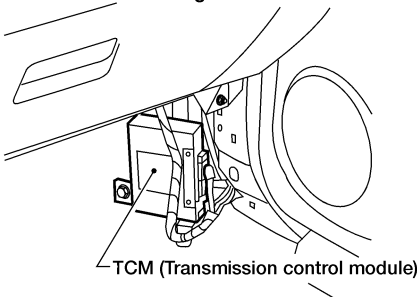
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	PU	A/T CHECK SIGNAL	IGN ON	0 - APPROX. 5V

SEF586Y

Diagnostic Procedure

NIEC1192

1	CHECK INPUT SIGNAL CIRCUIT	
	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and TCM harness connector.</p> <div style="text-align: center;"> <p>View with dash side lower garnish RH removed</p>  <p>TCM (Transmission control module)</p> </div> <p style="text-align: right;">LEC306</p> <p>3. Check harness continuity between ECM terminal 91 and TCM terminal 15. Refer to "Wiring Diagram", EC-1892. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 2.
	NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.
2	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶	INSPECTION END

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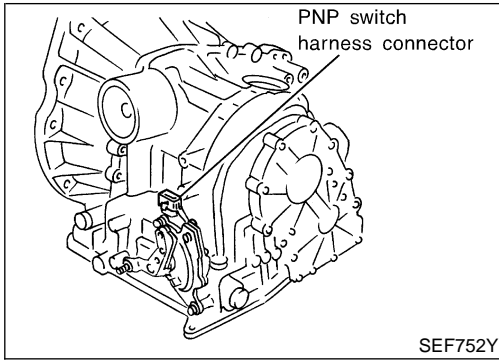
EL

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DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (EXC CALIF CA)

Component Description



Component Description

When the gear position is "P" (A/T models only) or "N", park/neutral position (PNP) switch is "ON".
ECM detects the park/neutral position when continuity with ground exists.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: "P" or "N" ON
		Except above OFF

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1706	● The signal of the PNP switch is not changed in the process of engine starting and driving.	● Harness or connectors (The PNP switch circuit is open or shorted.) ● PNP switch

2

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DTC Confirmation Procedure

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- Turn ignition switch "ON".
- Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known good signal
"N" and "P" (A/T only) position	ON
Except the above position	OFF

If NG, go to "Diagnostic Procedure", EC-661.
If OK, go to following step.

- Select "DATA MONITOR" mode with CONSULT-II.

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

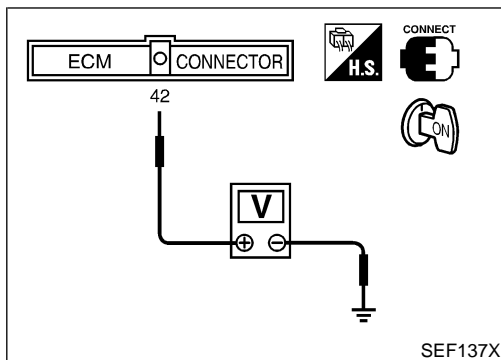
QG18DE (EXC CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 4) Start engine and warm it up to normal operating temperature.
- 5) Maintain the following conditions for at least 50 consecutive seconds.

ENG SPEED	1,550 - 3,450 rpm (A/T) 1,850 - 4,100 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 12.5 msec (A/T) 2.8 - 10.0 msec (M/T)
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-661.



Overall Function Check

Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a 1st trip DTC might not be confirmed.

⊗ Without CONSULT-II

- 1) Turn ignition switch “ON”.
- 2) Check voltage between ECM terminal 42 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage (V) (Known good data)
“P” (A/T only) and “N” position	Approx. 0
Except the above position	BATTERY VOLTAGE (11 - 14V)

- 3) If NG, go to “Diagnostic Procedure”, EC-661.

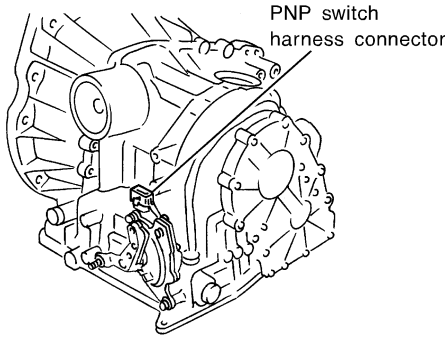
DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure For M/T Models

Diagnostic Procedure For M/T Models

NIEC0431

1	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect PNP switch harness connector.</p>	
			
		<p>3. Check harness continuity between PNP switch terminal 2 and body ground. Refer to "Wiring Diagram", EC-660. Continuity should exist.</p> <p>4. Also check harness for short to power.</p>	SEF752Y
		OK or NG	
OK		▶	GO TO 3.
NG		▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
		Check the harness for open or short between PNP switch and body ground.	
		▶	Repair open circuit or short to power in harness or connectors.

3	CHECK INPUT SIGNAL CIRCUIT		
		<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1. Refer to "Wiring Diagram", EC-660. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>	
		OK or NG	
OK		▶	GO TO 5.
NG		▶	GO TO 4.

4	DETECT MALFUNCTIONING PART		
		Check the harness for open or short between ECM and PNP switch.	
		▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK PNP SWITCH		
		Refer to <i>MT-10</i> , "Position Switch Check".	
		OK or NG	
OK		▶	GO TO 6.
NG		▶	Replace PNP switch.

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DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure For M/T Models (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure For A/T Models

Diagnostic Procedure For A/T Models

=NIEC0432

1	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect PNP switch harness connector.</p> <p>3. Check continuity between PNP switch terminal 2 and ground with CONSULT-II or tester. Refer to "Wiring Diagram", EC-660. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	DETECT MALFUNCTIONING PART	
Check the harness for open or short between PNP switch and body ground.		
▶		Repair open circuit or short to power in harness or connectors.

EC
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3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 42 and PNP switch terminals 1. Refer to "Wiring Diagram", EC-660. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

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4	DETECT MALFUNCTIONING PART	
Check the harness for open or short between PNP switch and ECM.		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

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5	CHECK PNP SWITCH	
Refer to AT-112 , "Diagnostic Procedure".		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace PNP switch.

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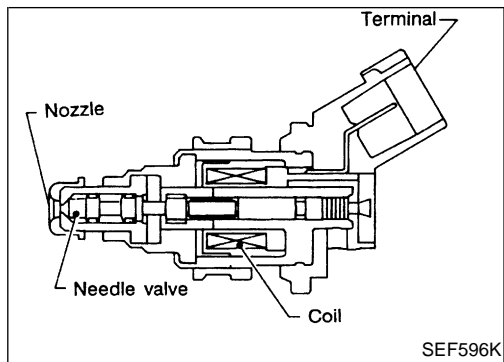
6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶		INSPECTION END

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INJECTOR

QG18DE (EXC CALIF CA)

Component Description



Component Description

The fuel injector is a small, precise solenoid valve. When the ^{NIEC0435}ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.

CONSULT-II Reference Value in Data Monitor Mode

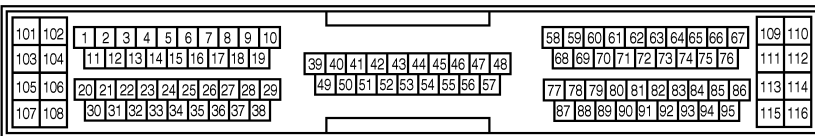
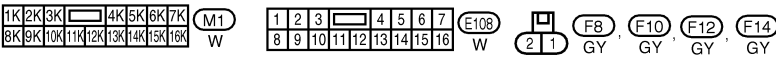
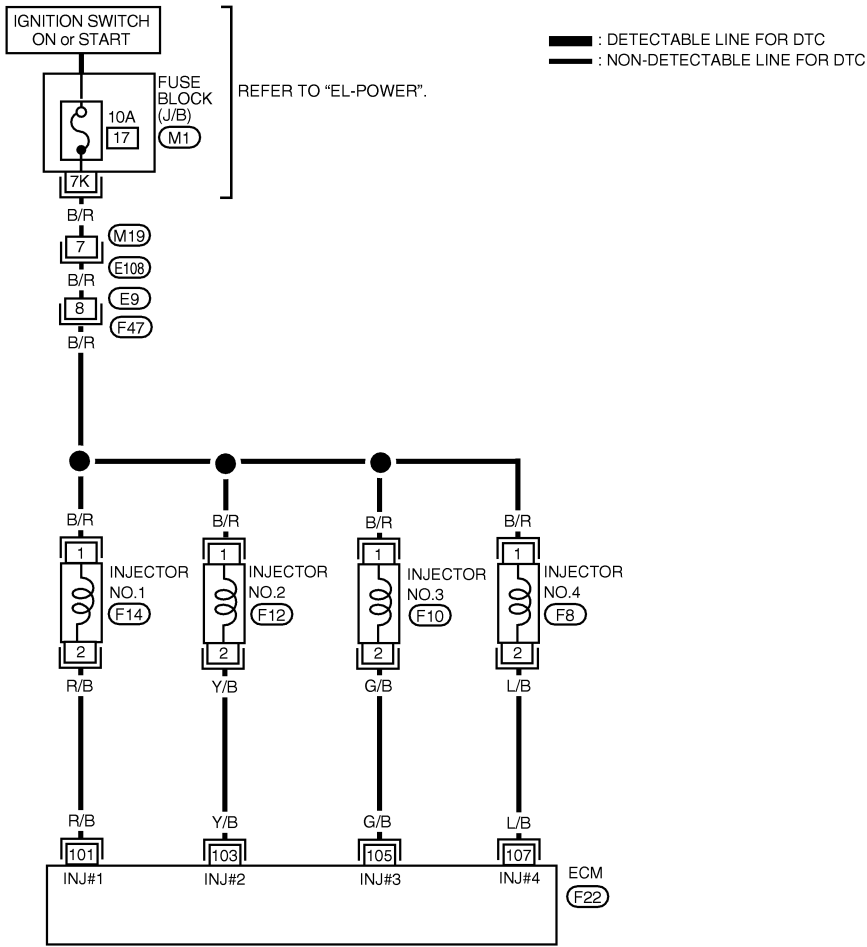
^{NIEC0436}

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 3.2 msec
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	1.0 - 1.6 msec
		2,000 rpm	0.7 - 1.3 msec

Wiring Diagram

NIEC0434

EC-INJECT-01



WEC415

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.



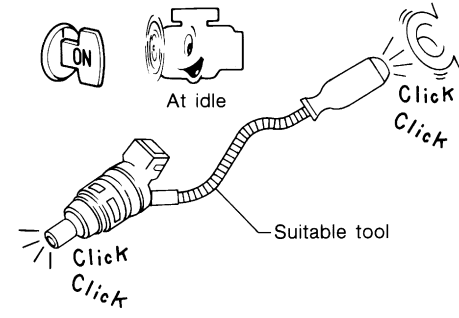
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

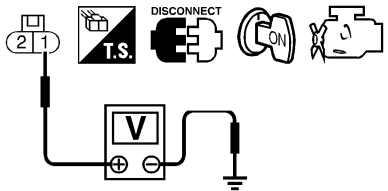
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
101	R/B	INJECTOR NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	
103	Y/B	INJECTOR NO. 2		
105	G/B	INJECTOR NO. 3	ENGINE RUNNING AT 2,000 RPM UNDER WARM-UP CONDITION	
107	L/B	INJECTOR NO. 4		

SEF588Y

Diagnostic Procedure

NIEC0438

1	CHECK OVERALL FUNCTION																
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 																	
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
SEF190Y																	
<ol style="list-style-type: none"> 3. Make sure that each circuit produces a momentary engine speed drop. 																	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Listen to each injector operating sound. 																	
																	
MEC703B																	
<p>Clicking noise should be heard.</p> <p>OK or NG</p>																	
OK	▶ INSPECTION END																
NG	▶ GO TO 2.																

2	CHECK POWER SUPPLY		
<p>1. Stop engine. 2. Disconnect injector harness connector. 3. Turn ignition switch "ON". 4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.</p>			
			
Voltage: Battery voltage			
SEF949X			
OK or NG			
OK	▶	GO TO 4.	
NG	▶	GO TO 3.	

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3	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● Harness connectors M19, E108 ● Harness connectors E9, F47 ● Harness for open or short between injector and fuse 			
		▶	Repair harness or connectors.

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4	CHECK OUTPUT SIGNAL CIRCUIT		
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between injector harness connector terminal 2 and ECM terminals 101, 103, 105, 107. Refer to "Wiring Diagram", EC-665. Continuity should exist.</p>			
4. Also check harness for short to ground and short to power.			
OK or NG			
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

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5	DETECT MALFUNCTIONING PART		
<p>Check the harness for open or short between ECM and injector.</p>			
		▶	Repair open circuit or short to ground or short to power in harness or connectors.

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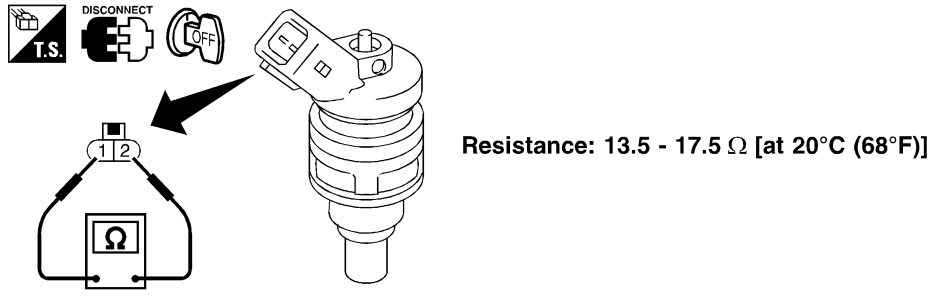
EL

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INJECTOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK INJECTOR
1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.	
 <p>Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> <p>SEF964XA</p>	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace injector.

7	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

START SIGNAL

QG18DE (EXC CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC0441

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

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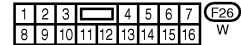
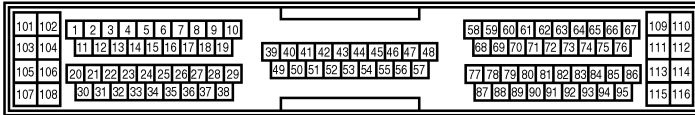
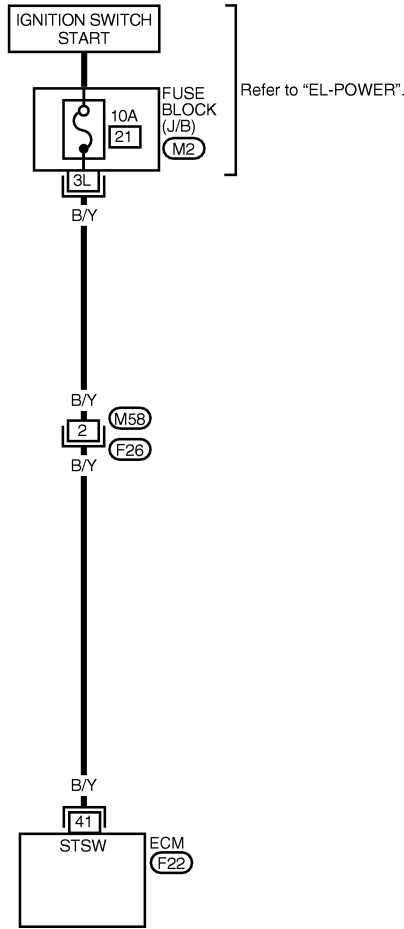
IDX

Wiring Diagram

=NIEC0440

EC-S/SIG-01

— : Detectable line for DTC
 — : Non-detectable line for DTC



LEC212

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
41	B/Y	START SIGNAL	IGN ON	APPROX. 0V
			IGN START	9 - 14V

SEF589Y

Diagnostic Procedure

=NIEC0443

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

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2	CHECK OVERALL FUNCTION																			
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>																				
<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th>NO FAIL</th> </tr> </thead> <tbody> <tr> <td>START SIGNAL</td> <td>OFF</td> </tr> <tr> <td>CLSD TH/P SW</td> <td>ON</td> </tr> <tr> <td>AIR COND SIG</td> <td>OFF</td> </tr> <tr> <td>P/N POSI SW</td> <td>ON</td> </tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr> <th>Condition</th> <th>"START SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON"</td> <td>OFF</td> </tr> <tr> <td>Ignition switch "START"</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING	NO FAIL	START SIGNAL	OFF	CLSD TH/P SW	ON	AIR COND SIG	OFF	P/N POSI SW	ON	Condition	"START SIGNAL"	Ignition switch "ON"	OFF	Ignition switch "START"	ON
DATA MONITOR																				
MONITORING	NO FAIL																			
START SIGNAL	OFF																			
CLSD TH/P SW	ON																			
AIR COND SIG	OFF																			
P/N POSI SW	ON																			
Condition	"START SIGNAL"																			
Ignition switch "ON"	OFF																			
Ignition switch "START"	ON																			
SEF604X																				
OK or NG																				
OK	▶	INSPECTION END																		
NG	▶	GO TO 4.																		

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3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch to "START".</p> <p>2. Check voltage between ECM terminal 41 and ground under the following conditions.</p>								
SEF142X								
<table border="1"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "START"</td> <td>Battery voltage</td> </tr> <tr> <td>Except above</td> <td>Approximately 0V</td> </tr> </tbody> </table>			Condition	Voltage	Ignition switch "START"	Battery voltage	Except above	Approximately 0V
Condition	Voltage							
Ignition switch "START"	Battery voltage							
Except above	Approximately 0V							
MTBL0143								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

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Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● 10A fuse ● Harness for open or short between ECM and fuse 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
	▶	INSPECTION END

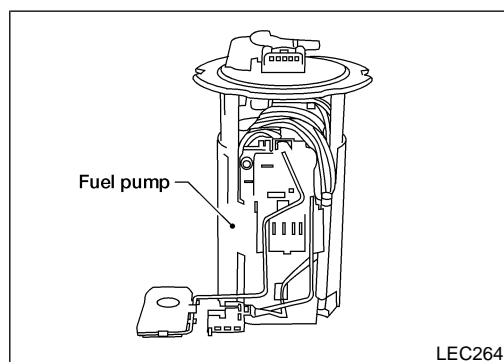
System Description

NIEC0444

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Fuel pump control	Fuel pump relay
Camshaft position sensor (PHASE)	Engine speed and cylinder number		
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor (PHASE), it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops



Component Description

A turbine type design fuel pump is used in the fuel tank.

NIEC0501

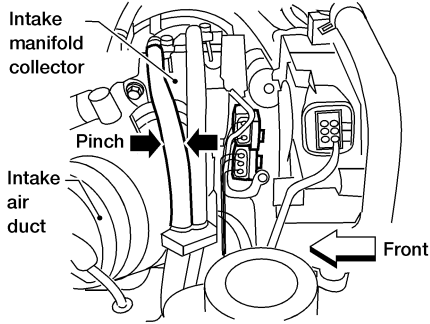
CONSULT-II Reference Value in Data Monitor Mode

NIEC0445

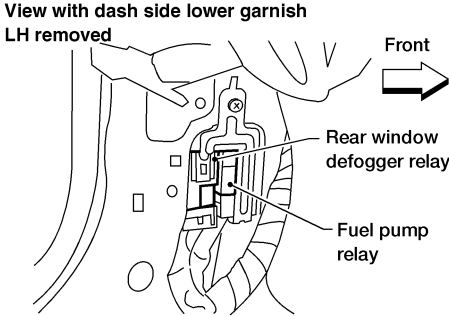
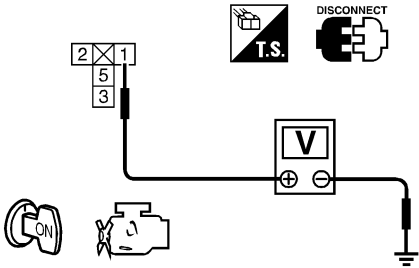
MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> Ignition switch is turned to ON (Operates for 5 seconds) Engine running and cranking When engine is stopped (stops in 1.0 seconds) 	ON
	<ul style="list-style-type: none"> Except as shown above 	OFF

Diagnostic Procedure

NIEC0448

1	CHECK OVERALL FUNCTION	
<p>1. Turn ignition switch "ON". 2. Pinch fuel feed hose with fingers.</p>		
		
LEC262		
<p>Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".</p> <p>OK or NG</p>		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

GI
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2	CHECK POWER SUPPLY-I	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay.</p>		
		
LEC363		
<p>3. Turn ignition switch "ON". 4. Check voltage between fuel pump relay terminal 1 and ground with CONSULT-II or tester.</p>		
 <p style="text-align: right;">Voltage: Battery voltage</p>		
SEF495Y		
<p>OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

AT
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3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● 10A fuse ● Harness for open or short between fuse and fuel pump relay 	
▶	Repair harness or connectors.

4	CHECK POWER SUPPLY-II
1. Check voltage between fuel pump relay terminal 5 and ground with CONSULT-II or tester.	
OK	▶ GO TO 9.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● 15A fuse ● Harness for open or short between fuse and fuel pump relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK POWER GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect fuel pump harness connector.	
3. Check harness continuity between fuel pump terminal 3 and body ground, fuel pump terminal 1 and fuel pump relay terminal 3. Refer to "Wiring Diagram", EC-674. Continuity should exist.	
4. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

FUEL PUMP

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

7	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between fuel pump and body ground ● Harness for open or short between fuel pump and fuel pump relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI

MA

8	CHECK OUTPUT SIGNAL CIRCUIT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 20 (without NVIS) or 21 (with NVIS) and fuel pump relay connector terminal 2. Refer to "Wiring Diagram", EC-674. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 10.
NG	▶ GO TO 9.

EM

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9	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connector M58, F26 ● Harness for open or short between ECM and fuel pump relay 	
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

MT

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10	CHECK FUEL PUMP RELAY
<p>Refer to "Component Inspection", EC-678.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 11.
NG	▶ Replace fuel pump relay.

SU

BR

11	CHECK FUEL PUMP
<p>Refer to "Component Inspection", EC-678.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 12.
NG	▶ Replace fuel pump.

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12	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.</p>	
▶	INSPECTION END

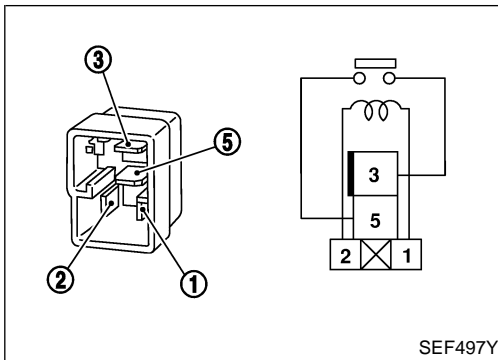
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Component Inspection



Component Inspection

=NIEC0449

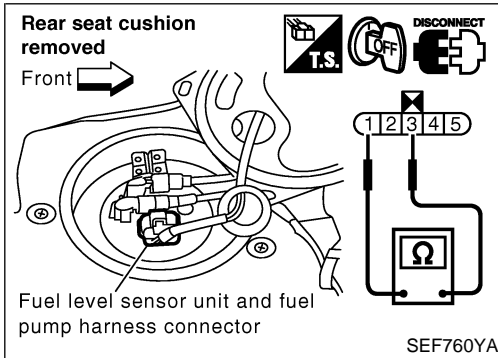
FUEL PUMP RELAY

NIEC0449S01

Check continuity between terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



FUEL PUMP

NIEC0449S02

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals 1 and 3.

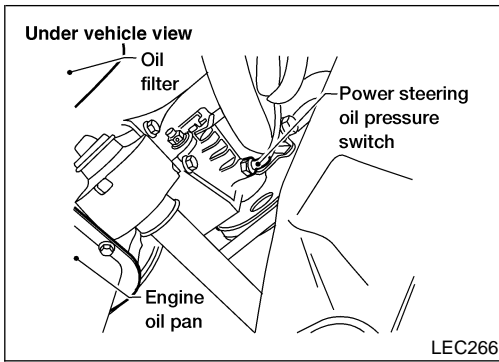
Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]

If NG, replace fuel pump.

POWER STEERING OIL PRESSURE SWITCH

QG18DE (EXC CALIF CA)

Component Description



Component Description

NIEC0451

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM adjusts the IACV-AAC valve to increase the idle speed and adjust for the increased load.

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CONSULT-II Reference Value in Data Monitor Mode

NIEC0452

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is fully turned	ON

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POWER STEERING OIL PRESSURE SWITCH

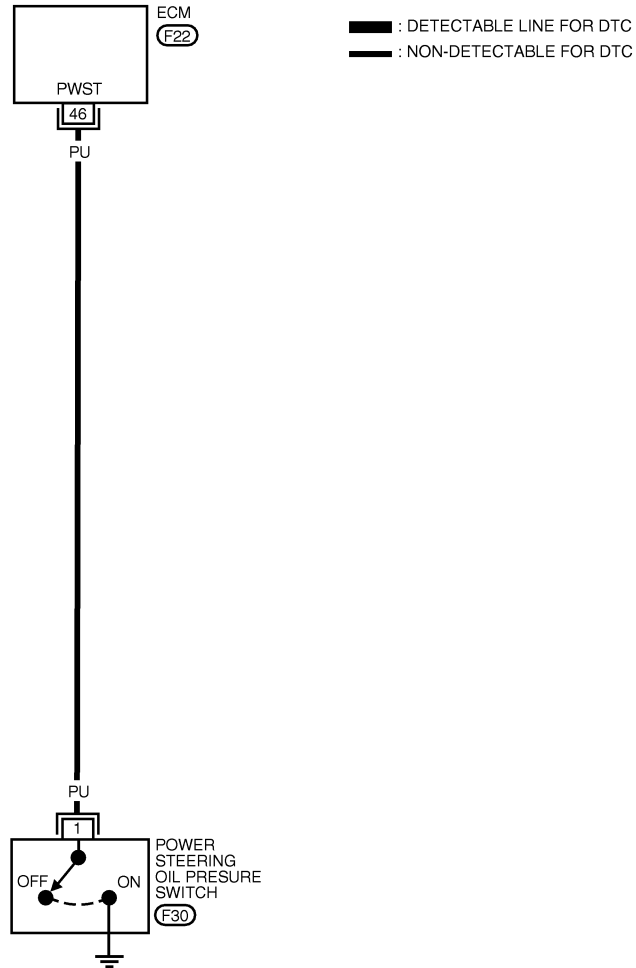
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0450

EC-PST/SW-01



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110							
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	

F22
GY

H.S.

①

F30

WEC416

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
46	PU	POWER STEERING OIL PRESSURE SWITCH	ENGINE RUNNING WITH STEERING WHEEL BEING FULLY TURNED	APPROX. 0V
			ENGINE RUNNING WITH STEERING WHEEL NOT BEING TURNED	APPROX. 5V

SEF591YA

POWER STEERING OIL PRESSURE SWITCH

QG18DE (EXC CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC0454

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION													
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>														
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center;">MONITOR</th> <th style="text-align: center;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">PW/ST SIGNAL</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td colspan="2" style="text-align: center;"> <table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">Steering is in neutral position</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;">Steering is turned</td> <td style="text-align: center;">ON</td> </tr> </table> </td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	PW/ST SIGNAL	OFF	<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">Steering is in neutral position</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;">Steering is turned</td> <td style="text-align: center;">ON</td> </tr> </table>		Steering is in neutral position	OFF	Steering is turned	ON
DATA MONITOR														
MONITOR	NO DTC													
PW/ST SIGNAL	OFF													
<table border="1" style="margin: auto;"> <tr> <td style="text-align: center;">Steering is in neutral position</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;">Steering is turned</td> <td style="text-align: center;">ON</td> </tr> </table>		Steering is in neutral position	OFF	Steering is turned	ON									
Steering is in neutral position	OFF													
Steering is turned	ON													
SEF228Y														
OK or NG														
OK	▶	INSPECTION END												
NG	▶	GO TO 4.												

3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check voltage between ECM terminal 46 and ground under the following conditions.</p>								
SEF148X								
<table border="1" style="margin: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">When steering wheel is turned quickly</td> <td style="text-align: center;">Approximately 0V</td> </tr> <tr> <td style="text-align: center;">Except above</td> <td style="text-align: center;">Approximately 5V</td> </tr> </tbody> </table>			Condition	Voltage	When steering wheel is turned quickly	Approximately 0V	Except above	Approximately 5V
Condition	Voltage							
When steering wheel is turned quickly	Approximately 0V							
Except above	Approximately 5V							
MTBL0142								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

POWER STEERING OIL PRESSURE SWITCH

QG18DE (EXC CALIF CA)

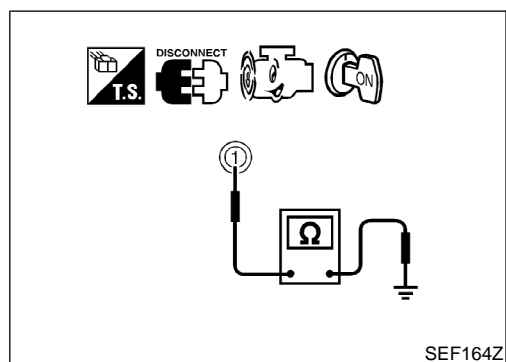
Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL CIRCUIT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 46 and terminal 1. Refer to "Wiring Diagram", EC-680. Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
Check the harness for open or short between ECM and power steering oil pressure switch.		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

6	CHECK POWER STEERING OIL PRESSURE SWITCH	
Refer to "Component Inspection", EC-682.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace power steering oil pressure switch.

7	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶ INSPECTION END		



Component Inspection POWER STEERING OIL PRESSURE SWITCH

NIEC0455
NIEC0455S01

1. Turn ignition switch "OFF".
2. Disconnect power steering oil pressure switch harness connector.
3. Start engine.
4. Check continuity between terminal 1 and body ground.

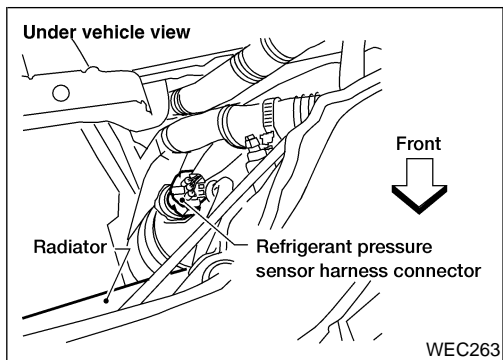
Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

REFRIGERANT PRESSURE SENSOR

QG18DE (EXC CALIF CA)

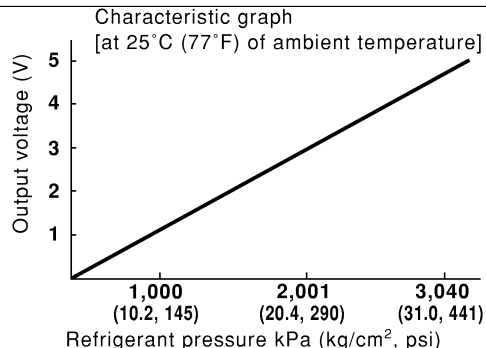
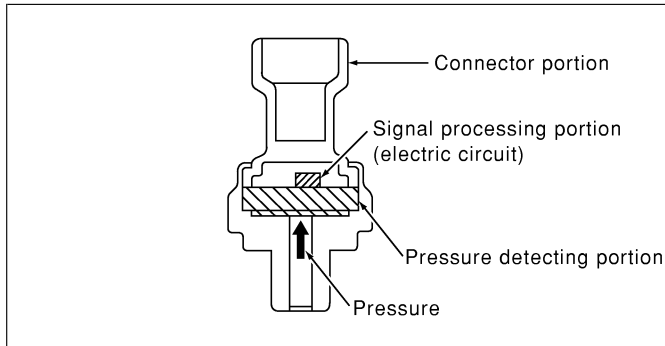
Description



Description

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

N/EC0638



SEF099XA

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- EL
- IDX

REFRIGERANT PRESSURE SENSOR

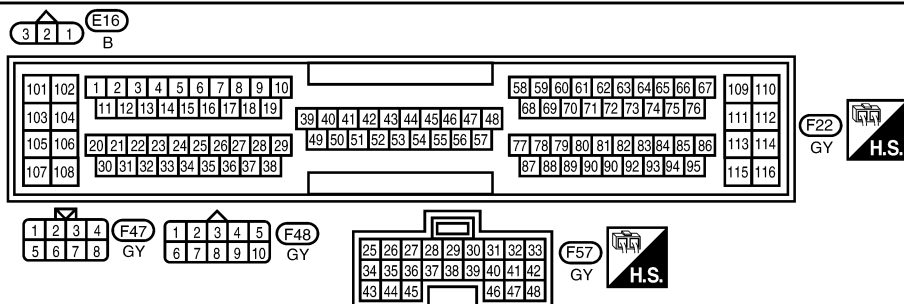
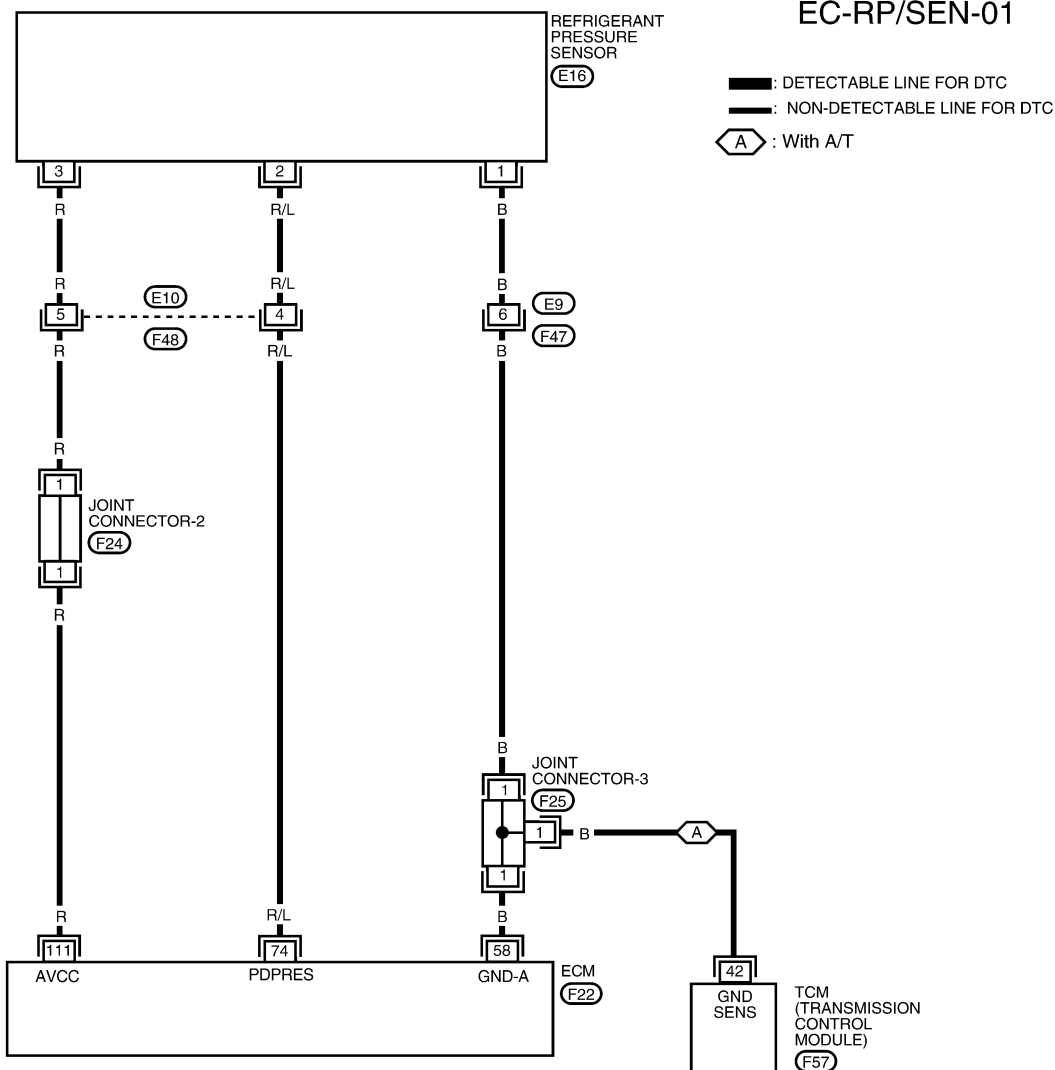
QG18DE (EXC CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC0639

EC-RP/SEN-01



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR

WEC628

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
74	R/L	REFRIGERANT PRESSURE SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH A/C SWITCH AND BLOWER SWITCH ON	1.0 - 4.0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF211ZA

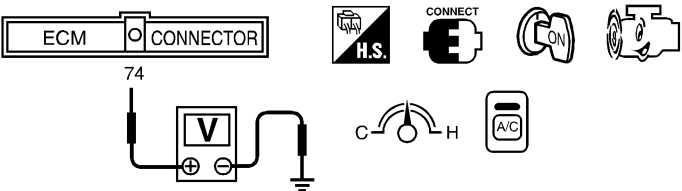
REFRIGERANT PRESSURE SENSOR

QG18DE (EXC CALIF CA)

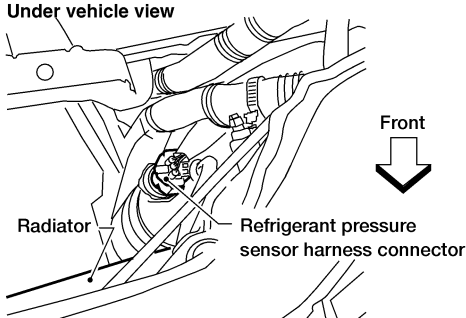
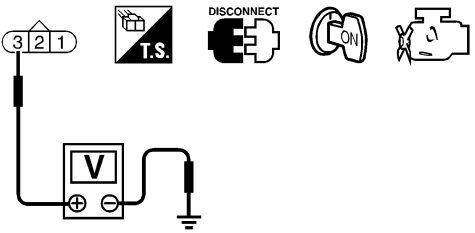
Diagnostic Procedure

Diagnostic Procedure

NIEC0640

1	CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION	
<p>1. Start engine and warm it up to normal operating temperature. 2. Turn A/C switch and blower switch "ON". 3. Check voltage between ECM terminal 74 and ground with CONSULT-II or tester.</p>		
 <div style="float: right; margin-top: 10px;">Voltage: 1.0 - 4.0V</div>		
SEF897Z		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

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2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn A/C switch and blower switch "OFF". 2. Stop engine. 3. Disconnect refrigerant pressure sensor harness connector.</p>		
<p>Under vehicle view</p> 		
WEC263		
<p>4. Turn ignition switch "ON". 5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.</p>		
 <div style="float: right; margin-top: 10px;">Voltage: Approximately 5V</div>		
SEF953X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

REFRIGERANT PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Joint connector-2 ● Harness for open or short between ECM and refrigerant pressure sensor 	
▶	Repair harness or connectors.

4	CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to "Wiring Diagram", EC-684. Continuity should exist. 3. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Joint connector-3 ● Harness for open or short between ECM and refrigerant pressure sensor ● Harness for open or short between TCM (Transmission control module) and refrigerant pressure sensor 	
▶	Repair open circuit or short to power in harness or connectors.

6	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 74 and refrigerant pressure sensor terminal 2. Refer to "Wiring Diagram", EC-684. Continuity should exist. 3. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between ECM and refrigerant pressure sensor 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK REFRIGERANT PRESSURE SENSOR
Refer to HA-49 , "Refrigerant pressure sensor".	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace refrigerant pressure sensor.

REFRIGERANT PRESSURE SENSOR

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

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CONSULT-II Reference Value in Data Monitor Mode

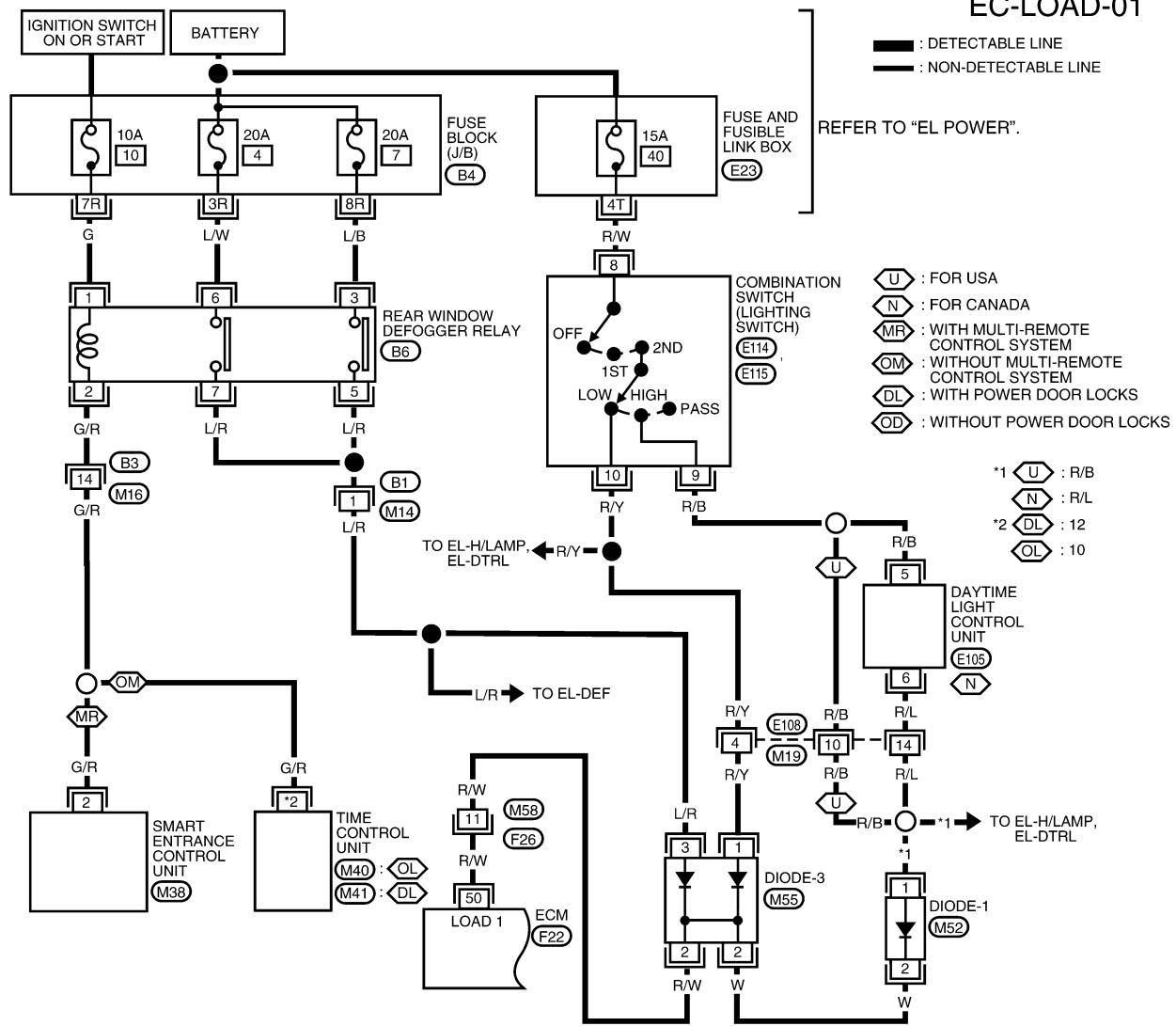
NIEC0664

Specification data are reference values.

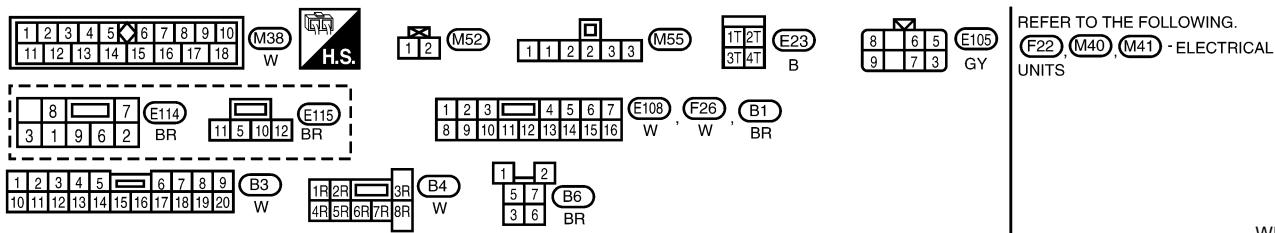
MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch and/or lighting switch "ON"	ON
		Rear window defogger switch and lighting switch "OFF"	OFF

Wiring Diagram

=NIEC0641



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WEC629

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
50	R	ELECTRICAL LOAD SIGNAL	IGN ON WITH REAR WINDOW DEFOGGER SWITCH ON OR LIGHTING SWITCH ON AT 2ND POSITION	BATTERY VOLTAGE
			IGN ON WITH REAR WINDOW DEFOGGER SWITCH AND LIGHTING SWITCH OFF	0V

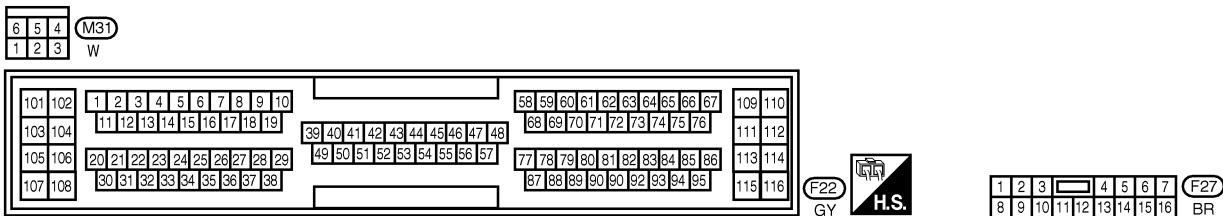
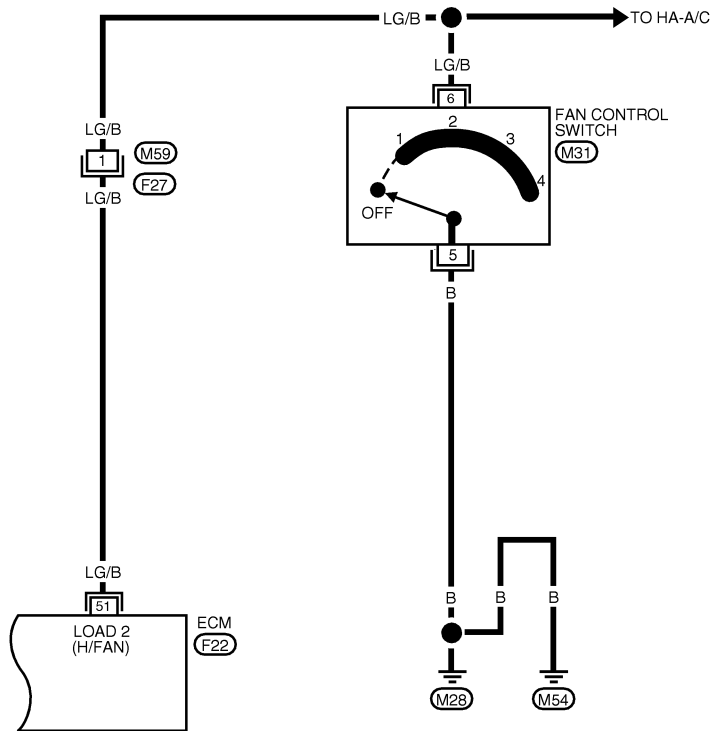
ELECTRICAL LOAD SIGNAL

QG18DE (EXC CALIF CA)

Wiring Diagram (Cont'd)

EC-LOAD-02

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



WEC419

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
51	LG/B	HEATER FAN SWITCH	IGN ON WITH FAN CONTROL SWITCH ON	APPROX. 0V
			IGN ON WITH FAN CONTROL SWITCH OFF	APPROX. 5V


SEF594Y

Diagnostic Procedure


NIEC0642

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 5.

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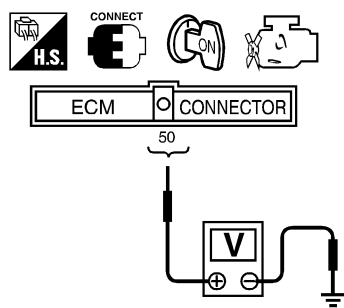
2	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I							
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Rear window defogger switch "ON"	ON	Rear window defogger switch "OFF"	OFF		
Rear window defogger switch "ON"	ON							
Rear window defogger switch "OFF"	OFF							
SEF954X								
OK or NG								
OK	▶	GO TO 3.						
NG	▶	GO TO 8.						

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AT

3	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II							
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tbody> <tr> <td>Lighting switch "ON" at 2nd position</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Lighting switch "ON" at 2nd position	ON	Lighting switch "OFF"	OFF		
Lighting switch "ON" at 2nd position	ON							
Lighting switch "OFF"	OFF							
SEF955X								
OK or NG								
OK	▶	GO TO 4.						
NG	▶	GO TO 13.						

SU
BR
ST
RS
BT
HA
SC
EL
IDX

4	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-III							
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions. 								
<table border="1" style="margin: 0 auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: 0 auto;"> <tbody> <tr> <td>Fan control switch "ON"</td> <td>ON</td> </tr> <tr> <td>Fan control switch "OFF"</td> <td>OFF</td> </tr> </tbody> </table>			Fan control switch "ON"	ON	Fan control switch "OFF"	OFF		
Fan control switch "ON"	ON							
Fan control switch "OFF"	OFF							
SEF165Z								
OK or NG								
OK	▶	INSPECTION END.						
NG	▶	GO TO 9.						

5	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-I							
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Check voltage between ECM terminal 50 and ground under the following conditions. 								
								
<table border="1" style="margin: 0 auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Rear window defogger switch "ON"	BATTERY VOLTAGE	Rear window defogger switch "OFF"	0V
Condition	Voltage							
Rear window defogger switch "ON"	BATTERY VOLTAGE							
Rear window defogger switch "OFF"	0V							
SEF956X								
OK or NG								
OK	▶	GO TO 6.						
NG	▶	GO TO 8.						

6	CHECK LOAD SIGNAL CIRCUIT OVERALL FUNCTION-II							
<p>⊗ Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "ON" at 2nd position</td> <td>Battery voltage</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Lighting switch "ON" at 2nd position	Battery voltage	Lighting switch "OFF"	0V
Condition	Voltage							
Lighting switch "ON" at 2nd position	Battery voltage							
Lighting switch "OFF"	0V							
SEF898Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 13.						

7	CHECK FAN CONTROL CIRCUIT OVERALL FUNCTION-III							
<p>⊗ Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 51 and ground under the following conditions.</p>								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Fan control switch "ON"</td> <td>Battery voltage</td> </tr> <tr> <td>Fan control switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Fan control switch "ON"	Battery voltage	Fan control switch "OFF"	0V
Condition	Voltage							
Fan control switch "ON"	Battery voltage							
Fan control switch "OFF"	0V							
SEF899Z								
OK or NG								
OK	▶	GO TO 17.						
NG	▶	GO TO 9.						

8	CHECK REAR WINDOW DEFOGGER FUNCTION	
<p>1. Start engine.</p> <p>2. Turn "ON" the rear window defogger switch.</p> <p>3. Check the rear windshield. Is the rear windshield heated up?</p>		
Yes or No		
Yes	▶	GO TO 10.
No	▶	Refer to EL-143 , "Rear Window Defogger".

GI
 MA
 EM
 LC
 EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

9	CHECK FAN CONTROL FUNCTION	
<ol style="list-style-type: none"> 1. Start engine. 2. Turn "ON" the fan control switch. 3. Check the blower fan motor. Does the blower fan motor activate? <p style="text-align: center;">YES or NO</p>		
YES	▶	GO TO 17.
NO	▶	Refer to HA-36 , "Blower Motor".

10	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect rear window defogger relay. 4. Check harness continuity between ECM terminal 50 and rear window defogger relay terminals 5 and 7. 								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Condition</th> <th>Continuity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Should not exist.</td> </tr> </tbody> </table>			Condition	Continuity	1	Should exist.	2	Should not exist.
Condition	Continuity							
1	Should exist.							
2	Should not exist.							
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 12.						
NG	▶	GO TO 11.						

SEF900Z

11	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M58, F26 ● Diode M55 ● Harness for open and short between ECM and rear window defogger relay 		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

12	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.		
▶ INSPECTION END		

13	CHECK HEADLAMP FUNCTION	
<ol style="list-style-type: none"> 1. Start engine. 2. Turn the lighting switch "ON" at 2nd position. 3. Check that headlamps are illuminated. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 14.
NG	▶	Refer to EL-35 , "HEADLAMP (FOR USA)" or EL-40 , "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

14	CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT						
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connectors. 4. Check harness continuity between ECM terminal 50 and lighting switch terminal 10 under the following conditions.</p>							
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>							
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table>		Condition	Continuity	1	Should exist.	2	Should not exist.
Condition	Continuity						
1	Should exist.						
2	Should not exist.						
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>							
OK	▶ GO TO 16.						
NG	▶ GO TO 15.						

15	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Fuse block M1, E103 ● Diode M55 ● Harness for open and short between ECM and lighting switch 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

16	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
▶	INSPECTION END

17	CHECK FAN CONTROL CIRCUIT FOR OPEN OR SHORT
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect fan control switch harness connector. 4. Check harness continuity between ECM terminal 51 and fan control switch terminal 6. 5. Check harness continuity between fan control switch terminal 5 and body ground. Refer to "Wiring Diagram", EC-689. 6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 19.
NG	▶ GO TO 18.

18	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M59, F27 ● Harness for open and short between ECM and fan control switch ● Harness for open or short between fan control switch and body ground 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

ELECTRICAL LOAD SIGNAL

QG18DE (EXC CALIF CA)

Diagnostic Procedure (Cont'd)

19	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-167.	
	▶ INSPECTION END

SERVICE DATA AND SPECIFICATIONS (SDS)

QG18DE (EXC CALIF CA)

Fuel Pressure Regulator

Fuel Pressure Regulator

NIEC0467

Fuel pressure at idling kPa (kg/cm ² , psi)	Vacuum hose is connected	Approximately 235 (2.4, 34)
	Vacuum hose is disconnected	Approximately 294 (3.0, 43)

Idle Speed and Ignition Timing

NIEC0468

Target idle speed*1 rpm	No-load*2 (in "P" or "N" position)	M/T: 650±50 A/T: 800±50
Air conditioner: ON rpm	In "P" or "N" position	850 or more
Ignition timing*1	In "P" or "N" position	9°±5° BTDC
Throttle position sensor idle position V		0.2 - 0.8

*1: Throttle position sensor harness connector connected

*2: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Mass Air Flow Sensor

NIEC0470

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.0 - 1.7*
Mass air flow (Using CONSULT-II or GST) g-m/sec	1.4 - 4.0 at idle* 5.0 - 10.0 at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and idling under no-load.

Engine Coolant Temperature Sensor

NIEC0471

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

EGR Temperature Sensor

NIEC0472

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

Fuel Pump

NIEC0473

Resistance [at 25°C (77°F)] Ω	0.2 - 5.0
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IACV-AAC Valve

NIEC0474

Resistance [at 20°C (68°F)] Ω	Approximately 22
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Injector

NIEC0475

Resistance [at 20°C (68°F)] Ω	13.5 - 17.5
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SERVICE DATA AND SPECIFICATIONS (SDS)

QG18DE (EXC CALIF CA)

Resistor

Resistor

NIEC0476

Resistance [at 25°C (77°F)] Ω	4 - 8
-------------------------------	-------

GI

Throttle Position Sensor

NIEC0477

Throttle valve conditions	Voltage (at normal operating temperature, engine off, ignition switch ON, throttle opener disengaged)
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

MA

EM

LC

Heated Oxygen Sensor 1 Heater (Front)

NIEC0478

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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EC

Calculated Load Value

NIEC0479

	Calculated load value % (Using CONSULT-II or GST)
At idle	20.0 - 35.5
At 2,500 rpm	12.0 - 27.0

FE

CL

MT

Intake Air Temperature Sensor

NIEC0480

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

AT

AX

EVAP Canister Purge Volume Control Valve

NIEC0481

Resistance [at 20°C (68°F)] Ω	22 - 26
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SU

BR

Heated Oxygen Sensor 2 Heater (Rear)

NIEC0483

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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ST

Crankshaft Position Sensor (POS)

NIEC0484

Resistance [at 20°C (68°F)] Ω	166 - 204
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RS

Fuel Tank Temperature Sensor

NIEC0485

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

BT

HA

SC

EL

IDX

Alphabetical & P No. Index for DTC

NIEC1195

NIEC1195S01

ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC*1	Reference page
Unable to access ECM	—	EC-814
ABSL PRES SEN/CIRC	P0105	EC-855
AIR TEMP SEN/CIRC	P0110	EC-860
A/F SENSOR1 (B1)	P1271	EC-1190
A/F SENSOR1 (B1)	P1272	EC-1195
A/F SENSOR1 (B1)	P1273	EC-1200
A/F SENSOR1 (B1)	P1274	EC-1205
A/F SENSOR1 (B1)	P1275	EC-1210
A/F SENSOR1 (B1)	P1276	EC-1218
A/F SEN1 HTR (B1)	P1277	EC-1223
A/T 1ST GR FNCTN	P0731	AT-130
A/T 2ND GR FNCTN	P0732	AT-137
A/T 3RD GR FNCTN	P0733	AT-143
A/T 4TH GR FNCTN	P0734	AT-149
A/T COMM LINE	P0600*2	EC-1122
A/T DIAG COMM LINE	P1605	EC-1317
A/T TCC S/V FNCTN	P0744	AT-162
ATF TEMP SEN/CIRC	P0710	AT-115
CMP SEN/CIRCUIT	P0340	EC-1011
CLOSED LOOP-B1	P1148	EC-1172
CLOSED TP SW/CIRC	P0510	EC-1114
COOLANT T SEN/CIRC*3	P0115	EC-866
*COOLAN T SEN/CIRC	P0125	EC-882
CKP SEN/CIRCUIT	P0335	EC-1006
CYL 1 MISFIRE	P0301	EC-995
CYL 2 MISFIRE	P0302	EC-995
CYL 3 MISFIRE	P0303	EC-995
CYL 4 MISFIRE	P0304	EC-995
ECM	P0605	EC-1125
EGR SYSTEM	P0400	EC-1017
EGR SYSTEM	P1402	EC-1246
EGR TEMP SEN/CIRC	P1401	EC-1239
EGR VOL CONT/V CIR	P0403	EC-1026
ENGINE SPEED SIG	P0725	AT-126
ENG OVER TEMP	P0217	EC-976

TROUBLE DIAGNOSIS — INDEX

QG18DE (CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page	
ENG OVER TEMP	P1217*2	EC-1173	GI
EVAP GROSS LEAK	P0455	EC-1077	MA
EVAP PURG FLOW/MON	P1447	EC-1275	
EVAP SYS PRES SEN	P0450	EC-1065	EM
EVAP SMALL LEAK	P0440	EC-1037	
EVAP SMALL LEAK	P1440	EC-1253	LC
FUEL LEVL SEN/CIRC	P0464	EC-1097	
FUEL LEVL SEN/CIRC	P1464	EC-1296	EC
FUEL LEVEL SENSOR	P0461	EC-1095	
FUEL LV SE (SLOSH)	P0460	EC-1091	FE
FUEL SYS-LEAN/BK1	P0171	EC-957	
FUEL SYS-RICH/BK1	P0172	EC-964	CL
FUEL TEMP SEN/CIRC	P0180	EC-971	
HO2S2 (B1)	P0137	EC-887	MT
HO2S2 (B1)	P0138	EC-895	
HO2S2 (B1)	P0139	EC-903	AT
HO2S2 (B1)	P0140	EC-911	AX
HO2S2 HTR (B1)	P0141	EC-917	
HO2S3 (B1)	P0143	EC-922	SU
HO2S3 (B1)	P0144	EC-930	
HO2S3 (B1)	P0145	EC-938	BR
HO2S3 (B1)	P0146	EC-946	
HO2S3 HTR (B1)	P0147	EC-952	ST
IACV/AAC VLV/CIRC	P0505	EC-1105	
IGN SIGNAL-PRIMARY	P1320	EC-1228	RS
INT/V TIM CONT-B1	P1110	EC-1134	
INTK TIM S/CIRC-B1	P1140	EC-1167	BT
INT/V TIM V/CIR-B1	P1111	EC-1140	
KNOCK SEN/CIRC-B1	P0325*2	EC-1002	HA
L/PRES SOL/CIRC	P0745	AT-173	
MAP SENSOR	P1108	EC-1127	SC
MAF SEN/CIRCUIT*3	P0100	EC-846	
MULTI CYL MISFIRE	P0300	EC-995	EL
NATS MALFUNCTION	P1610 - P1615	EL-301	
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	IDX
O/R CLTCH SOL/CIRC	P1760	AT-194	
P-N POS SW/CIRCUIT	P1706	EC-1320	

TROUBLE DIAGNOSIS — INDEX

QG18DE (CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page
PNP SW/CIRC	P0705	AT-110
PURG VOLUME CONT/V	P0443	EC-1052
PURG VOLUME CONT/V	P1444	EC-1255
SFT SOL A/CIRC*3	P0750	AT-178
SFT SOL B/CIRC*3	P0755	AT-182
SWIRL CONT VALVE	P1138	EC-1159
SWL CON/V POS SEN	P1137	EC-1152
TCC SOLENOID/CIRC	P0740	AT-158
THERMOSTAT FNCTN	P1126	EC-1145
TP SEN/CIRC A/T*3	P1705	AT-186
TRTL POS SEN/CIRC*3	P0120	EC-871
TW CATALYST SYS-B1	P0420	EC-1033
VARI SWL CON/SV-B1	P1132	EC-1147
VC CUT/V BYPASS/V	P1491	EC-1305
VC/V BYPASS/V	P1490	EC-1299
VEH SPEED SEN/CIRC*4	P0500	EC-1101
VEH SPD SEN/CIR A/T*4	P0720	AT-121
VENT CONTROL VALVE	P0446	EC-1058
VENT CONTROL VALVE	P1446	EC-1267
VENT CONTROL VALVE	P1448	EC-1287

*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

TROUBLE DIAGNOSIS — INDEX

QG18DE (CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

P NO. INDEX FOR DTC

—NIEC1195S02

DTC*1	Items (CONSULT-II screen terms)	Reference page	
—	Unable to access ECM	EC-814	GI
P0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—	MA
P0100	MAF SEN/CIRCUIT*3	EC-846	EM
P0105	ABSL PRES SEN/CIRC	EC-855	LC
P0110	AIR TEMP SEN/CIRC	EC-860	LC
P0115	COOLANT T SEN/CIRC*3	EC-866	EC
P0120	THRTL POS SEN/CIRC*3	EC-871	EC
P0125	*COOLAN T SEN/CIRC	EC-882	FE
P0137	HO2S2 (B1)	EC-887	FE
P0138	HO2S2 (B1)	EC-895	CL
P0139	HO2S2 (B1)	EC-903	CL
P0140	HO2S2 (B1)	EC-911	MT
P0141	HO2S2 HTR (B1)	EC-917	MT
P0143	HO2S3 (B1)	EC-922	AT
P0144	HO2S3 (B1)	EC-930	AT
P0145	HO2S3 (B1)	EC-938	AX
P0146	HO2S3 (B1)	EC-946	AX
P0147	HO2S3 HTR (B1)	EC-952	SU
P0171	FUEL SYS-LEAN/BK1	EC-957	SU
P0172	FUEL SYS-RICH/BK1	EC-964	BR
P0180	FUEL TEMP SEN/CIRC	EC-971	BR
P0217	ENG OVER TEMP	EC-976	ST
P0300	MULTI CYL MISFIRE	EC-995	ST
P0301	CYL 1 MISFIRE	EC-995	RS
P0302	CYL 2 MISFIRE	EC-995	RS
P0303	CYL 3 MISFIRE	EC-995	BT
P0304	CYL 4 MISFIRE	EC-995	BT
P0325*2	KNOCK SEN/CIRC-B1	EC-1002	HA
P0335	CKP SEN/CIRCUIT	EC-1006	HA
P0340	CMP SEN/CIRCUIT	EC-1011	SC
P0400	EGR SYSTEM	EC-1017	SC
P0403	EGR VOL CONT/V CIR	EC-1026	EL
P0420	TW CATALYST SYS-B1	EC-1033	EL
P0440	EVAP SMALL LEAK	EC-1037	IDX
P0443	PURG VOLUME CONT/V	EC-1052	IDX
P0446	VENT CONTROL VALVE	EC-1058	IDX

TROUBLE DIAGNOSIS — INDEX

QG18DE (CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page
P0450	EVAP SYS PRES SEN	EC-1065
P0455	EVAP GROSS LEAK	EC-1077
P0460	FUEL LV SE (SLOSH)	EC-1091
P0461	FUEL LEVEL SENSOR	EC-1095
P0464	FUEL LEVL SEN/CIRC	EC-1097
P0500	VEH SPEED SEN/CIRC*4	EC-1101
P0505	IACV/AAC VLV/CIRC	EC-1105
P0510	CLOSED TP SW/CIRC	EC-1114
P0600*2	A/T COMM LINE	EC-1122
P0605	ECM	EC-1125
P0705	PNP SW/CIRC	AT-110
P0710	ATF TEMP SEN/CIRC	AT-115
P0720	VEH SPD SEN/CIR A/T*4	AT-121
P0725	ENGINE SPEED SIG	AT-126
P0731	A/T 1ST GR FNCTN	AT-130
P0732	A/T 2ND GR FNCTN	AT-137
P0733	A/T 3RD GR FNCTN	AT-143
P0734	A/T 4TH GR FNCTN	AT-149
P0740	TCC SOLENOID/CIRC	AT-158
P0744	A/T TCC S/V FNCTN	AT-162
P0745	L/PRESS SOL/CIRC	AT-173
P0750	SFT SOL A/CIRC*3	AT-178
P0755	SFT SOL B/CIRC*3	AT-182
P1108	MAP SENSOR	EC-1127
P1110	INT/V TIM CONT-B1	EC-1134
P1111	INT/V TIM V/CIR-B1	EC-1140
P1126	THERMOSTAT FNCTN	EC-1145
P1132	VARI SWL CON/SV-B1	EC-1147
P1137	SWL CON/V POS SEN	EC-1152
P1138	SWIRL CONT VALVE	EC-1159
P1140	INTK TIM S/CIRC-B1	EC-1167
P1148	CLOSED LOOP-B1	EC-1172
P1217*2	ENG OVER TEMP	EC-1173
P1271	A/F SENSOR1 (B1)	EC-1190
P1272	A/F SENSOR1 (B1)	EC-1195
P1273	A/F SENSOR1 (B1)	EC-1200
P1274	A/F SENSOR1 (B1)	EC-1205

TROUBLE DIAGNOSIS — INDEX

QG18DE (CALIF CA)

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page
P1275	A/F SENSOR1 (B1)	EC-1210
P1276	A/F SENSOR1 (B1)	EC-1218
P1277	A/F SEN1 HTR (B1)	EC-1223
P1320	IGN SIGNAL-PRIMARY	EC-1228
P1401	EGR TEMP SEN/CIRC	EC-1239
P1402	EGR SYSTEM	EC-1246
P1440	EVAP SMALL LEAK	EC-1253
P1444	PURG VOLUME CONT/V	EC-1255
P1446	VENT CONTROL VALVE	EC-1267
P1447	EVAP PURG FLOW/MON	EC-1275
P1448	VENT CONTROL VALVE	EC-1287
P1464	FUEL LEVL SEN/CIRC	EC-1296
P1490	VC/V BYPASS/V	EC-1299
P1491	VC CUT/V BYPASS/V	EC-1305
P1605	A/T DIAG COMM LINE	EC-1317
P1610 - P1615	NATS MALFUNCTION	EL-302
P1705	TP SEN/CIRC A/T*3	AT-186
P1706	P-N POS SW/CIRCUIT	EC-1320
P1760	O/R CLTCH SOL/CIRC	AT-194

*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NIEC1196

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL B15 is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS** section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses covered with yellow insulation tape either just before the harness connectors or for the complete harness are related to the SRS.

Precautions for On Board Diagnostic (OBD) System of Engine and A/T

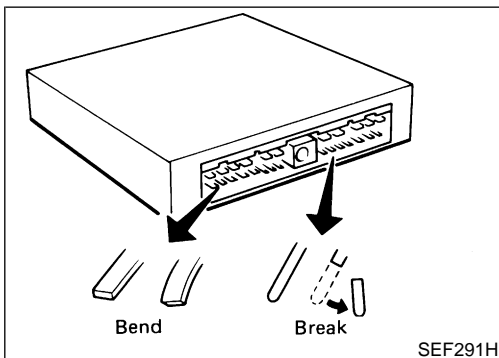
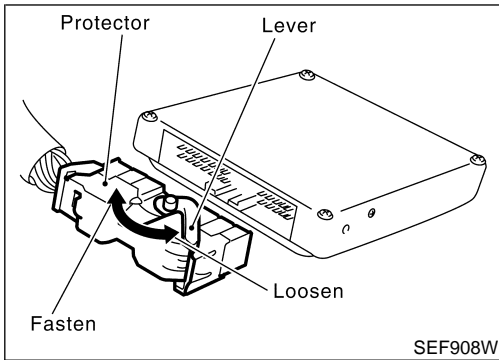
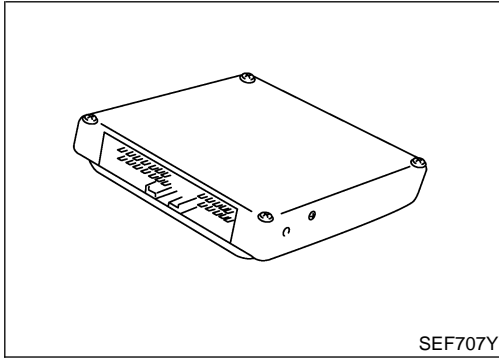
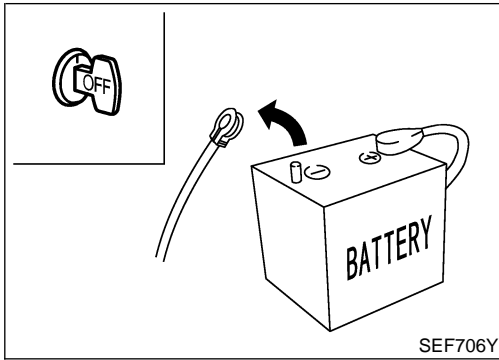
NIEC1197

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- Be sure to turn the ignition switch "OFF" and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector.
For description and how to disconnect, refer to EL section, "Description", "HARNES CONNECTOR".
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission Control Module) before returning the vehicle to the customer.

NIEC1198



Precautions

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value. The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go as shown at left.
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break). Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Securely connect ECM harness connectors. A Poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent a ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.

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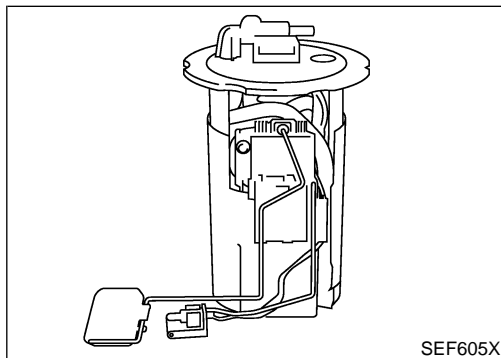
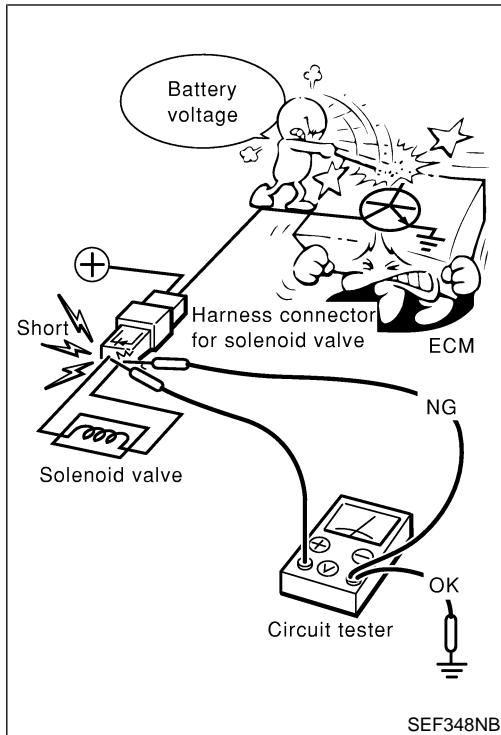
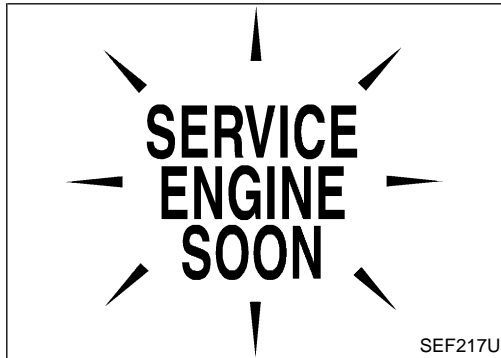
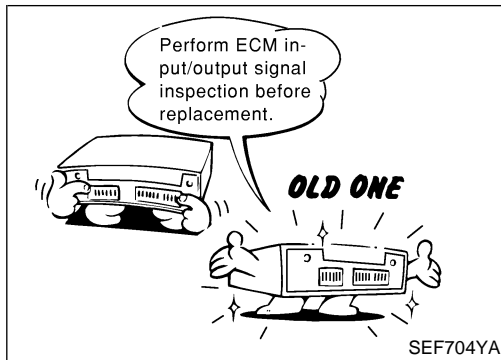
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Precautions (Cont'd)



- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-824.

- After performing each TROUBLE DIAGNOSIS, perform “Overall Function Check” or “DTC Confirmation Procedure”. The DTC should not be displayed in the “DTC Confirmation Procedure” if the repair is completed. The “Overall Function Check” should be a good result if the repair is completed.

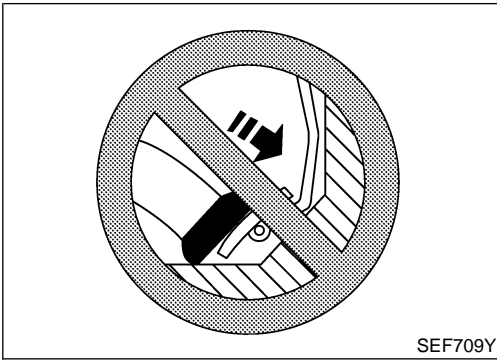
- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM’s transistor. Use a ground other than ECM terminals, such as the ground.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble IAC valve-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor.

- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

PRECAUTIONS

QG18DE (CALIF CA)

Precautions (Cont'd)



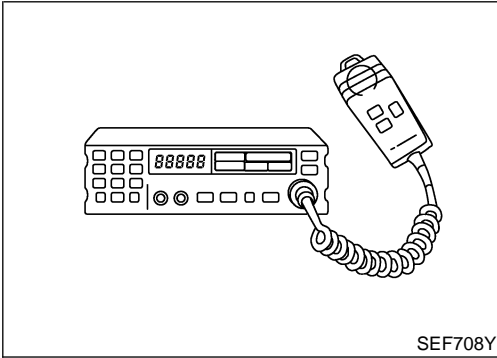
- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

GI

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- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - a) Keep the antenna as far as possible from the electronic control units.
 - b) Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - c) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - d) Be sure to ground the radio to vehicle body.

EC

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Wiring Diagrams and Trouble Diagnosis

NIEC1199

AT

When you read Wiring diagrams, refer to the following:

- **GI-11**, "HOW TO READ WIRING DIAGRAMS"
- **EL-9**, "POWER SUPPLY ROUTING" for power distribution circuit

AX

When you perform trouble diagnosis, refer to the following:

- **GI-35**, "How To Follow Test Groups In Trouble Diagnoses"
- **GI-24**, "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT"

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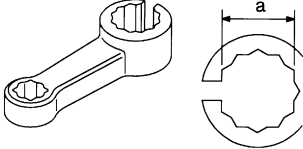
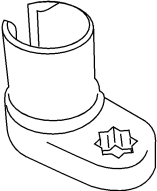
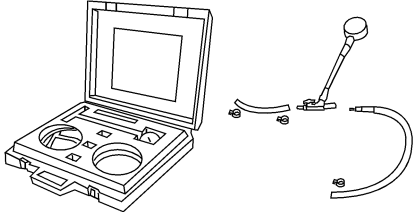

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Special Service Tools

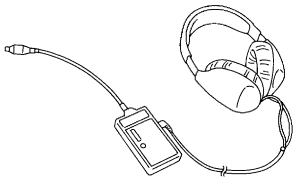
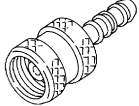
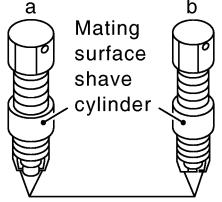


NIEC1200

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description	
KV10114400 (J-38365) Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensor a: 22 mm (0.87 in)
(J44626) Air fuel ratio (A/F) sen- sor wrench		Loosening or tightening air fuel ratio (A/F) sensor 1
(J-44321) Fuel pressure gauge kit		Checking fuel pressure
Fuel filler cap adapter (J-45356)		Checking fuel tank vacuum relief valve opening pressure

Commercial Service Tools

NIEC1201

Tool name	Description	
Leak detector (J41416)	Locating the EVAP leak  NT703	GI MA EM LC
EVAP service port adapter (J41413-OBDD)	Applying positive pressure through EVAP service port  NT704	EC FE CL
Oxygen sensor thread cleaner (J-43897-18) (J-43897-12)	Reconditioning the exhaust system threads before installing a new oxygen sensor or A/F sensor. Use with anti-seize lubricant shown below. a: J-43897-18 18 mm with 1.5 mm pitch dia., for Zirconia Oxygen Sensor or A/F sensor b: J-43897-12 12 mm with 1.25 mm pitch dia., for Titania Oxygen Sensor  NT778	MT AT AX
Anti-seize lubricant (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907)	Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.  NT779	SU BR ST
Fuel tube removal tool	For disconnecting fuel tube quick connectors a: 7.9 mm (5/16 in)  LEC643	RS BT

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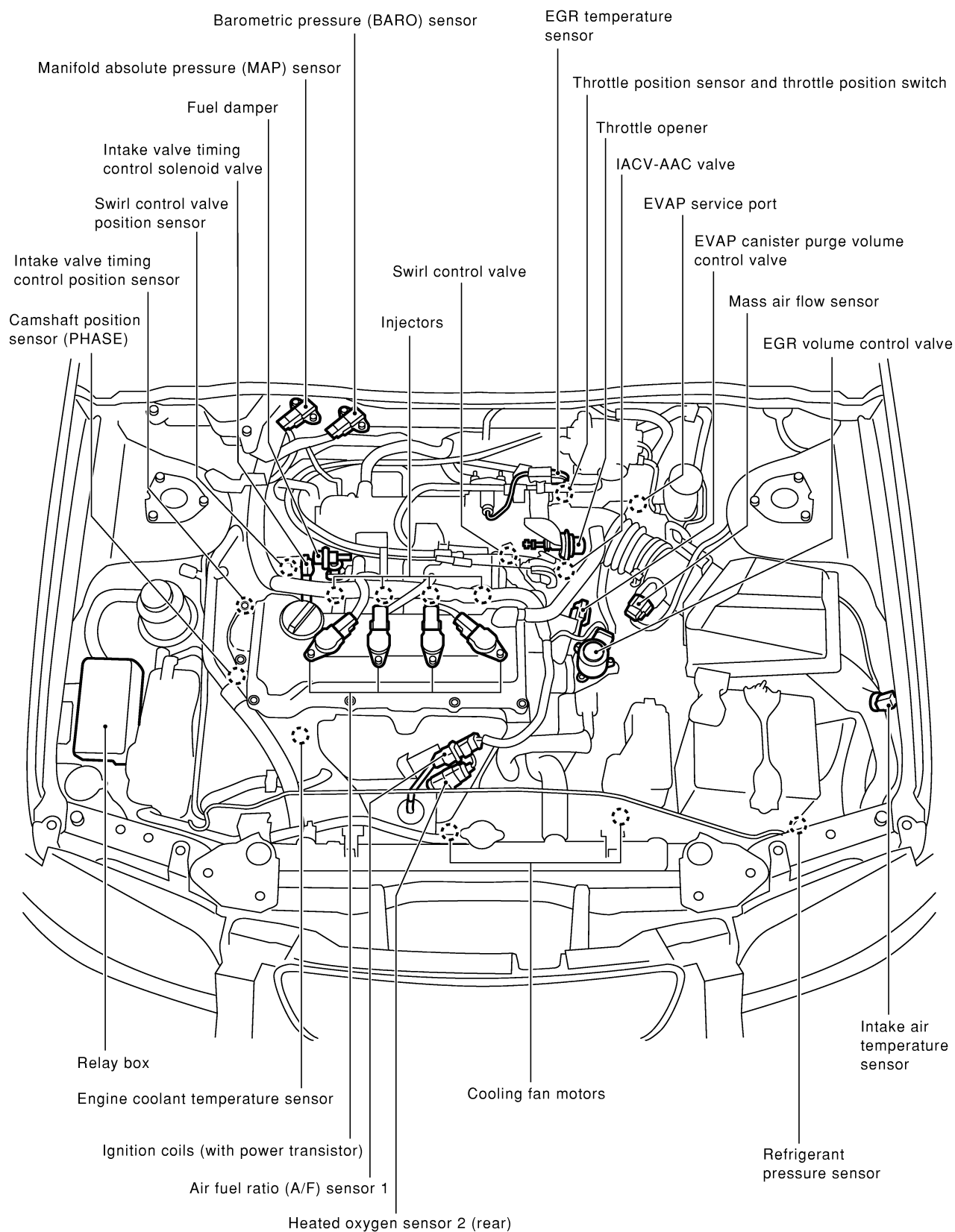
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Engine Control Component Parts Location

Engine Control Component Parts Location

NIEC1202

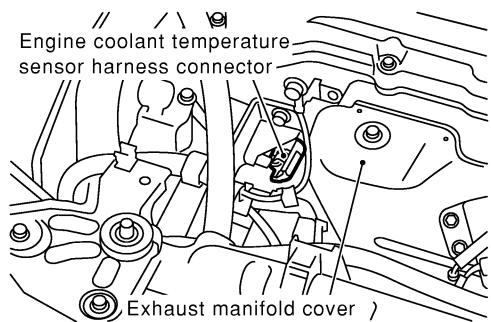


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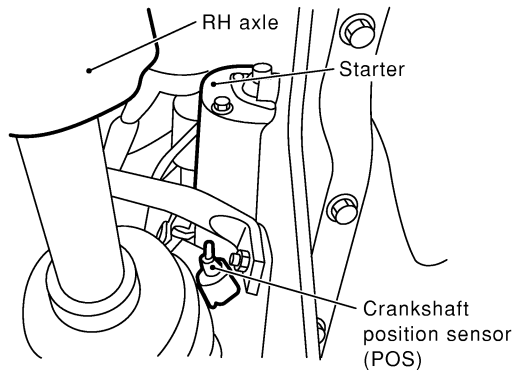
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Engine Control Component Parts Location (Cont'd)



Under vehicle view



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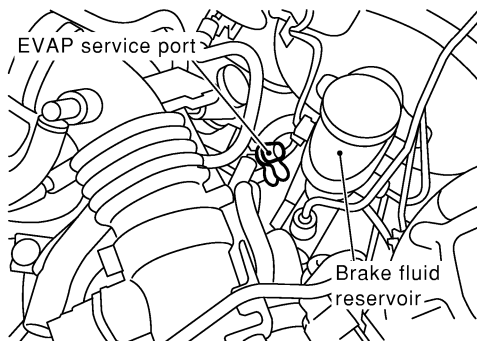
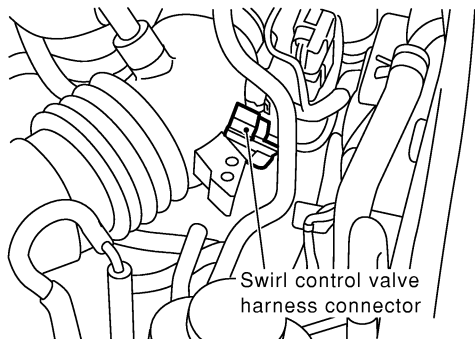
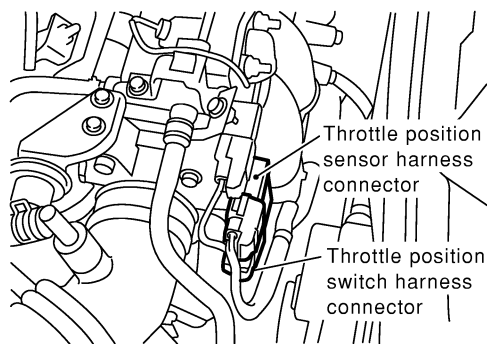
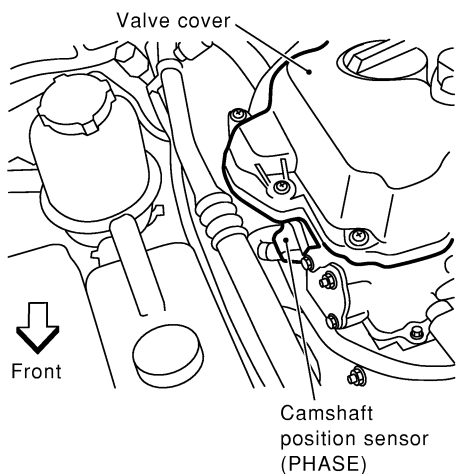
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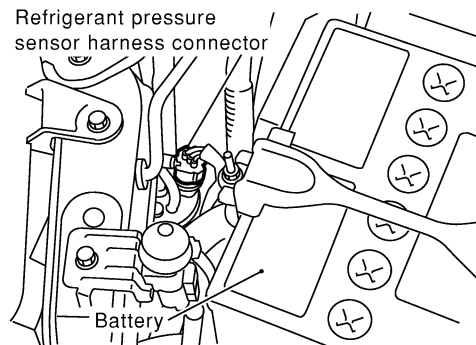
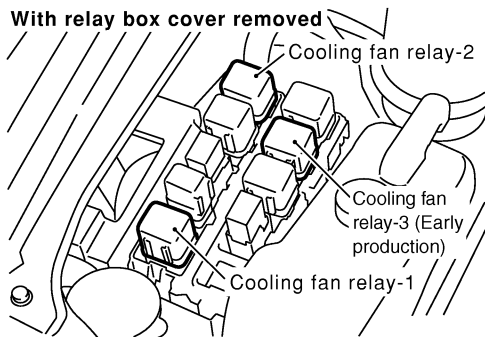
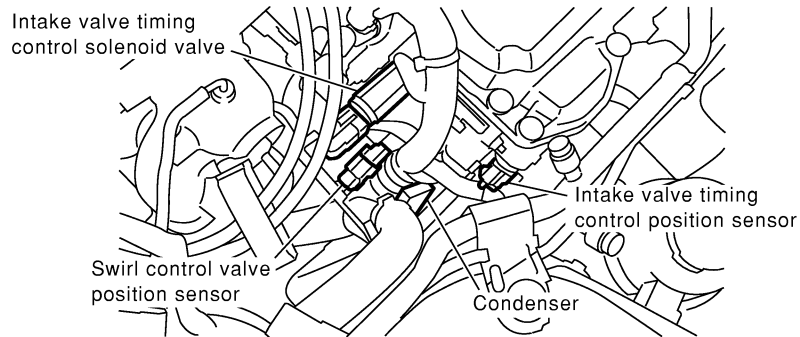
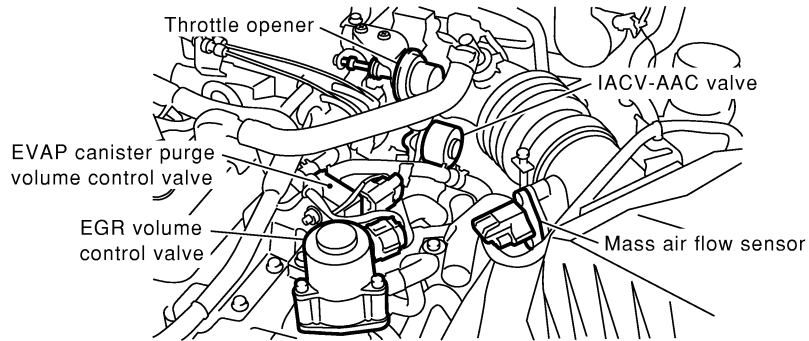


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Engine Control Component Parts Location (Cont'd)

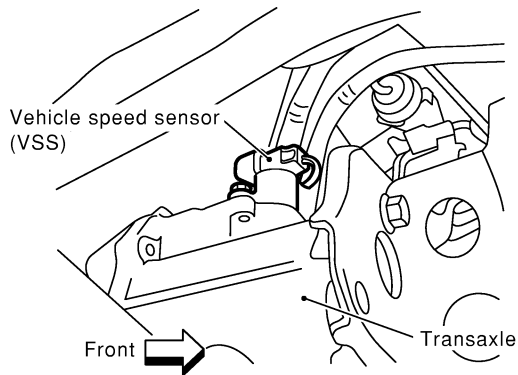
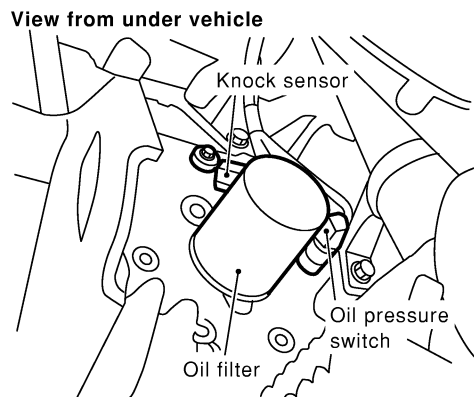
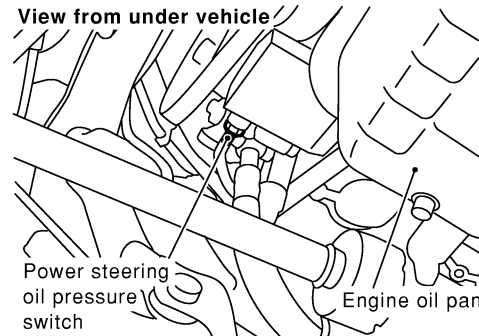
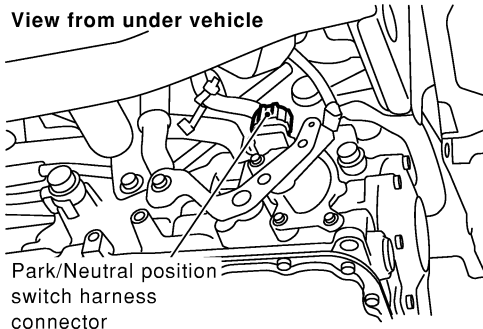
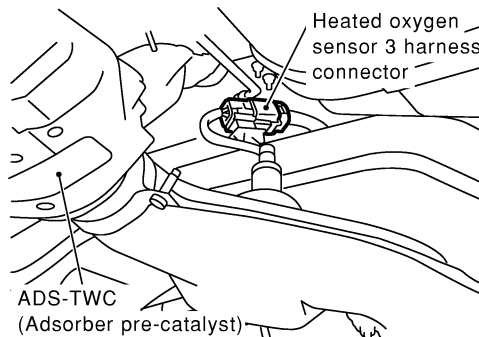
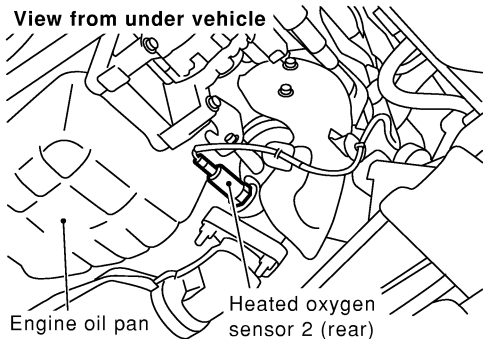


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Engine Control Component Parts Location (Cont'd)



- GI
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- LC
- EC**
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- MT
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- BR
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- BT
- HA
- SC
- EL
- IDX

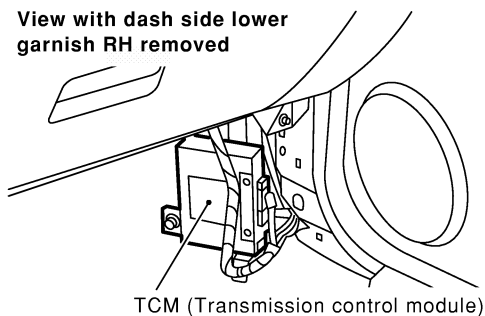
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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

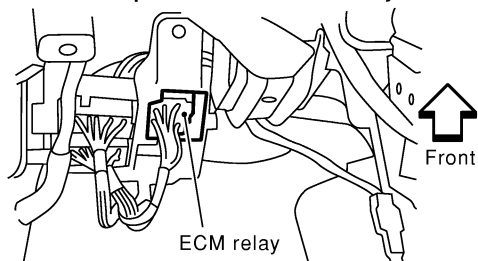
QG18DE (CALIF CA)

Engine Control Component Parts Location (Cont'd)

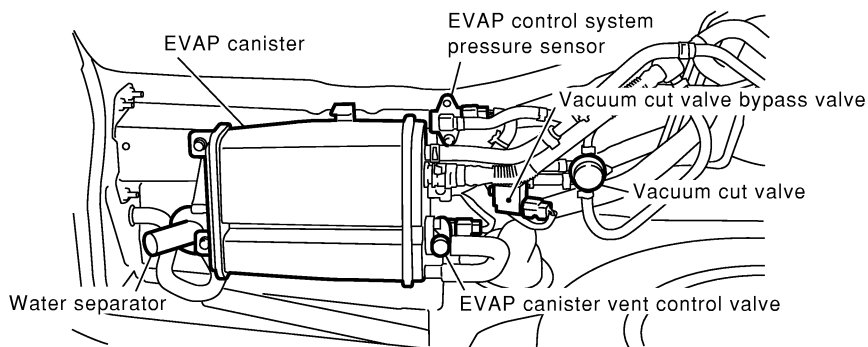
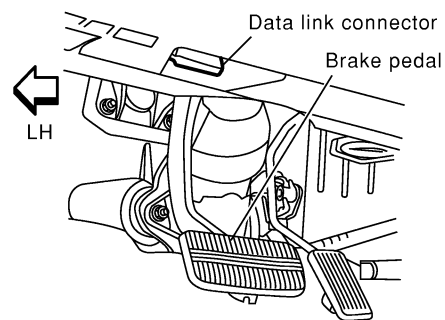
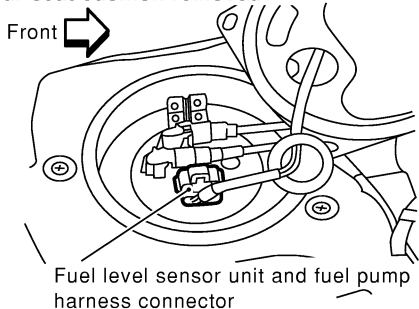
View with dash side lower garnish RH removed



Passenger side view with instrument panel removed for clarity



Rear seat cushion removed



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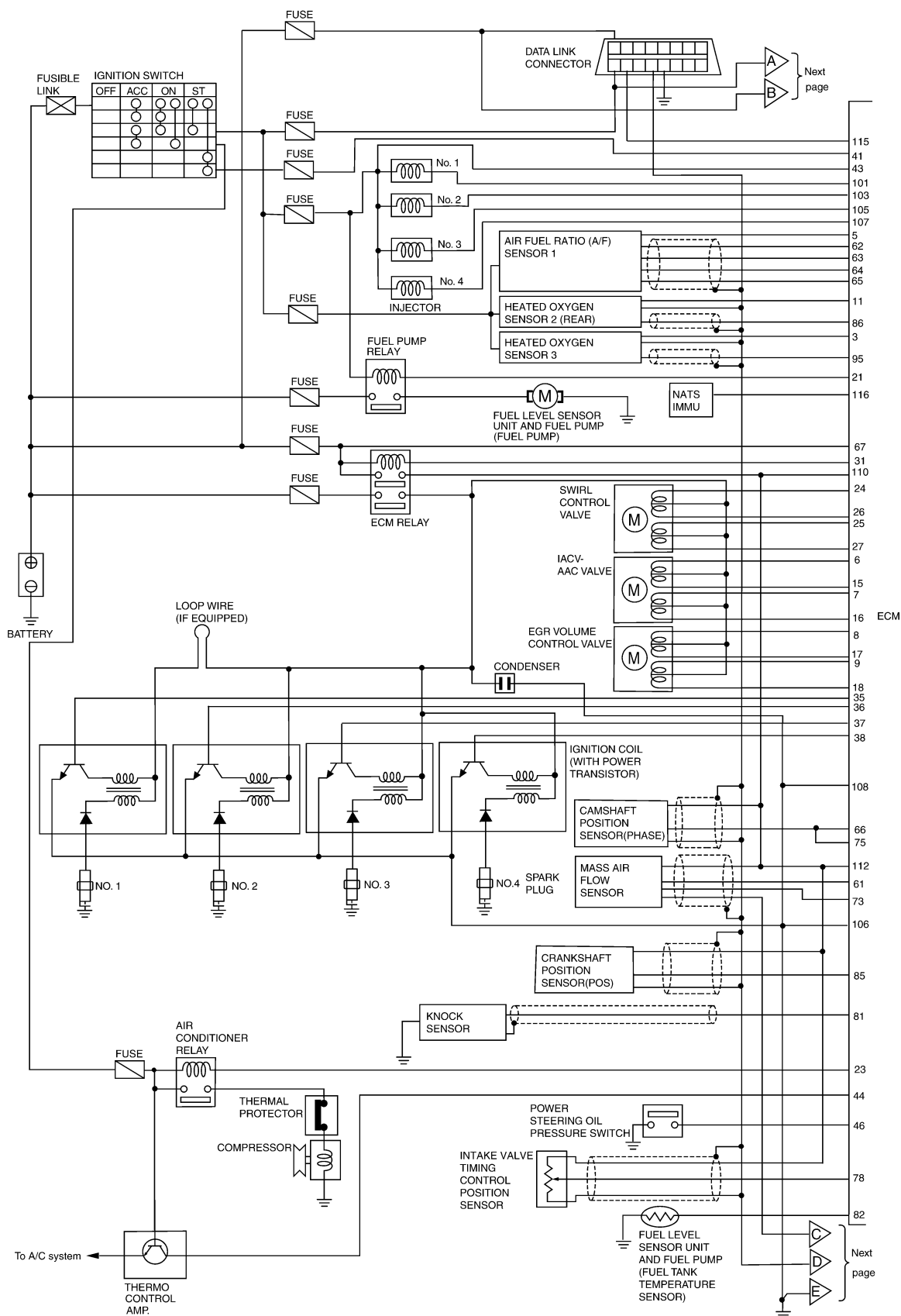
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Circuit Diagram

Circuit Diagram

NIEC1203

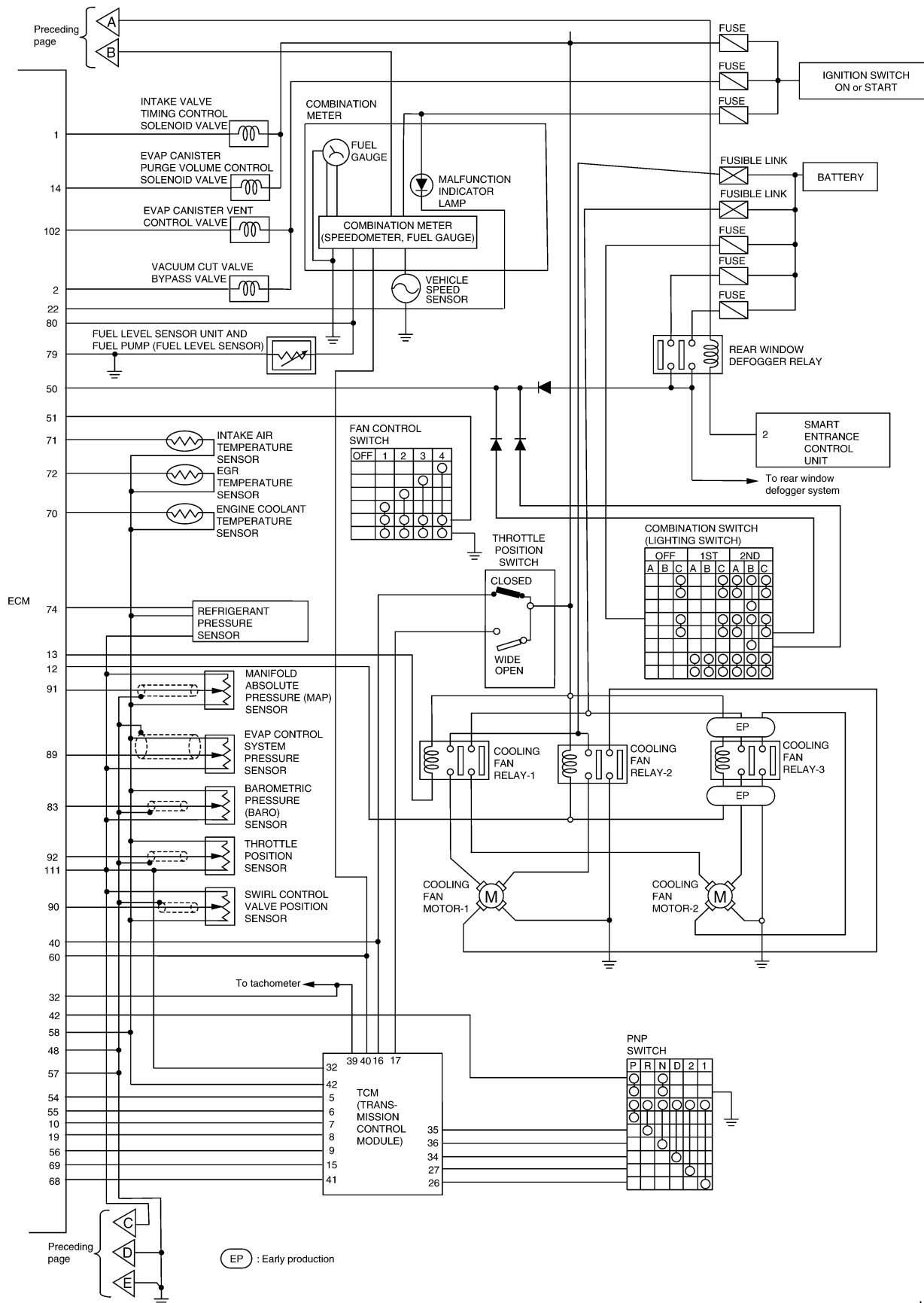


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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

Circuit Diagram (Cont'd)



WEC136A

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

QG18DE (CALIF CA)

System Chart

System Chart

NIEC1205

Input (Sensor)	ECM Function	Output (Actuator)
<ul style="list-style-type: none"> ● Camshaft position sensor (PHASE) ● Crankshaft position sensor (POS) ● Mass air flow sensor ● Engine coolant temperature sensor ● Air fuel ratio (A/F) sensor 1 ● Ignition switch ● Throttle position sensor ● PNP switch ● Air conditioner switch ● Knock sensor ● EGR temperature sensor*1 ● EVAP control system pressure sensor*1 ● Fuel tank temperature sensor*1 ● Battery voltage ● Power steering oil pressure switch ● Vehicle speed sensor ● Intake air temperature sensor ● Manifold absolute pressure (MAP) sensor ● Barometric pressure (BARO) sensor ● Heated oxygen sensor 2 (rear) ● Heated oxygen sensor 3*3 ● TCM (Transmission control module)*2 ● Closed throttle position switch*4 ● Electrical load ● Intake valve timing control position sensor*1 ● Swirl control valve position sensor*1 ● Fuel level sensor*1 ● Refrigerant pressure sensor 	Fuel injection & mixture ratio control	Injectors
	Distributor ignition system	Power transistor
	Idle air control system	IACV-AAC valve
	Intake valve timing control	Intake valve timing control solenoid valve
	Fuel pump control	Fuel pump relay
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)
	EGR control	EGR volume control valve
	Swirl control valve control	Swirl control valve
	A/F sensor 1 heater and heated oxygen sensor 2 and 3 heater control	A/F sensor 1 heater and heated oxygen sensor heater
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
	Cooling fan control	Cooling fan relays
	Air conditioning cut control	Air conditioner relay
	ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve

*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

*2: The DTC related to A/T will be sent to ECM.

*3: Under normal conditions, this sensor is not for engine control operation.

*4: This switch will operate in place of the throttle position sensor to control EVAP parts if the sensor malfunctions.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Multiport Fuel Injection (MFI) System

Multiport Fuel Injection (MFI) System

DESCRIPTION

Input/Output Signal Chart

NIEC1206

GI

NIEC1206S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and piston number	Fuel injection & mixture ratio control	Injector
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position Throttle valve idle position		
PNP switch	Gear position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Electrical load	Electrical load signal		
Battery	Battery voltage		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 (rear)	Density of oxygen in exhaust gas		
Barometric pressure (BARO) sensor	Ambient air barometric pressure		

MA

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AX

SU

Basic Multiport Fuel Injection System

NIEC1206S02

BR

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

ST

Various Fuel Injection Increase/Decrease Compensation

NIEC1206S03

RS

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D"
- High-load, high-speed operation

BT

HA

SC

<Fuel decrease>

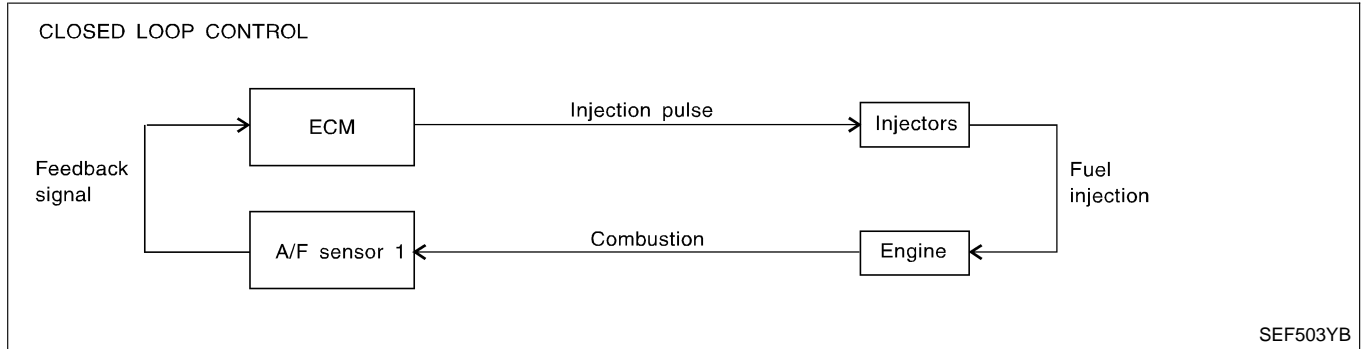
- During deceleration
- During high engine speed operation
- During high vehicle speed operation
- Extremely high engine coolant temperature

EL

IDX

Mixture Ratio Feedback Control (Closed loop control)

NIEC1206S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a air fuel ratio (A/F) sensor 1 in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the air fuel ratio (A/F) sensor 1, refer to EC-1190. This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 (rear) is located downstream of the three way catalyst. Even if the switching characteristics of the A/F sensor 1 shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2 (rear).

Open Loop Control

NIEC1206S05

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of A/F sensor 1 or its circuit
- Insufficient activation of A/F sensor 1 at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

Mixture Ratio Self-learning Control

NIEC1206S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the A/F sensor 1. This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from the A/F sensor 1 indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

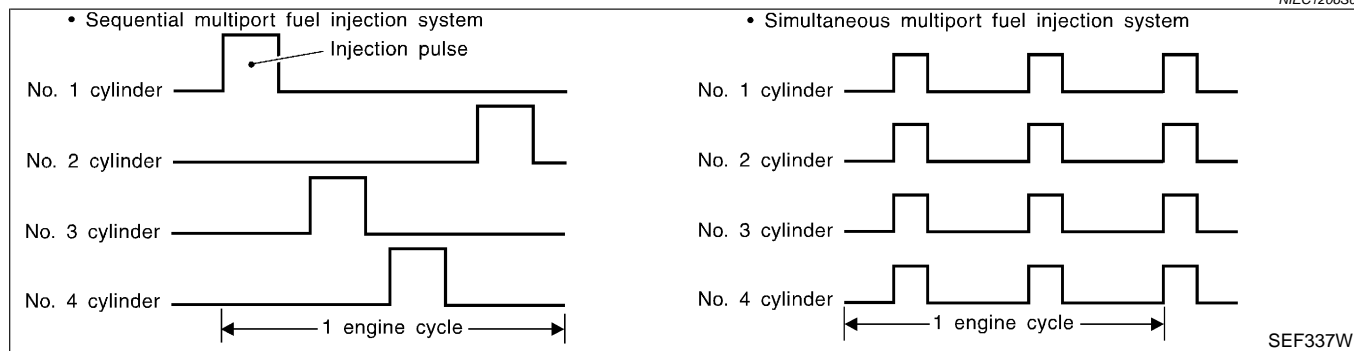
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Multiport Fuel Injection (MFI) System (Cont'd)

Fuel Injection Timing

NIEC1206S07



SEF337W

Two types of systems are used.

Sequential Multiport Fuel Injection System

NIEC1206S0701

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

NIEC1206S0702

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

Fuel Shut-off

NIEC1206S08

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Distributor Ignition (DI) System

DESCRIPTION

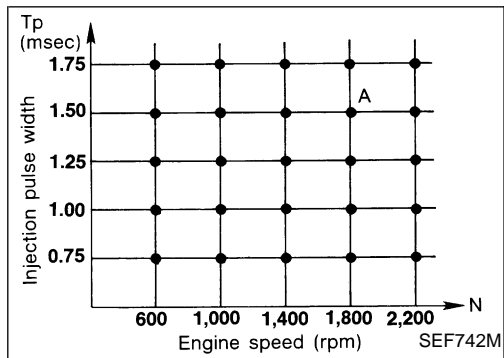
NIEC1207

Input/Output Signal Chart

NIEC1207S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and piston number	Ignition timing control	Power transistor
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position Throttle valve idle position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage		

System Description



The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec
A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control

DESCRIPTION

Input/Output Signal Chart

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
PNP switch	Neutral position		
Throttle position sensor	Throttle valve opening angle		
Camshaft position sensor (PHASE)	Engine speed		
Crankshaft position sensor (POS)	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

System Description

This system improves engine operation when the air conditioner is used.

Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Air Conditioning Cut Control (Cont'd)

- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.
- When the refrigerant pressure is excessively high or low.

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NIEC1209

NIEC1209S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Crankshaft position sensor (POS)	Engine speed		
Camshaft position sensor (PHASE)	Engine speed and piston number		

If the engine speed is above 2,500 rpm with no load, (for example, in Neutral and engine speed over 2,500 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 2,000 rpm, then fuel cut is cancelled.

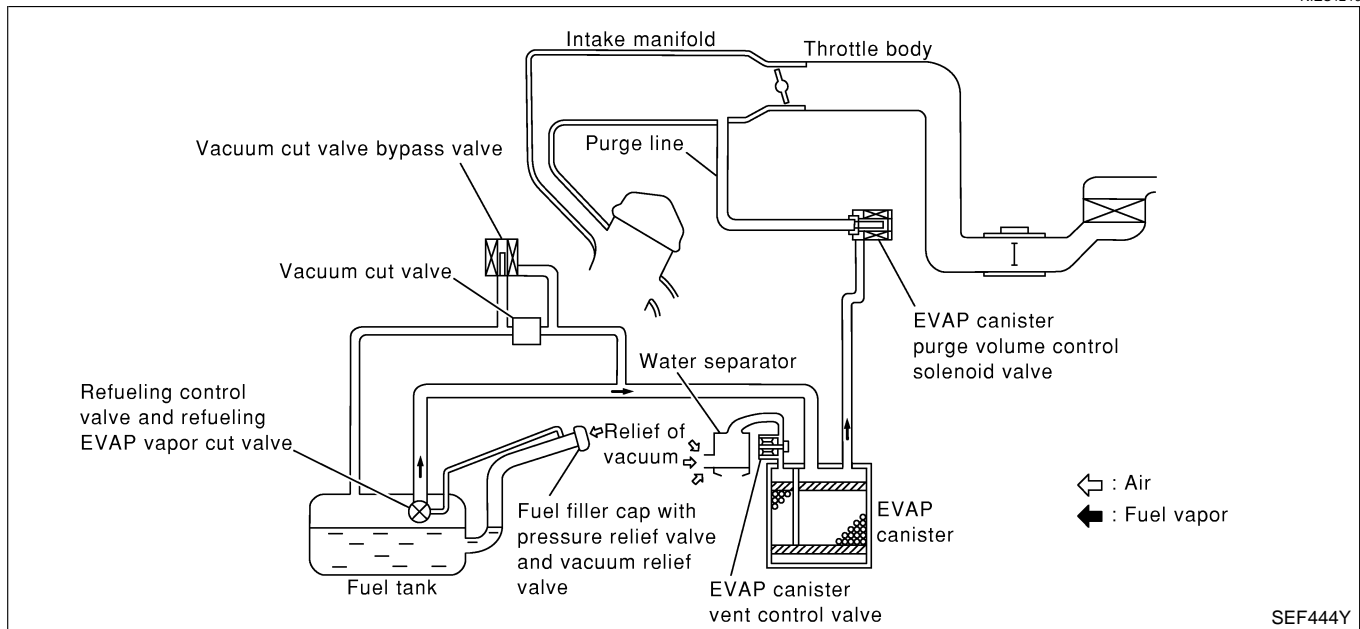
NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, EC-721.

Evaporative Emission System

DESCRIPTION

NIEC1210



The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank.

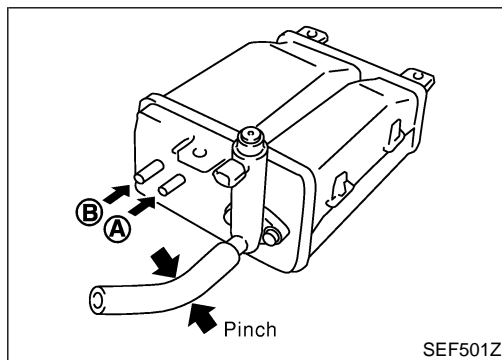
The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating.

EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow

Evaporative Emission System (Cont'd)

rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge control solenoid valve also shuts off the vapor purge line during decelerating and idling.



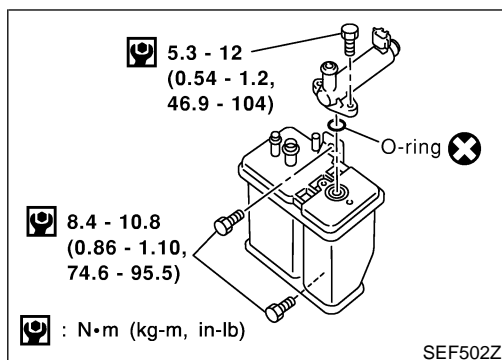
INSPECTION EVAP Canister

NIEC1211

NIEC1211S01

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port **A** and check that air flows freely through port **B**.

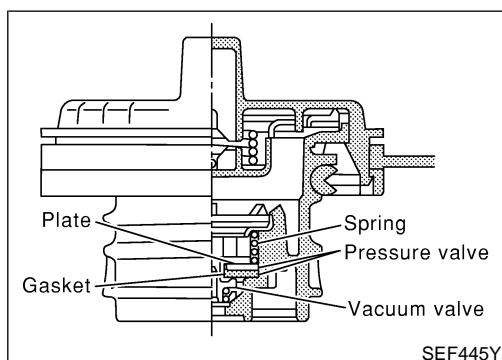


Tightening Torque

NIEC1211S02

Tighten EVAP canister as shown in the figure.

Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.



Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NIEC1211S03

NOTE:

Refer to fuel filler cap adapter instruction manual before performing following inspection.

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

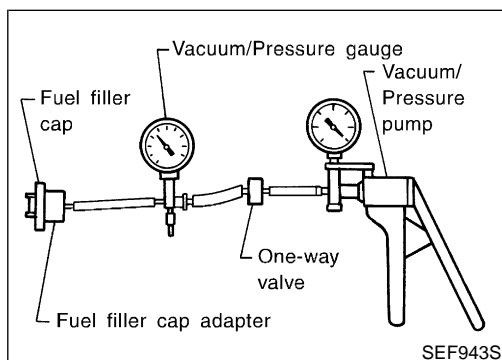
Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.48 psi)

3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Evaporative Emission System (Cont'd)

Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

NEC1211S04

Refer to EC-1305.

Evaporative Emission (EVAP) Canister Purge Volume Control Solenoid Valve

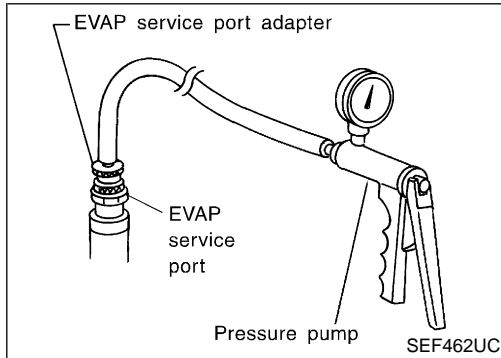
NEC1211S05

Refer to EC-1052.

Fuel Tank Temperature Sensor

NEC1211S06

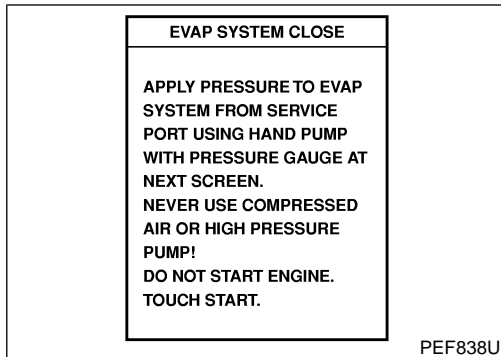
Refer to EC-971.



EVAP Service Port

NEC1211S07

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.



How to Detect Fuel Vapor Leakage

NEC1211S08

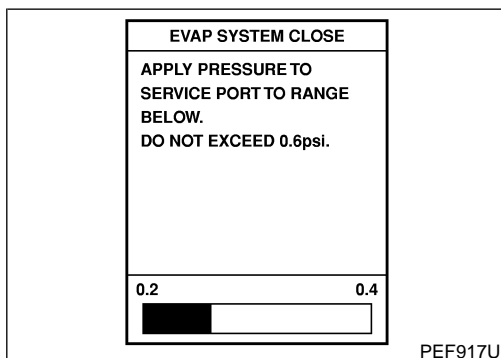
CAUTION:

- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

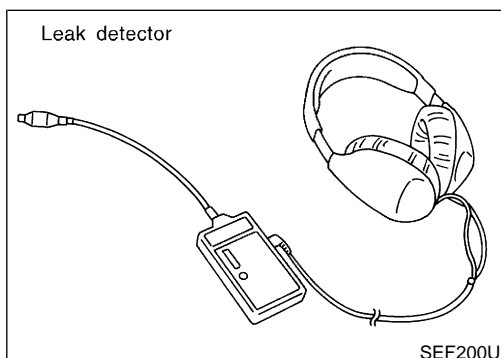
NOTE:

Improper installation of adapter to the service port may cause a leak.

With CONSULT-II



- 1) Attach the EVAP service port adapter securely to the EVAP service port.
- 2) Also attach the pressure pump and hose.
- 3) Turn ignition switch "ON".
- 4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
- 5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- 7) Remove the EVAP service port adapter and hose with pressure pump.
- 8) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.
- 9) If the check result is NG, repair or replace the malfunctioning parts. If OK, touch "BACK" on CONSULT-II screen.
- 10) Start engine and warm it up to normal operating temperature.
- 11) Turn ignition switch "OFF" and wait at least 10 seconds.
- 12) Restart engine and let it idle for 90 seconds.
- 13) Keep engine speed at 2,000 rpm for 30 seconds.
- 14) Turn ignition switch "OFF".



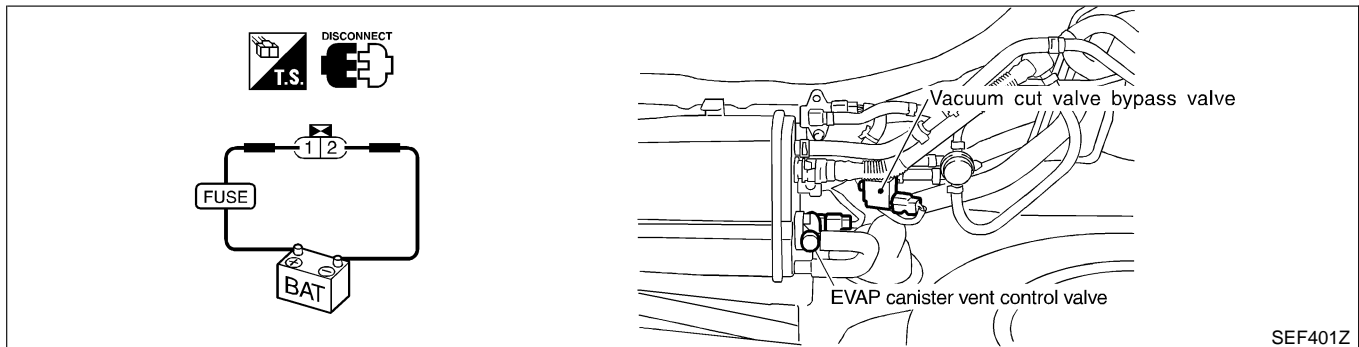
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Evaporative Emission System (Cont'd)

⊗ Without CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
- 2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
- 3) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
- 4) Remove the EVAP service port adapter and hose with pressure pump.
- 5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.
- 6) If the check result is NG, repair or replace the malfunctioning parts. If OK, stop applying battery voltage to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 7) Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 8) Start engine and warm it up to normal operating temperature.
- 9) Turn ignition switch "OFF" and wait at least 10 seconds.
- 10) Restart engine and let it idle for 90 seconds.
- 11) Keep engine speed at 2,000 rpm for 30 seconds.
- 12) Turn ignition switch "OFF".



ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Evaporative Emission System (Cont'd)

EVAPORATIVE EMISSION LINE DRAWING

NIEC12/12

GI

MA

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LC

EC

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CL

MT

AT

AX

SU

BR

ST

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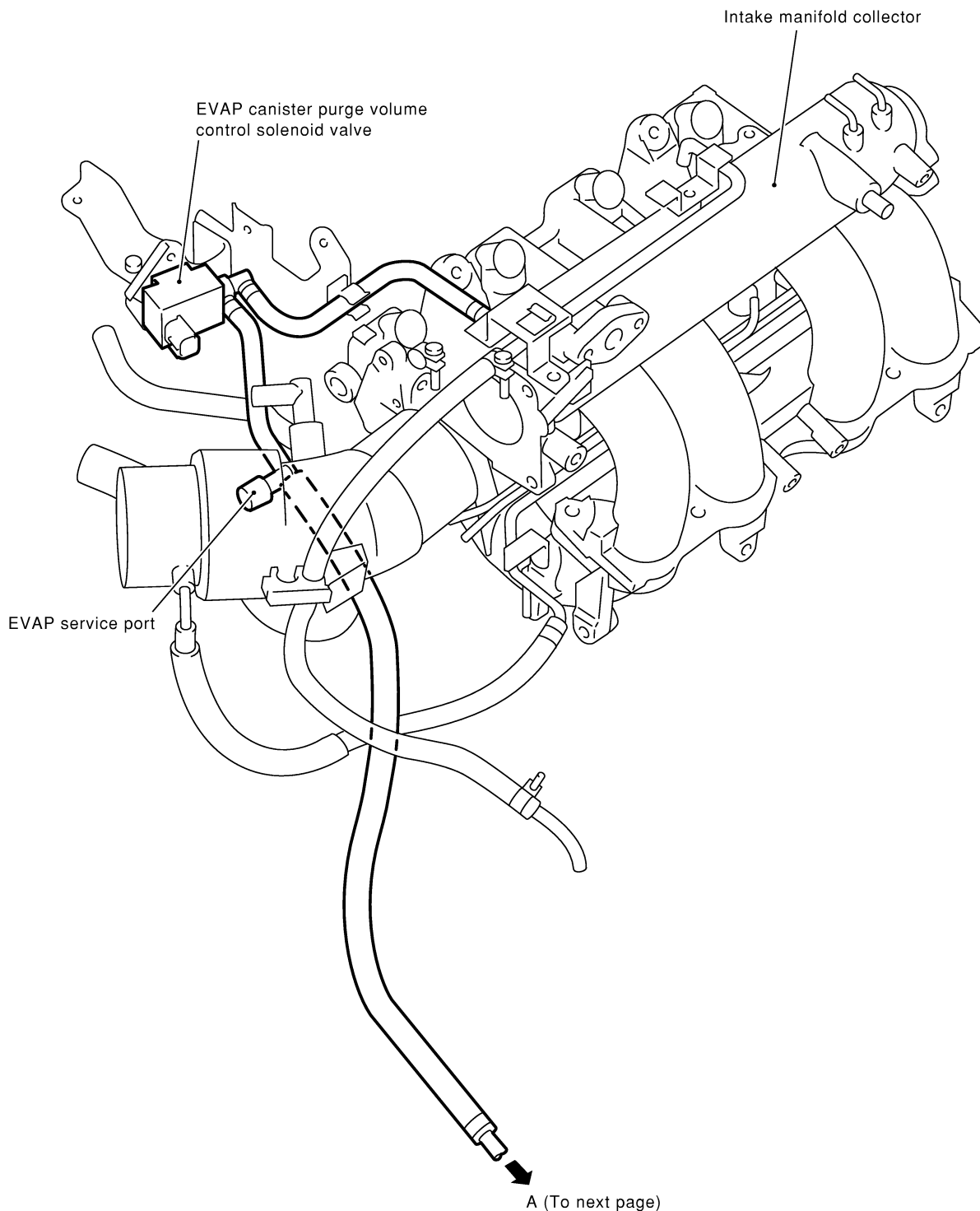
BT

HA

SC

EL

IDX



NOTE : Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

SEF503Z

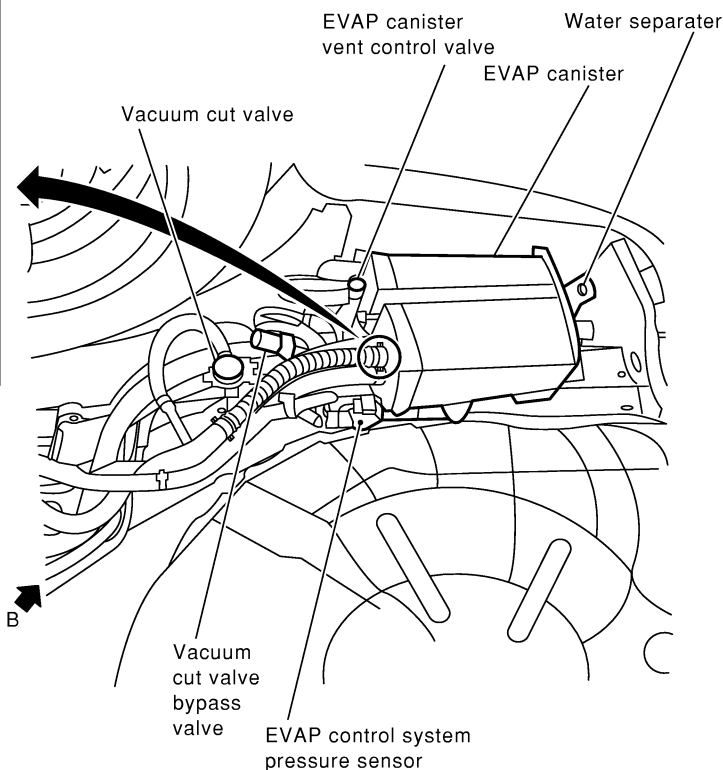
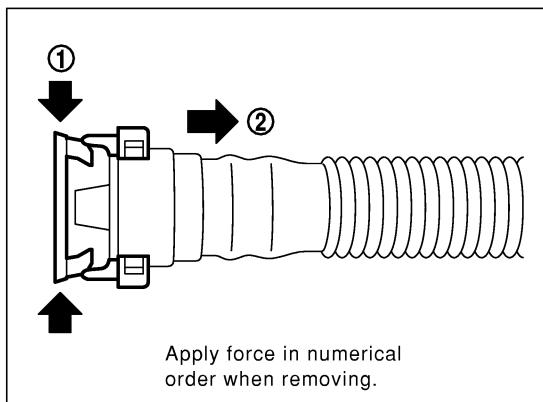
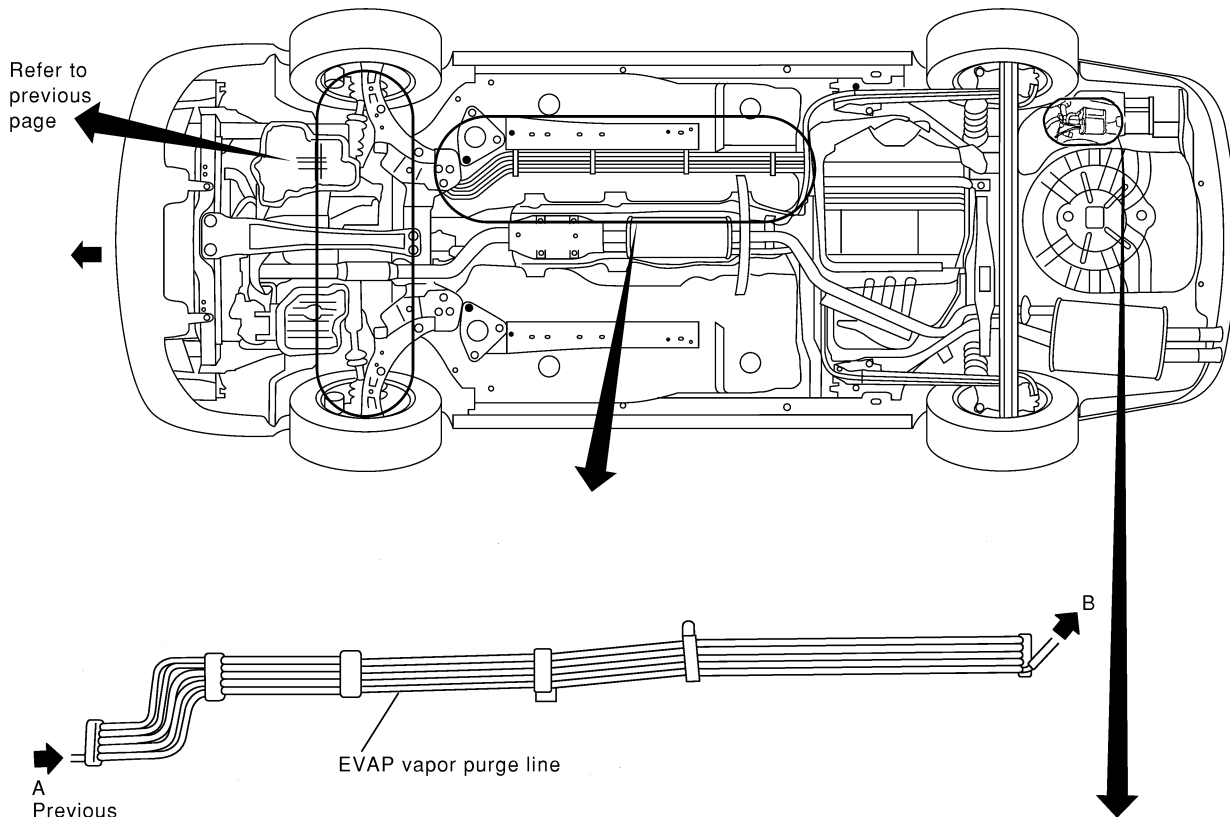
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Evaporative Emission System (Cont'd)

NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.



INSTALLATION PRECAUTIONS:

- This hose can be reused, but do not remove it unless necessary.
- Remove any foreign matter (dust, sand, etc.) from the hose connection before installing.
- Apply oil to the O-ring before installing.
- Replace the hose assembly if the O-ring is scratched or cracked.

SEF515Z

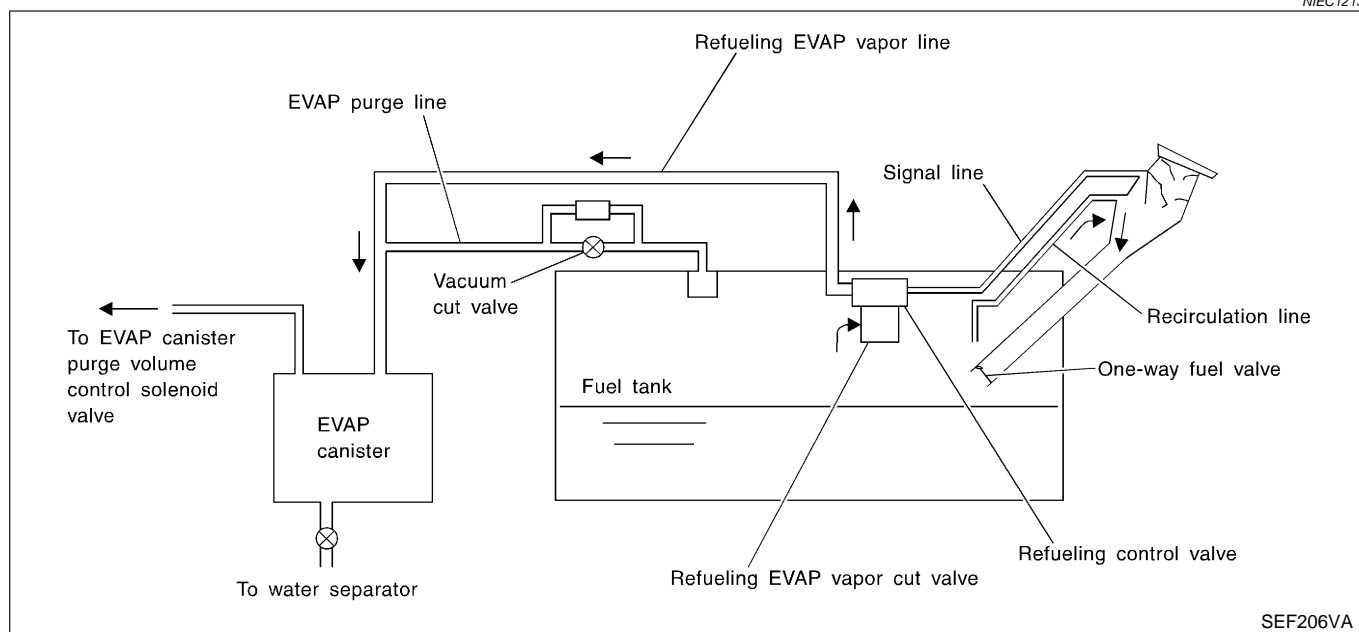
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR)

On Board Refueling Vapor Recovery (ORVR)

SYSTEM DESCRIPTION



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a “CAUTION: INFLAMMABLE” sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

Before removing fuel line parts, carry out the following procedures:

- a) Put drained fuel in an explosion-proof container and put lid on securely.
 - b) Release fuel pressure from fuel line. Refer to “Fuel Pressure Release”, EC-743.
 - c) Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
 - Do not kink or twist hose and tube when they are installed.
 - Do not tighten hose and clamps excessively to avoid damaging hoses.
 - After installation, run engine and check for fuel leaks at connection.
 - Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

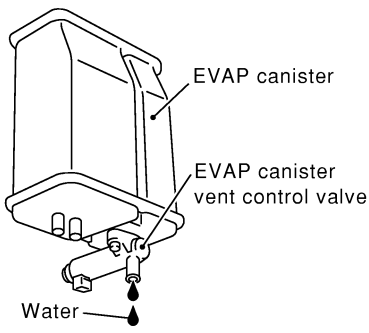
DIAGNOSTIC PROCEDURE

NIEC1214

Symptom: Fuel Odor From EVAP Canister Is Strong.

NIEC1214S01

1	CHECK EVAP CANISTER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
Yes or No		
Yes	▶	GO TO 3.
No (With CONSULT-II)	▶	GO TO 6.
No (Without CONSULT-II)	▶	GO TO 7.

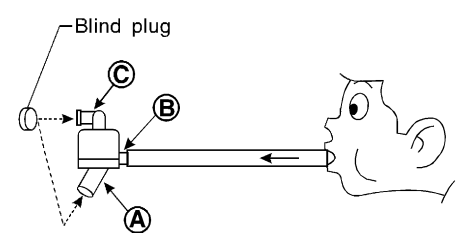
SEF504Z

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	▶	GO TO 4.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR	<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: • Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT	
	OK	▶	GO TO 5.	
	NG	▶	Replace water separator.	

5	DETECT MALFUNCTIONING PART	<p>Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.</p> <p style="text-align: center;">▶</p> <p>Repair or replace EVAP hose.</p>	AT AX SU BR ST RS BT HA SC EL IDX
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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

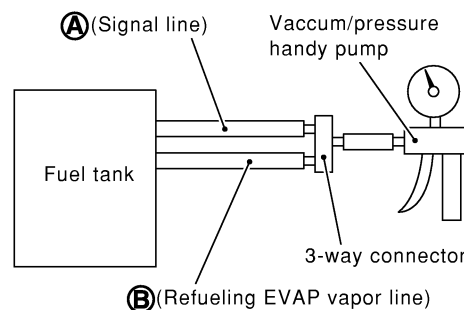
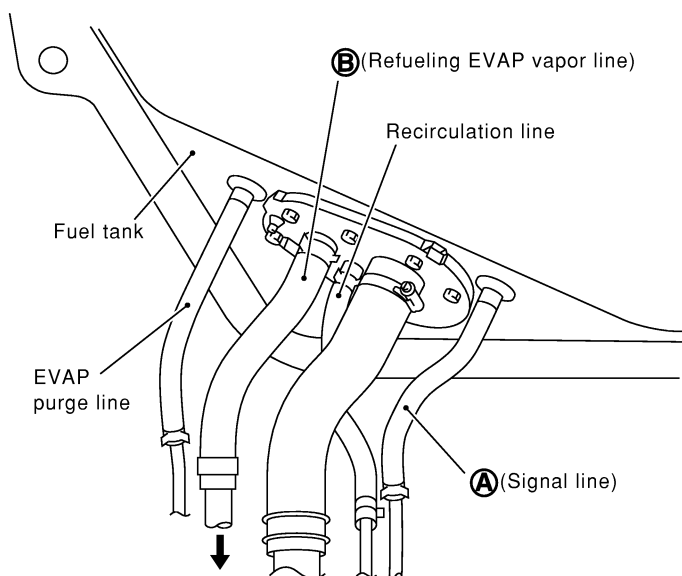
6 CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM."
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel gauge retainer with fuel level sensor unit.

Always replace O-ring with new one.

 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF505Z

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

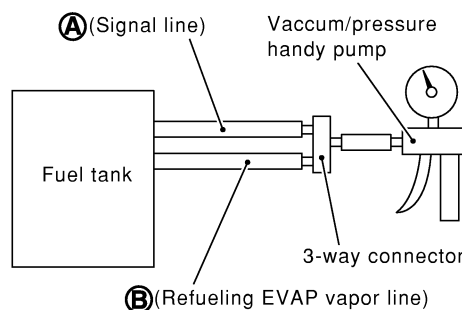
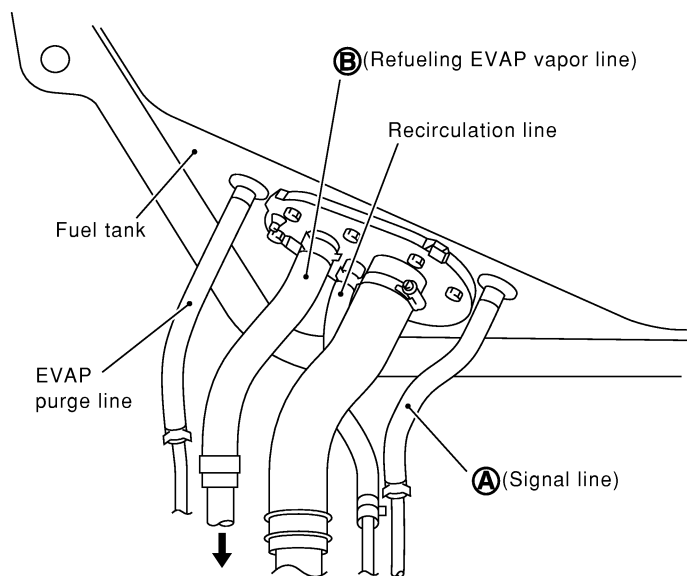
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

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RS
BT
HA
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EL
IDX

7 CHECK REFUELING EVAP VAPOR CUT VALVE

⊗ Without CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel level sensor unit retainer.
 - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit retainer with fuel level sensor unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF505Z

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

8	CHECK REFUELING CONTROL VALVE	<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.
		SEF505Z
		OK or NG
OK	▶▶	INSPECTION END
NG	▶▶	Replace refueling control valve with fuel tank.

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

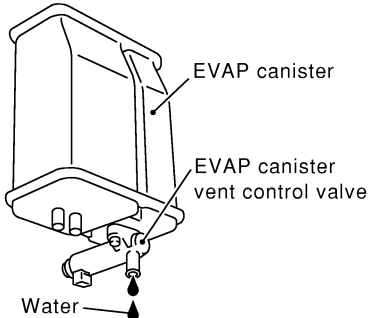
NIEC1214S02

1	CHECK EVAP CANISTER	<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).
		OK or NG
OK	▶▶	GO TO 2.
NG	▶▶	GO TO 3.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

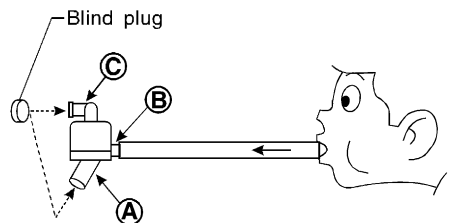
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
SEF504Z		
Yes or No		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

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3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
▶ GO TO 4.		

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4	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
<ul style="list-style-type: none"> ● Do not disassemble water separator. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace water separator.

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5	DETECT MALFUNCTIONING PART	
Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.		
▶ Repair or replace EVAP hose.		

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

6	CHECK VENT HOSES AND VENT TUBES	
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE	
Check signal line and recirculation line for clogging, dents and cracks.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace filler neck tube.

8	CHECK REFUELING CONTROL VALVE	
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 		
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Labels: Fuel tank, EVAP purge line, Recirculation line, (A) (Signal line), (B) (Refueling EVAP vapor line)</p> </div> <div style="text-align: center;"> <p>Labels: Fuel tank, (A) (Signal line), Vacuum/pressure handy pump, 3-way connector, (B) (Refueling EVAP vapor line)</p> </div> </div>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	Replace refueling control valve with fuel tank.

SEF505Z

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

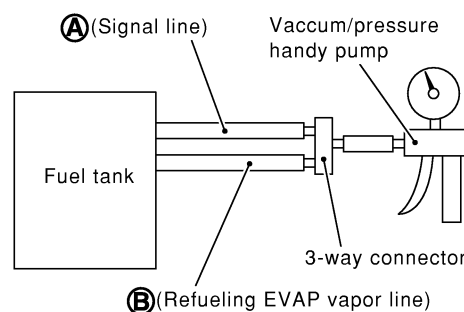
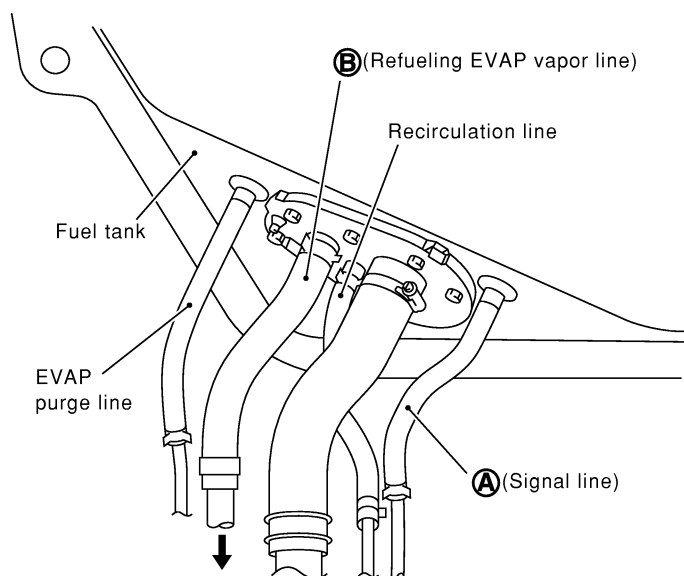
QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

9 CHECK REFUELING EVAP VAPOR CUT VALVE

Ⓜ With CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit retainer.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit retainer where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit retainer with fuel level sensor unit.
Always replace O-ring with new one.
 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable.



SEF505Z

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

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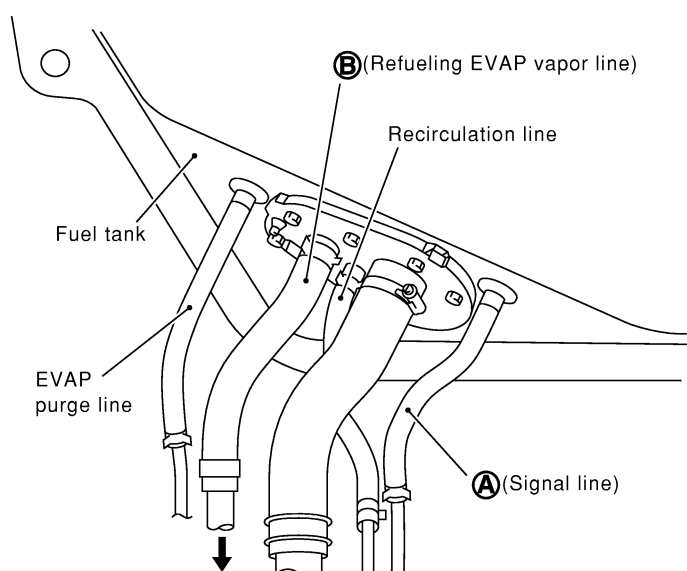
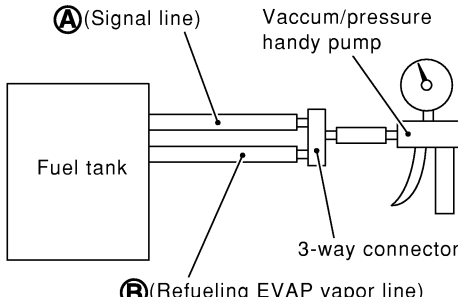
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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

10	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel level sensor unit retainer. b. Drain fuel from the tank using a hand pump into a fuel container. 3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Remove fuel level sensor unit retainer with fuel level sensor unit. Always replace O-ring with new one. c. Put fuel tank upside down. d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit retainer remaining open and check that the pressure is applicable. 	
 	
SEF505Z	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace refueling EVAP vapor cut valve with fuel tank.

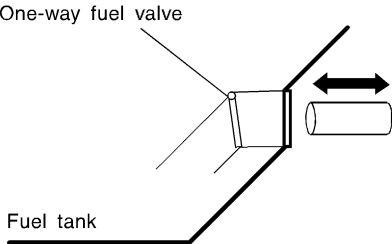
11	CHECK FUEL FILLER TUBE
Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I
Check one-way valve for clogging.	
OK or NG	
OK	▶ GO TO 13.
NG	▶ Repair or replace one-way fuel valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

QG18DE (CALIF CA)

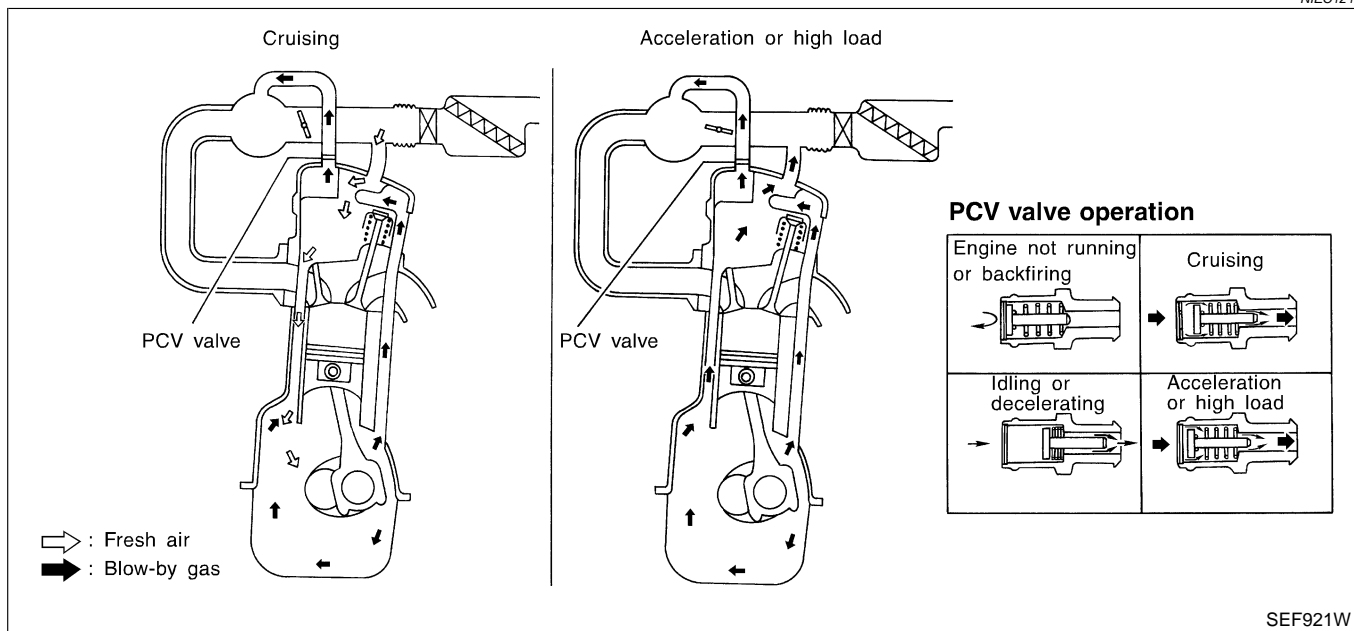
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

13	CHECK ONE-WAY FUEL VALVE-II	<p>1. Make sure that fuel is drained from the tank. 2. Remove fuel filler tube and hose. 3. Check one-way fuel valve for operation as follows. When a stick is inserted, the valve should open, when removing stick it should close.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF665U</p> <p>Do not drop any material into the tank.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT AT AX SU BR ST RS BT HA
OK	▶	INSPECTION END	
NG	▶	Replace fuel filler tube or replace one-way fuel valve with fuel tank.	

Positive Crankcase Ventilation

DESCRIPTION

NIEC1215



This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

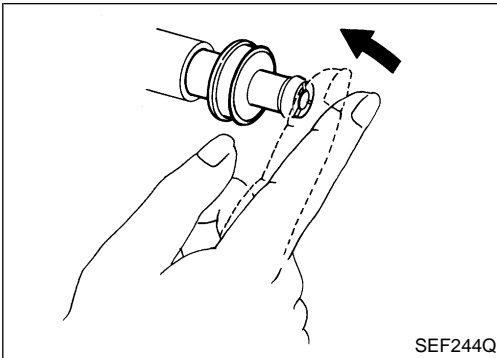
During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.

Positive Crankcase Ventilation (Cont'd)



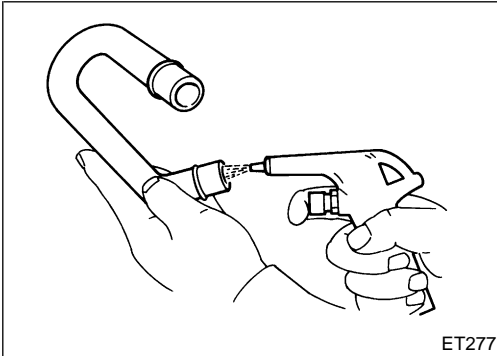
INSPECTION

PCV (Positive Crankcase Ventilation) Valve

NIEC1216

NIEC1216S01

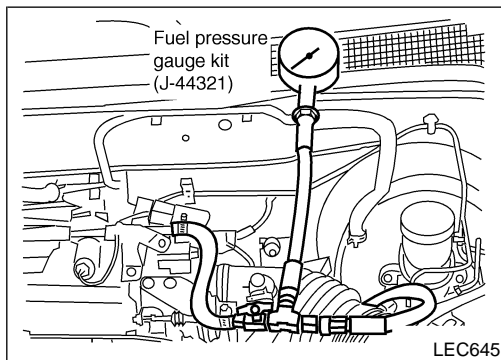
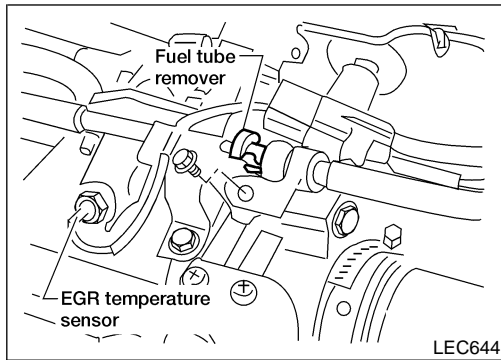
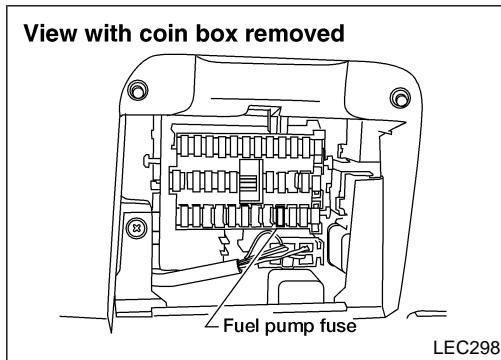
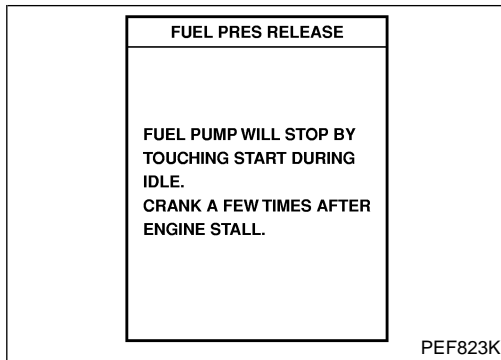
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.



Ventilation Hose

NIEC1216S02

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



Fuel Pressure Release

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

WITH CONSULT-II

1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.

WITHOUT CONSULT-II

1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF and reconnect fuel pump fuse.

Fuel Pressure Check

- Make sure that clamp screws do not contact adjacent parts.
 - Use a torque driver to tighten clamps.
 - Use Fuel Pressure Gauge Kit J-44321 to check fuel pressure.
 - Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.
1. Release fuel pressure to zero.
 2. Disconnect fuel hose from fuel feed tube (engine side) using fuel tube quick connect removal tool.
 3. Release quick connector and disconnect fuel hose from fuel feed tube (underbody side). Remove fuel hose assembly.

CAUTION:

Do not install hose clamps over flared portions of fuel feed tubes or damage to fuel feed tubes may result.

4. Install fuel pressure gauge from kit J-44321 between fuel tubes using hose and clamps from kit.
5. Turn ignition switch "ON" and check for fuel leakage.
6. Start engine and read the indication on fuel pressure gauge.

At idle speed:

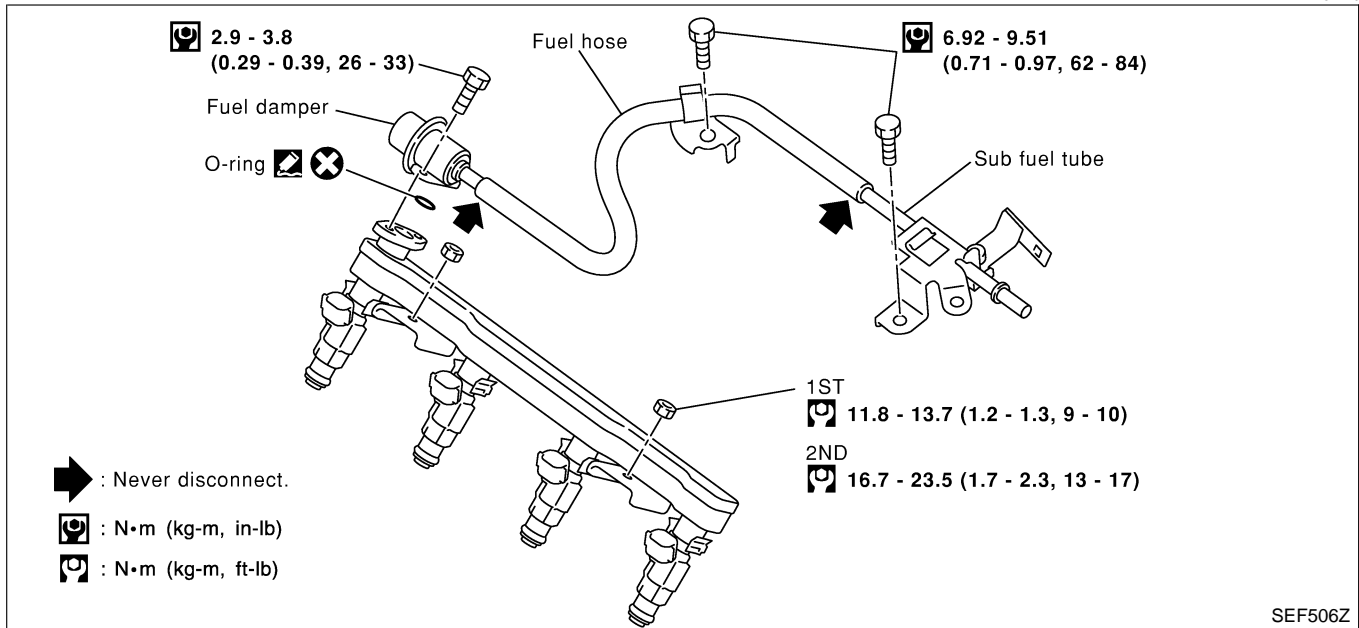
Approximately 350 kPa (3.57 kg/cm², 51 psi)

If results are unsatisfactory, check for fuel leakage in fuel line between fuel tank and injector, and check fuel filter for clogging.

If fuel line and fuel filter are OK, replace fuel pressure regulator. Refer to **FE-12**, "QG18DE CALIF. CA MODEL".

**Injector
REMOVAL AND INSTALLATION**

NIEC1219



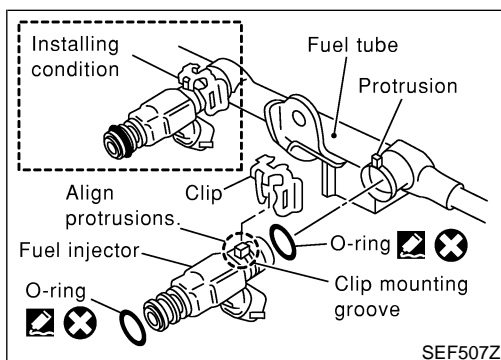
SEF506Z

1. Release fuel pressure to zero. Refer to previous page.
2. Remove accelerator cables.
3. Remove intake manifold bracket.
4. Remove PCV hose with bracket.
5. Disconnect injector harness connectors.
6. Disconnect fuel damper vacuum hose from intake manifold collector.
7. Remove fuel damper with fuel hose and sub fuel tube from the fuel rail. Do not kink or pull fuel hose.

CAUTION:

Do not separate fuel hose from fuel damper and sub fuel tube.

8. Remove injectors with fuel tube assembly.



SEF507Z

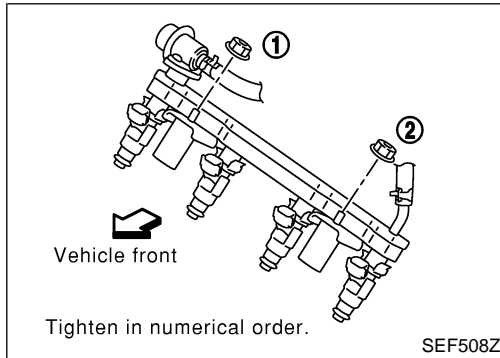
9. Expand and remove clips securing fuel injectors.
10. Extract fuel injectors straight from fuel tubes.
 - **Be careful not to damage injector nozzles during removal.**
 - **Do not bump or drop fuel injectors.**
11. Carefully install O-rings, including the one used with the pressure regulator.
 - **Lubricate O-rings by smearing engine oil.**
 - **Be careful not to damage O-rings with service tools finger nails or clips. Do not expand or twist O-rings.**
 - **Discard old clips; replace with new ones.**

12. Position clips in grooves on fuel injectors.
 - **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**
13. Align protrusions of fuel tubes with those of fuel injectors.
14. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.

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15. Tighten fuel tube assembly mounting nuts in two stages.

: Tightening torque N·m (kg·m, ft·lb)

1st stage:

12 - 13 (1.2 - 1.4, 9 - 10)

2nd stage:

17 - 23 (1.7 - 2.4, 13 - 17)

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16. Install all removed parts in the reverse order of removal.

CAUTION:

- **When installing the fuel damper, install the fuel damper with fuel hose and sub fuel tube as assembly.**
- **After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.**

CL

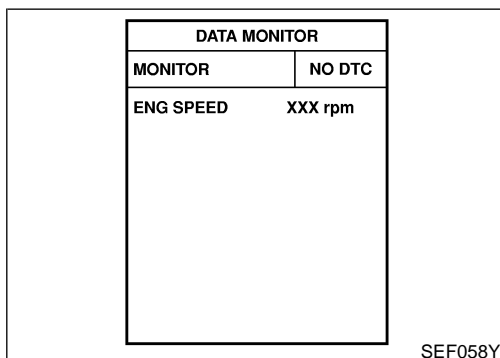
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How to Check Idle Speed and Ignition Timing

NIEC1220

IDLE SPEED

NIEC1220S01

Method A

- **With CONSULT-II**

Check idle speed in "DATA MONITOR" mode with CONSULT-II.

- **With GST**

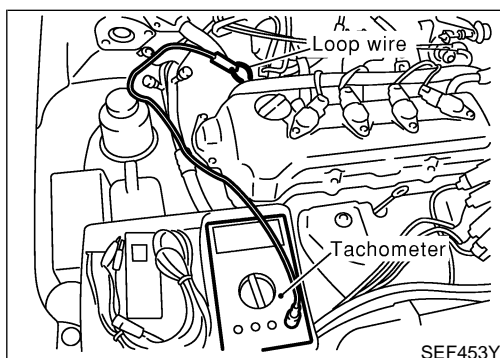
Check idle speed in "MODE 1" with GST.

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Method B (Using Loop wire) (If equipped)

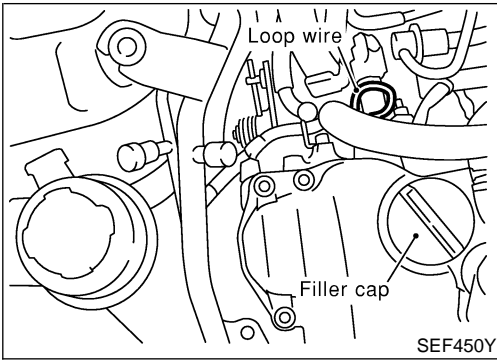
Check the idle speed using loop-wire as shown in the figure.

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How to Check Idle Speed and Ignition Timing (Cont'd)



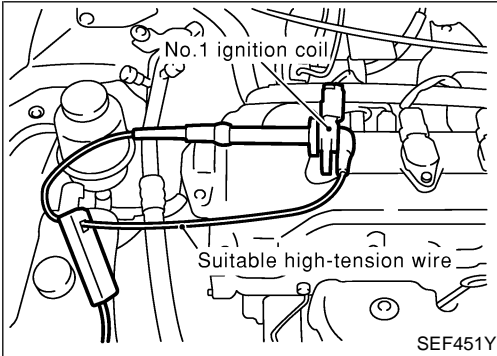
IGNITION TIMING

NIEC1220S02

Any of following two methods may be used.

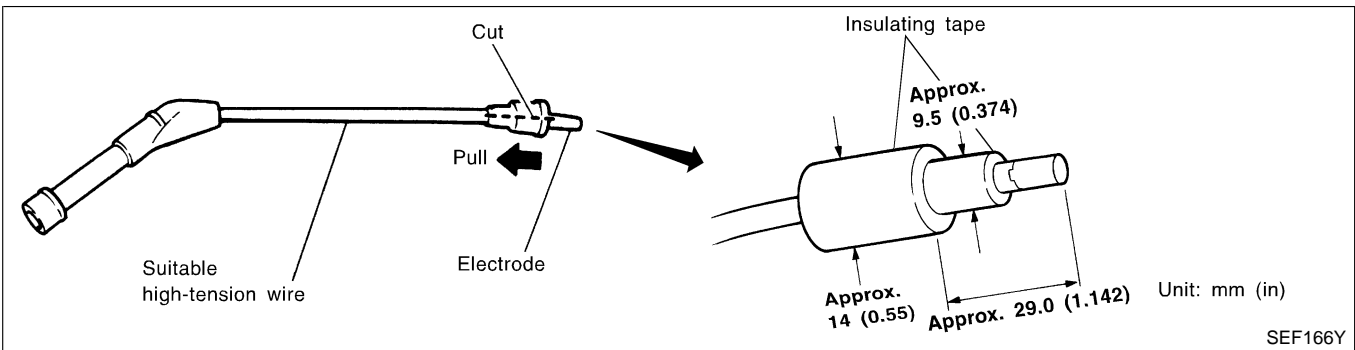
Method A

- 1) Attach timing light to loop wire (if equipped) which location is shown in the figure.
- 2) Check ignition timing.



Method B

- 1) Remove No. 1 ignition coil.
- 2) Connect No. 1 ignition coil and No. 1 spark plug with suitable high-tension wire as shown, and attach timing light clamp to this wire.
- 3) Check ignition timing.



Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

NIEC1221

NIEC1221S01

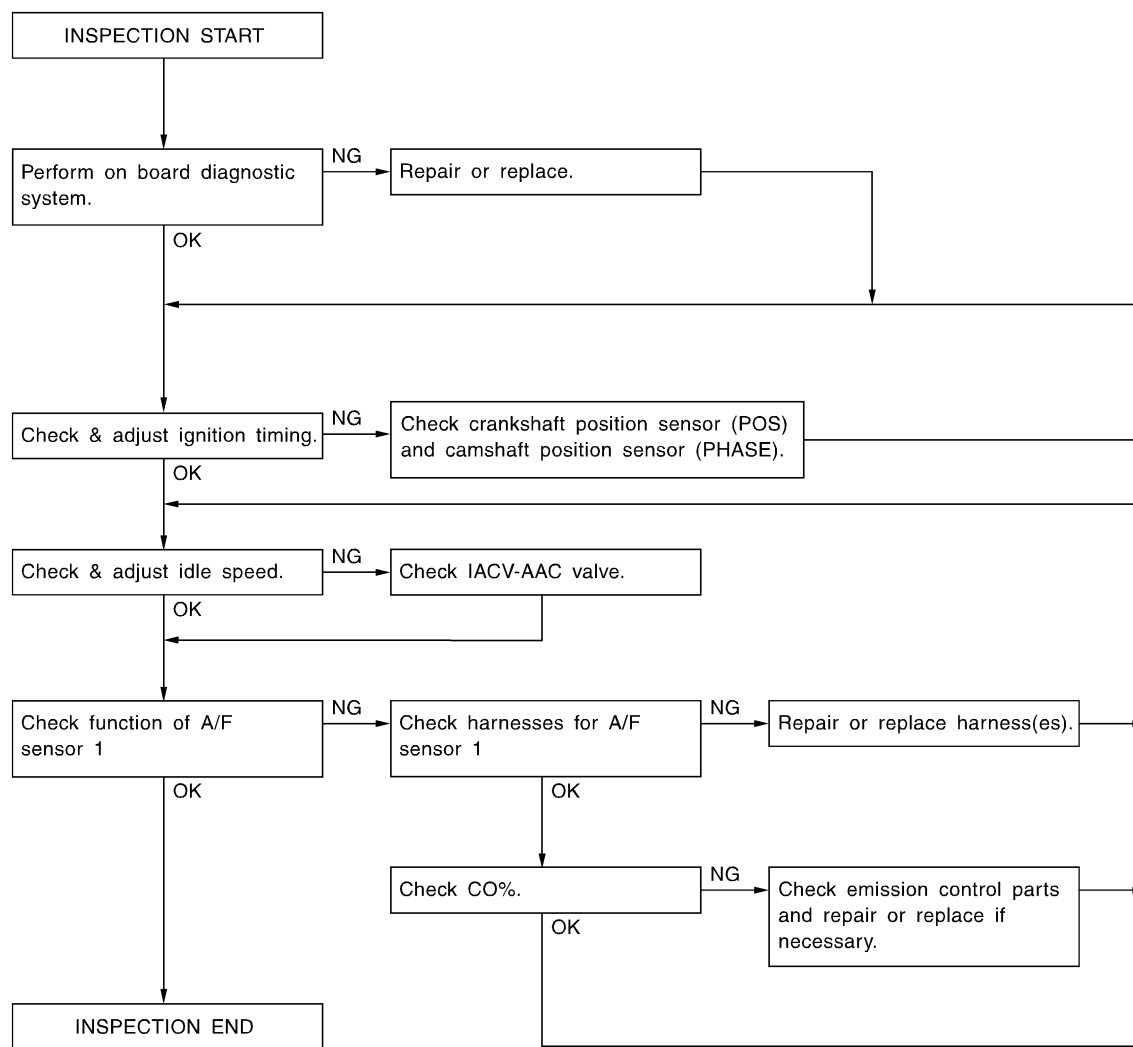
PREPARATION

- 1) Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system (Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - EGR valve operation
 - Throttle valve
 - EVAP system
- 2) On models equipped with air conditioner, checks should be carried out while the air conditioner is "OFF".
- 3) On models equipped with automatic transaxle, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "P" or "N" position.
- 4) When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.

- 5) Turn off headlamps, heater blower, rear window defogger.
- 6) Keep front wheels pointed straight ahead.
- 7) Make the check after the cooling fan has stopped.

Overall Inspection Sequence

NIEC1221S0101



NOTE:

If a vehicle contains a part which is operating outside of design specifications with no MIL illumination, the part shall not be replaced prior to emission testing unless it is determined that the part has been tampered with or abused in such a way that the diagnostic system cannot reasonably be expected to detect the resulting malfunction.

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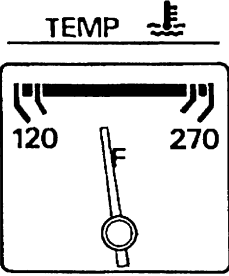
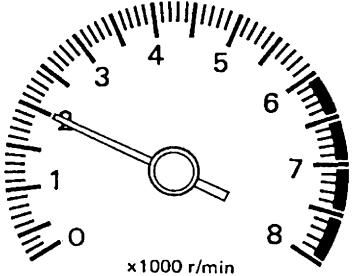
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INSPECTION PROCEDURE

1	INSPECTION START		
<p>1. Visually check the following:</p> <ul style="list-style-type: none"> ● Air cleaner clogging ● Hoses and ducts for leaks ● EGR valve operation ● Electrical connectors ● Gasket ● Throttle position and throttle position sensor operation <p>2. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.</p>			
			
<p>3. Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.</p>			
			
<p>4. Make sure that no DTC is displayed with CONSULT-II or GST.</p> <p style="text-align: center;">OK or NG</p>			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

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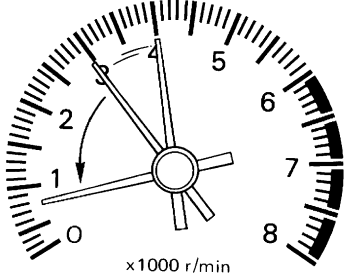
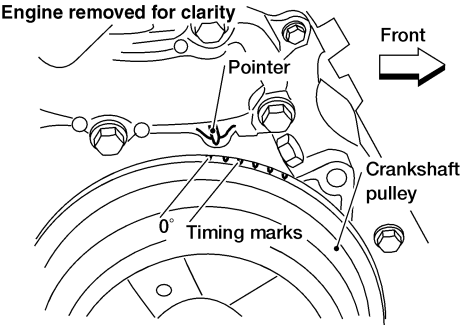
2	REPAIR OR REPLACE		
<p>Repair or replace components as necessary according to corresponding "Diagnostic Procedure".</p>			
		▶	GO TO 3.

3	CHECK TARGET IDLE SPEED						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute. 3. Read idle speed in "DATA MONITOR" mode with CONSULT-II. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">DATA MONITOR</th> </tr> <tr> <th style="padding: 2px;">MONITOR</th> <th style="padding: 2px;">NO DTC</th> </tr> <tr> <td style="padding: 2px;">ENG SPEED</td> <td style="padding: 2px;">XXX rpm</td> </tr> </table>		DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR							
MONITOR	NO DTC						
ENG SPEED	XXX rpm						
<p>800±50 rpm (in "P" or "N" position)</p>							
<p>SEF058Y</p>							
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Run engine at about 2,000 rpm for about 2 minutes under no-load. 2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute. 3. Check idle speed. <p style="text-align: center;">800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>							
OK	▶ GO TO 6.						
NG	▶ GO TO 4.						

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4	CHECK TARGET IDLE SPEED AGAIN
<p>Perform test No. 3 again.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check IACV-AAC valve and replace if necessary. Refer to EC-1105. ● Check IACV-AAC valve harness and repair if necessary. Refer to EC-1105. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
	▶ GO TO 3.

6	CHECK IGNITION TIMING	<p>1. Run engine at about 2,000 rpm for about 2 minutes under no-load.</p> <p>2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.</p> <div style="text-align: center;">  </div> <p>3. Check ignition timing with a timing light.</p> <div style="text-align: center;">  </div> <p style="color: blue;">9°±5° BTDC (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>	
	OK (With CONSULT-II) ▶	GO TO 8.	
	OK (Without CONSULT-II) ▶	GO TO 9.	
	NG ▶	GO TO 7.	

SEF978U

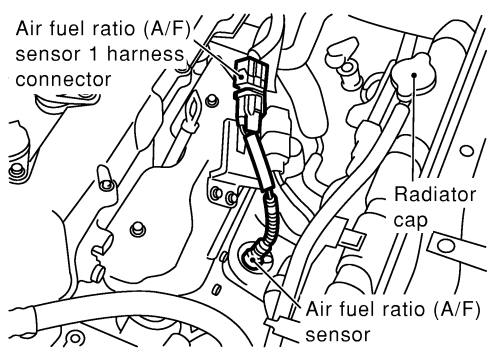
LEC245

7	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Check camshaft position sensor (PHASE) and circuit, repair or replace if necessary. Refer to EC-1011. ● Check crankshaft position sensor (POS) and circuit, repair or replace if necessary. Refer to EC-1006. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
	▶	GO TO 3.	

8	CHECK AIR FUEL RATIO (A/F) SENSOR 1 FUNCTION	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF. NOTE: Keep the accelerator pedal as steady as possible during the cruising. 3. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH). NOTE: Never apply brake during releasing the accelerator pedal. 4. Repeat steps 2 to 3 five times. 5. Stop vehicle and connect CONSULT-II to the vehicle. 6. Make sure that no 1st trip DTC is displayed in "SELF-DIAG RESULTS" mode. <p style="text-align: center;">OK or NG</p>		
OK		▶ INSPECTION END
NG		▶ GO TO 10.

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9	CHECK AIR FUEL RATIO (A/F) 1 SENSOR FUNCTION	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF. NOTE: Keep the accelerator pedal as steady as possible during the cruising. 3. Set "OD" ON, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH). NOTE: Never apply brake during releasing the accelerator pedal. 4. Repeat steps 2 to 3 five times. 5. Stop the vehicle and turn ignition switch "OFF". 6. Wait at least 10 seconds and restart engine. 7. Repeat steps 2 to 3 five times. 8. Stop vehicle and connect GST to the vehicle. 9. Make sure that no DTC is displayed. <p style="text-align: center;">OK or NG</p>		
OK		▶ INSPECTION END
NG		▶ GO TO 10.

10	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT										
<p>1. Turn ignition switch "OFF" and disconnect battery ground cable.</p> <p>2. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p>											
											
<p>3. Check harness continuity between the following terminals. Refer to "Wiring Diagram", EC-1193.</p>											
<table border="1" style="margin: auto;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">62</td> <td style="text-align: center; padding: 5px;">2</td> </tr> <tr> <td style="text-align: center; padding: 5px;">63</td> <td style="text-align: center; padding: 5px;">5</td> </tr> <tr> <td style="text-align: center; padding: 5px;">64</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">65</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>		ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6
ECM terminal	A/F sensor 1 terminal										
62	2										
63	5										
64	1										
65	6										
SEF393Z											
<p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should exist.</p> <p>5. Also check harness for short to power.</p>											
OK or NG											
OK	▶ GO TO 12.										
NG	▶ GO TO 11.										

11	REPAIR OR REPLACE
Repair open circuit or short to ground or short to power in harness or connectors between ECM and A/F sensor 1.	
▶	GO TO 3.

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12 PREPARATION FOR "CO" % CHECK

With CONSULT-II

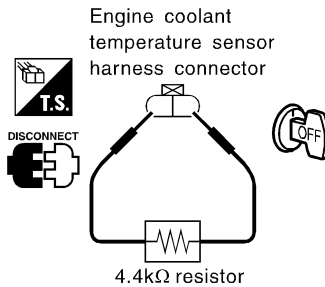
1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Select "COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

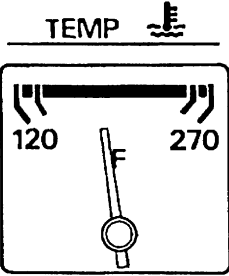
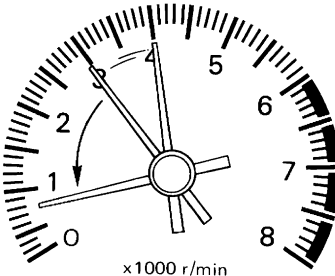
Without CONSULT-II

1. Reconnect ECM harness connector.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.



SEF982UA

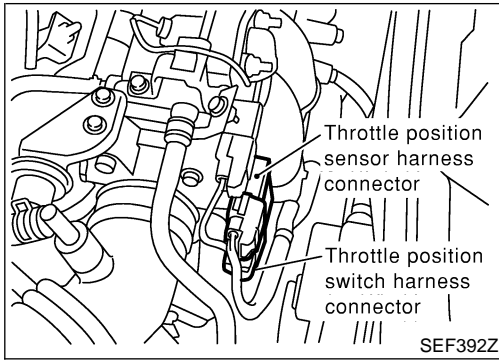
▶ GO TO 13.

13	CHECK "CO" %
<p>1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.</p> <div style="text-align: center;">  <p style="font-size: small;">TEMP </p> </div>	
<p>2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.</p> <div style="text-align: center;">  <p style="font-size: small;">x1000 r/min</p> </div>	
<p>3. Check "CO" %.</p> <p style="color: blue; font-weight: bold;">Idle CO: 3 - 11% and engine runs smoothly.</p> <p>4. Without CONSULT-II After checking CO%,</p> <p>a. Disconnect the resistor from terminals of engine coolant temperature sensor harness connector.</p> <p>b. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 14.

SEF976U

SEF978U

14	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Connect A/F sensor 1 harness connector to A/F sensor 1. ● Check fuel pressure. Refer to EC-743. ● Check mass air flow sensor and its circuit. Refer to EC-846. ● Check injector and its circuit. Refer to EC-1324. Clean or replace if necessary. ● Check engine coolant temperature sensor and its circuit. Refer to EC-866. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
▶	GO TO 3.



⊗ Without CONSULT-II

NIEC1222S0302

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING" (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 30 seconds.
7. Disconnect throttle position sensor harness connector (brown), then reconnect it within 5 seconds.
8. Wait 20 seconds.
9. Make sure that idle speed is within specifications. If not, the result will be incomplete. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	800±50 rpm (in "P" or "N" position)
Ignition timing	9°±5° BTDC (in "P" or "N" position)

NOTE:

If idle air volume learning cannot be performed successfully, proceed as follows:

- 1) Check that throttle valve is fully closed.
- 2) Check PCV valve operation.
- 3) Check that downstream of throttle valve is free from air leakage.
- 4) Adjust closed throttle position switch and reset memory. (Refer to Basic Inspection, EC-798.)
- 5) When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the problem. It is useful to perform "TROUBLE DIAGNOSIS — SPECIFICATION VALUE", EC-834.
- 6) If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" all over again:
 - Engine stalls.
 - Erroneous idle.
 - Blown fuses related to the IACV-AAC valve system.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Introduction

Introduction

NIEC1223

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X

*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-814.)

Two Trip Detection Logic

NIEC1224

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Coolant overtemperature enrichment protection — DTC: P0217	—	X	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	X	—	—	—	—	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	X	—	—	X	—	—
Closed loop control — DTC: P1148	—	X	—	—	X	—	X	—
Fail-safe items (Refer to EC-814.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except “ECM”

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information

Emission-related Diagnostic Information

NIEC1225

DTC AND 1ST TRIP DTC

NIEC1225S01

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logi0319c). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-767. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a problem. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to EC-796. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NIEC1225S0101

DTC and 1st trip DTC can be read by the following methods.

☐ With CONSULT-II

⊗ With GST

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1320, P0705, P0750, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- **1st trip DTC No. is the same as DTC No.**
- **Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.**

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

DTC display		SELF DIAG RESULTS		SELF DIAG RESULTS	
		DTC RESULTS	TIME	DTC RESULTS	TIME
		IACV-AAC VALVE [P0505]	0	IACV-AAC VALVE [P0505]	1t
			1st trip DTC display		

SEF698X

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NIEC1225S02

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed and absolute pressure at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-782.

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.

SYSTEM READINESS TEST (SRT) CODE

NIEC1225S03

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating "INCMP", use the information in this Service Manual to set the SRT to "CMPLT".

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate "CMPLT" for each application system. Once set as "CMPLT", the SRT status remains "CMPLT" until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer's normal driving pattern; the SRT will indicate "INCMP" for these items.

NOTE:

The SRT will also indicate "INCMP" if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates "CMPLT" for all test items, the inspector will continue with the emissions test. However, if the SRT indicates "INCMP" for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

If MIL is "ON" during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates "CMPLT" for all test items. Therefore, it is important to check SRT ("CMPLT") and DTC (No DTCs) before the inspection.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

SRT Item

=NIEC1225S0301

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*2	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	3	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system (small leak) (negative pressure)	P0440
	—	EVAP control system (small leak) (positive pressure)	P1440*1
	3	EVAP control system purge flow monitoring	P1447
HO2S	3	Air fuel ratio (A/F) sensor 1 (circuit)	P1271
		Air fuel ratio (A/F) sensor 1 (circuit)	P1272
		Air fuel ratio (A/F) sensor 1 (lean shift monitoring)	P1273
		Air fuel ratio (A/F) sensor 1 (rich shift monitoring)	P1274
		Air fuel ratio (A/F) sensor 1 (response monitoring)	P1275
		Air fuel ratio (A/F) sensor 1 (high voltage)	P1276
		Heated oxygen sensor 2 (rear) (min. voltage monitoring)	P0137
		Heated oxygen sensor 2 (rear) (max. voltage monitoring)	P0138
		Heated oxygen sensor 2 (rear) (response monitoring)	P0139
		Heated oxygen sensor 2 (rear) (high voltage)	P0140
		Heated oxygen sensor 3 (min. voltage monitoring)	P0143
		Heated oxygen sensor 3 (max. voltage monitoring)	P0144
		Heated oxygen sensor 3 (response monitoring)	P0145
		Heated oxygen sensor 3 (high voltage)	P0145
HO2S HTR	3	Air fuel ratio (A/F) sensor 1 heater	P1277
		Heated oxygen sensor 2 (rear) heater	P0141
		Heated oxygen sensor 3 heater	P0147
EGR SYSTEM	3	EGR function (close)	P0400
	1	EGR function (open)	P1402

*1: P1440 [EVAP control system (Small Leak) (positive pressure) diagnosis] is one type of SRT related diagnosis. This diagnosis, however, does not contribute to setting the SRT as "CMPLT" when no malfunction exists in the EVAP system. Therefore, P0440 must be used instead of P1440.

*2: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the performance priority for models with CONSULT-II.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

—NIEC1225S0302

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example							
		Diagnosis	Ignition cycle						
	← ON →		OFF	← ON →	OFF	← ON →	OFF	← ON →	
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)			
		P0402	OK (1)	— (1)	— (1)	OK (2)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”			
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)			
		P0402	— (0)	— (0)	OK (1)	— (1)			
		P1402	OK (1)	OK (2)	— (2)	— (2)			
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”			
NG exists	Case 3	P0400	OK	OK	—	—			
		P0402	—	—	—	—			
		P1402	NG	—	NG	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL “ON”)			
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”			

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

NOTE:

SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

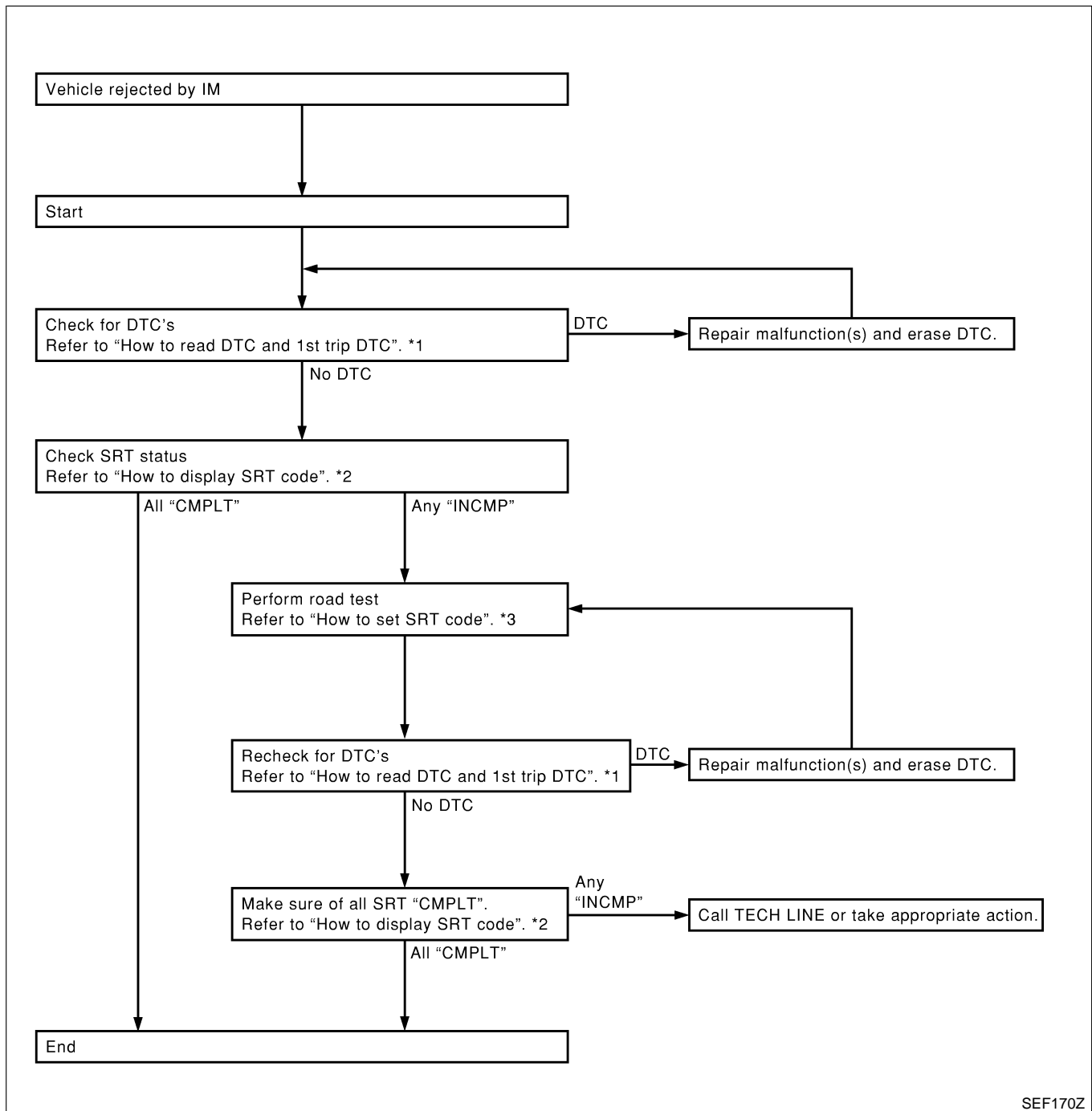
SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)



SEF170Z

*1 EC-758

*2 EC-762

*3 EC-763

How to Display SRT Code

With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

With GST

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

NIEC1225S0304

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

SRT STATUS	
CATALYST	CMLPT
EVAP SYSTEM	INCMP
HO2S HTR	CMLPT
HO2S	CMLPT
EGR SYSTEM	INCMP

SEF713Y

GI

MA

EM

LC

EC

How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions. NIEC1225S0305

With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-760.

Without CONSULT-II

The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

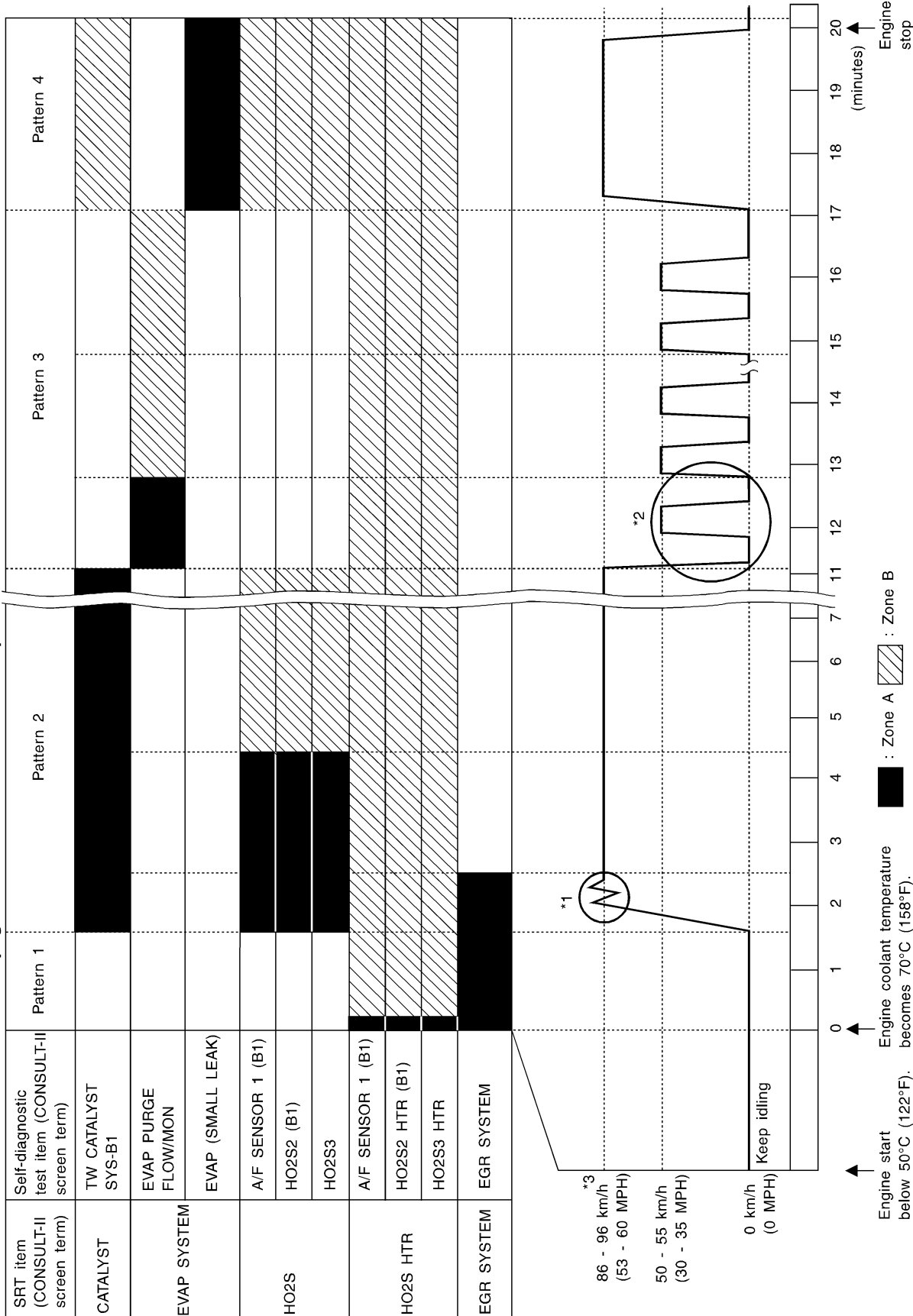
QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Driving Pattern

NIEC1225S0306

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.



SEF509Z

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
Zone A refers to the range where the time required, for the diagnosis under normal conditions*, is the shortest.
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 70 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 70 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 82 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in *2 must be repeated at least 3 times.

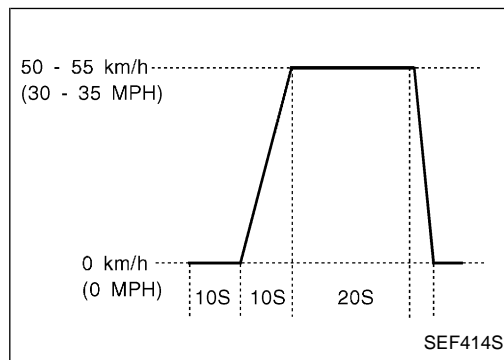
Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

*2: Operate the vehicle in the following driving pattern.

- 1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- 2) Repeat driving pattern shown below at least 10 times.
- **During acceleration, hold the accelerator pedal as steady as possible.**
- 3) Repeat steps 1 and 2 until the EGR system SRT is set.



*3: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

NIEC1225S04

The following is the information specified in Mode 6 of SAE J1979.

The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (9 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	X
		02H	81H	Min.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X
HO2S	A/F sensor 1	43H	0EH	Max.	X
		44H	8EH	Min.	X
		45H	8EH	Min.	X
	Heated oxygen sensor 2 (rear)	19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
		1CH	06H	Max.	X
	Heated oxygen sensor 3	61H	92H	Min.	X
		62H	92H	Min.	X
		63H	12H	Max.	X
		64H	12H	Max.	X
	HO2S HTR	A/F sensor 1 heater	57H	10H	Max.
58H			90H	Min.	X
Heated oxygen sensor 2 heater (rear)		2DH	0AH	Max.	X
		2EH	8AH	Min.	X
Heated oxygen sensor 3 heater		71H	14H	Max.	X
		72H	94H	Min.	X
EGR SYSTEM	EGR function	31H	8CH	Min.	X
		32H	8CH	Min.	X
		33H	8CH	Min.	X
		34H	8CH	Min.	X
		35H	0CH	Max.	X

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

NIEC1225S05

X: Applicable —: Not applicable

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	—	—	—
MAF SEN/CIRCUIT	P0100	—	—	X	EC-846
ABSL PRES SEN/CIRC	P0105	—	—	X	EC-855
AIR TEMP SEN/CIRC	P0110	—	—	X	EC-860
COOLANT T SEN/CIRC	P0115	—	—	X	EC-866
THRTL POS SEN/CIRC	P0120	—	—	X	EC-871
*COOLAN T SEN/CIRC	P0125	—	—	X	EC-882
HO2S2 (B1)	P0137	X	X	X*2	EC-887
HO2S2 (B1)	P0138	X	X	X*2	EC-895
HO2S2 (B1)	P0139	X	X	X*2	EC-903
HO2S2 (B1)	P0140	X	X	X*2	EC-911
HO2S2 HTR (B1)	P0141	X	X	X*2	EC-917
HO2S3 (B1)	P0143	X	X	X*2	EC-922
HO2S3 (B1)	P0144	X	X	X*2	EC-930
HO2S3 (B1)	P0145	X	X	X*2	EC-938
HO2S3 (B1)	P0146	X	X	X*2	EC-946
HO2S3 HTR (B1)	P0147	X	X	X*2	EC-952
FUEL SYS-LEAN/BK1	P0171	—	—	X	EC-957
FUEL SYS-RICH/BK1	P0172	—	—	X	EC-964
FUEL TEMP SEN/CIRC	P0180	—	—	X	EC-971
ENG OVER TEMP	P0217	—	—	X	EC-976
MULTI CYL MISFIRE	P0300	—	—	X	EC-995
CYL 1 MISFIRE	P0301	—	—	X	EC-995
CYL 2 MISFIRE	P0302	—	—	X	EC-995
CYL 3 MISFIRE	P0303	—	—	X	EC-995
CYL 4 MISFIRE	P0304	—	—	X	EC-995
KNOCK SEN/CIRC-B1	P0325	—	—	—	EC-1002
CKP SEN/CIRCUIT	P0335	—	—	X	EC-1006
CMP SEN/CIRCUIT	P0340	—	—	X	EC-1011
EGR SYSTEM	P0400	X	X	X*2	EC-1017
EGR VOL CONT/V CIR	P0403	—	—	X	EC-1026
TW CATALYST SYS-B1	P0420	X	X	X*2	EC-1033
EVAP SMALL LEAK	P0440	X	X	X*2	EC-1037
PURG VOLUME CONT/V	P0443	—	—	X	EC-1052

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
VENT CONTROL VALVE	P0446	—	—	X	EC-1058
EVAPO SYS PRES SEN	P0450	—	—	X	EC-1065
EVAP GROSS LEAK	P0455	—	X	X*2	EC-1077
FUEL LV SE (SLOSH)	P0460	—	—	X	EC-1091
FUEL LEVEL SENSOR	P0461	—	—	X	EC-1095
FUEL LEVEL SEN/CIRC	P0464	—	—	X	EC-1097
VEH SPEED SEN/CIRC	P0500	—	—	X	EC-1101
IACV/AAC VLV/CIRC	P0505	—	—	X	EC-1105
CLOSED TP SW/CIRC	P0510	—	—	X	EC-1114
A/T COMM LINE	P0600	—	—	—	EC-1122
ECM	P0605	—	—	X	EC-1125
PNP SW/CIRC	P0705	—	—	X	AT-110
ATF TEMP SEN/CIRC	P0710	—	—	X	AT-110
VEH SPD SEN/CIR AT	P0720	—	—	X	AT-114
ENGINE SPEED SIG	P0725	—	—	X	AT-118
A/T 1ST GR FNCTN	P0731	—	—	X	AT-121
A/T 2ND GR FNCTN	P0732	—	—	X	AT-137
A/T 3RD GR FNCTN	P0733	—	—	X	AT-128
A/T 4TH GR FNCTN	P0734	—	—	X	AT-134
TCC SOLENOID/CIRC	P0740	—	—	X	AT-140
A/T TCC S/V FNCTN	P0744	—	—	X	AT-143
L/PRESS SOL/CIRC	P0745	—	—	X	AT-148
SFT SOL A/CIRC	P0750	—	—	X	AT-153
SFT SOL B/CIRC	P0755	—	—	X	AT-159
MAP SENSOR	P1108	—	—	X	EC-1127
INT/V TIMING CONT	P1110	—	—	X	EC-1134
INT/V TIM V/CIR-B1	P1111	—	—	X	EC-1140
THERMOSTAT FNCTN	P1126	—	—	X	EC-1145
VARI SWL CON/SV-B1	P1132	—	—	X	EC-1147
SWIRL CON/V POS SEN	P1137	—	—	X	EC-1152
SWIRL CONT VALVE	P1138	—	—	X	EC-1159
INT TIM S/CIR-B1	P1140	—	—	X	EC-1167
CLOSED LOOP-B1	P1148	—	—	X	EC-1172
ENG OVER TEMP	P1217	—	—	X	EC-1173
A/F SENSOR 1 (B1)	P1271	X	X	X	EC-1190
A/F SENSOR 1 (B1)	P1272	X	X	X	EC-1195
A/F SENSOR 1 (B1)	P1273	X	X	X	EC-1200

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
A/F SENSOR 1 (B1)	P1274	X	X	X	EC-1205
A/F SENSOR 1 (B1)	P1275	X	X	X	EC-1210
A/F SENSOR 1 (B1)	P1276	X	X	X	EC-1218
A/F SEN1 HTR (B1)	P1277	X	X	X	EC-1223
IGN SIGNAL-PRIMARY	P1320	—	—	X	EC-1228
EGR TEMP SEN/CIRC	P1401	—	—	X	EC-1239
EGR SYSTEM	P1402	X	X	X*2	EC-1246
EVAP SMALL LEAK	P1440	X	X	X*2	EC-1253
PURG VOLUME CONT/V	P1444	—	—	X	EC-1255
VENT CONTROL VALVE	P1446	—	—	X	EC-1267
EVAP PURG FLOW/MON	P1447	X	X	X*2	EC-1275
VENT CONTROL VALVE	P1448	—	—	X	EC-1287
FUEL LEVEL SEN/CIRC	P1464	—	—	X	EC-1296
VC/V BYPASS/V	P1490	—	—	X	EC-1299
VC CUT/V BYPASS/V	P1491	—	—	X	EC-1305
A/T DIAG COMM LINE	P1605	—	—	X	EC-1317
TP SEN/CIRC A/T	P1705	—	—	X	AT-186
P-N POS SW/CIRCUIT	P1706	—	—	X	EC-1320
O/R CLTCH SOL/CIRC	P1760	—	—	X	AT-194

*1: 1st trip DTC No. is the same as DTC No.

*2: These are not displayed with GST.

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC (Ⓜ) With CONSULT-II

NIEC1225S06

NIEC1225S0601

NOTE:

If the DTC is not for A/T related items (see EC-700), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
 2. Turn CONSULT-II "ON" and touch "A/T".
 3. Touch "SELF-DIAG RESULTS".
 4. Touch "ERASE". [The DTC in the TCM (Transmission control module) will be erased.] Then touch "BACK" twice.
 5. Touch "ENGINE".
 6. Touch "SELF-DIAG RESULTS".
 7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

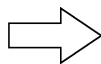
QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

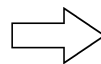
How to erase DTC (With CONSULT-II)

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.

SELECT SYSTEM
ENGINE
A/T



SELECT DIAG MODE
SELF-DIAG RESULTS
DATA MONITOR
DTC WORK SUPPORT
TCM PART NUMBER

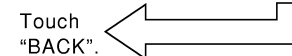
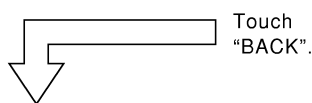


SELF-DIAG RESULTS	
DTC RESULTS	TIME
SHIFT SOLENOID/V A	

2. Turn **CONSULT-II** "ON", and touch "A/T".

3. Touch "SELF-DIAG RESULTS".

4. Touch "ERASE". (The DTC in the TCM will be erased.)



SELECT SYSTEM
ENGINE
A/T

5. Touch "ENGINE".

SELECT DIAG MODE
WORK SUPPORT
SELF-DIAG RESULTS
DATA MONITOR
DATA MONITOR (SPEC)
ACTIVE TEST
DTC & SRT CONFIRMATION
ECM PART NUMBER

6. Touch "SELF-DIAG RESULTS".

SELF DIAG RESULTS	
DTC RESULTS	TIME
SFT SOL A/CIRC [P0750]	0

7. Touch "ERASE". (The DTC in the ECM will be erased.)

SEF823YC

The emission related diagnostic information in the ECM can be erased by selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT-II.

How to Erase DTC (GST With GST)

NIEC1225S0602

NOTE:

If the DTC is not for A/T related items (see EC-700), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

- If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.
- The following data are cleared when the ECM memory is erased.
 - 1) Diagnostic trouble codes
 - 2) 1st trip diagnostic trouble codes
 - 3) Freeze frame data
 - 4) 1st trip freeze frame data
 - 5) System readiness test (SRT) codes
 - 6) Test values
 - 7) Others

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Emission-related Diagnostic Information (Cont'd)

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)

NIEC1225S07

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

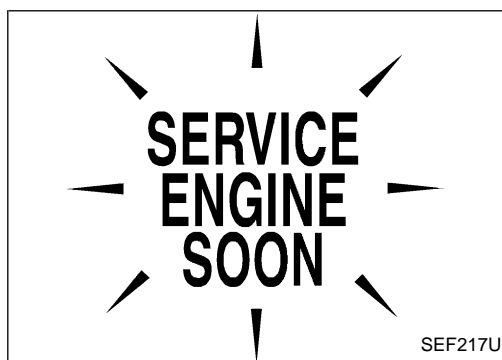
SEF543X

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to *EL-302*, “NVIS (NISSAN Vehicle Immobilizer System — NATS)”.
- Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to CONSULT-II operation manual, IVIS/NVIS.

Malfunction Indicator Lamp (MIL)

DESCRIPTION

NIEC1226



The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
- If the MIL does not light up, refer to *EL-103*, “WARNING LAMPS” or see EC-1358.
2. When the engine is started, the MIL should go off.
If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION




QG18DE (CALIF CA)

Malfunction Indicator Lamp (MIL) (Cont'd)

On Board Diagnostic System Function

=NIEC1226S01

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> ● Coolant overtemperature enrichment protection ● "Misfire (Possible three way catalyst damage)" ● "Closed loop control" ● Fail-safe mode

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to ^{NIEC1226S0101}**EL-103**, "WARNING LAMPS" or see EC-1358.

Diagnostic Test Mode I — Malfunction Warning

NIEC1226S0102

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)
OBD System Operation Chart

OBD System Operation Chart

=NIEC1227

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

NIEC1227S01

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory. GI
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to "Two Trip Detection Logic" on EC-757. MA
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset. EM
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT-II will count the number of times the vehicle is driven. LC
- The 1st trip DTC is not displayed when the self-diagnosis results in "OK" for the 2nd trip. EC

SUMMARY CHART

NIEC1227S02

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns "B" and "C" under "Fuel Injection System" and "Misfire", see EC-775.

For details about patterns "A" and "B" under "Other", see EC-777.

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

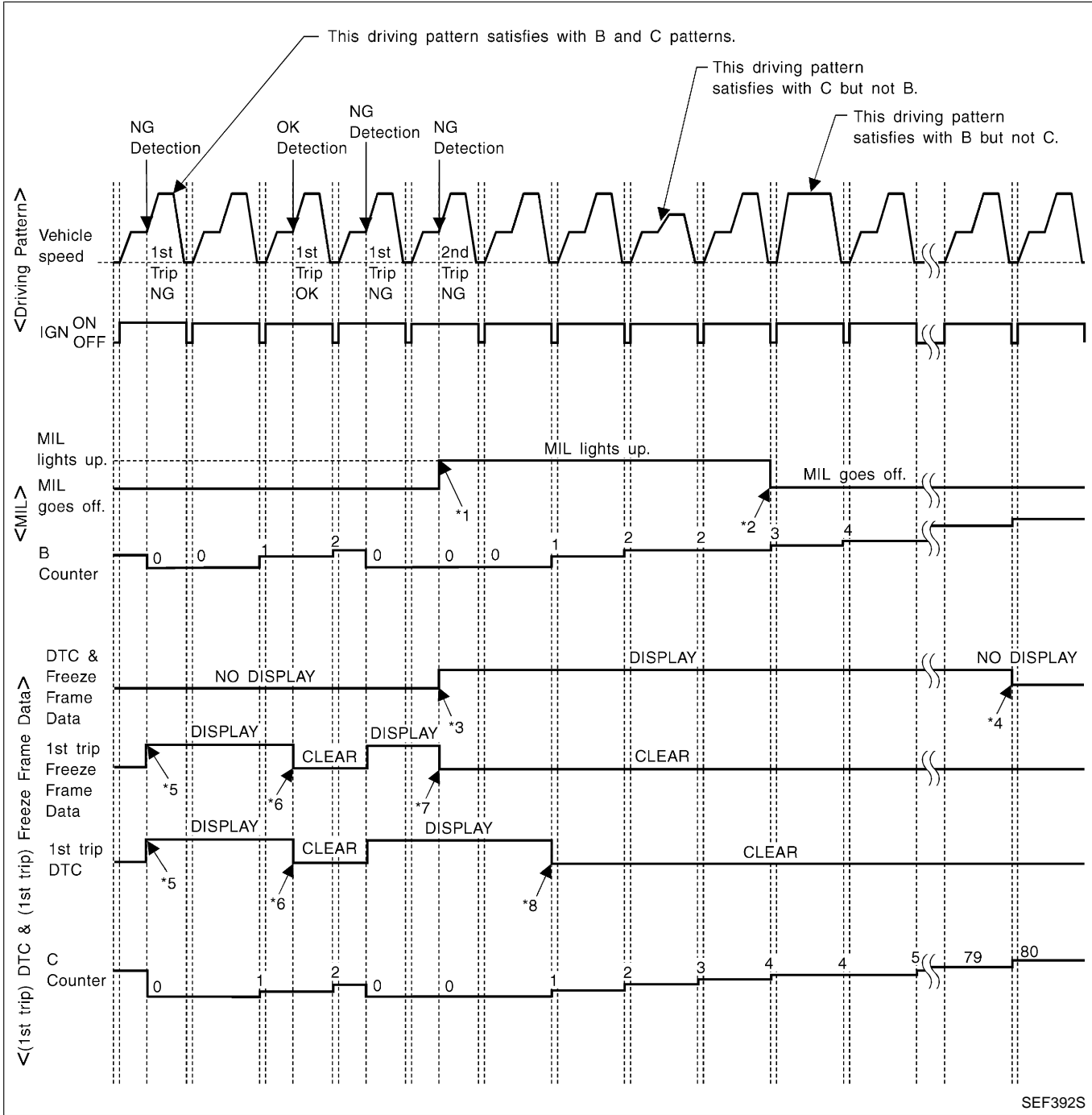
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

OBD System Operation Chart (Cont'd)

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS FOR "MISFIRE" <EXHAUST QUALITY DETERIORATION>, "FUEL INJECTION SYSTEM"

=NIEC1227S03



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.
- *4: The DTC and the freeze frame

- data will not be displayed any longer after vehicle is driven 80 times (pattern C) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data will be stored in ECM.
- *6: The 1st trip DTC and the 1st trip

- freeze frame data will be cleared at the moment OK is detected.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.
- *8: 1st trip DTC will be cleared when vehicle is driven once (pattern C) without the same malfunction after DTC is stored in ECM.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

OBD System Operation Chart (Cont'd)

EXPLANATION FOR DRIVING PATTERNS FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

Driving Pattern B

=NIEC1227S04

GI

NIEC1227S0401

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

MA

EM

Driving Pattern C

NIEC1227S0402

LC

Driving pattern C means the vehicle operation as follows:

1) The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the freeze frame data) $\times (1 \pm 0.1)$ [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), "T" should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), "T" should be higher than or equal to 70°C (158°F).

EC

FE

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

CL

MT

- The C counter will be cleared when the malfunction is detected regardless of (1).

- The C counter will be counted up when (1) is satisfied without the same malfunction.

- The DTC will not be displayed after C counter reaches 80.

- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

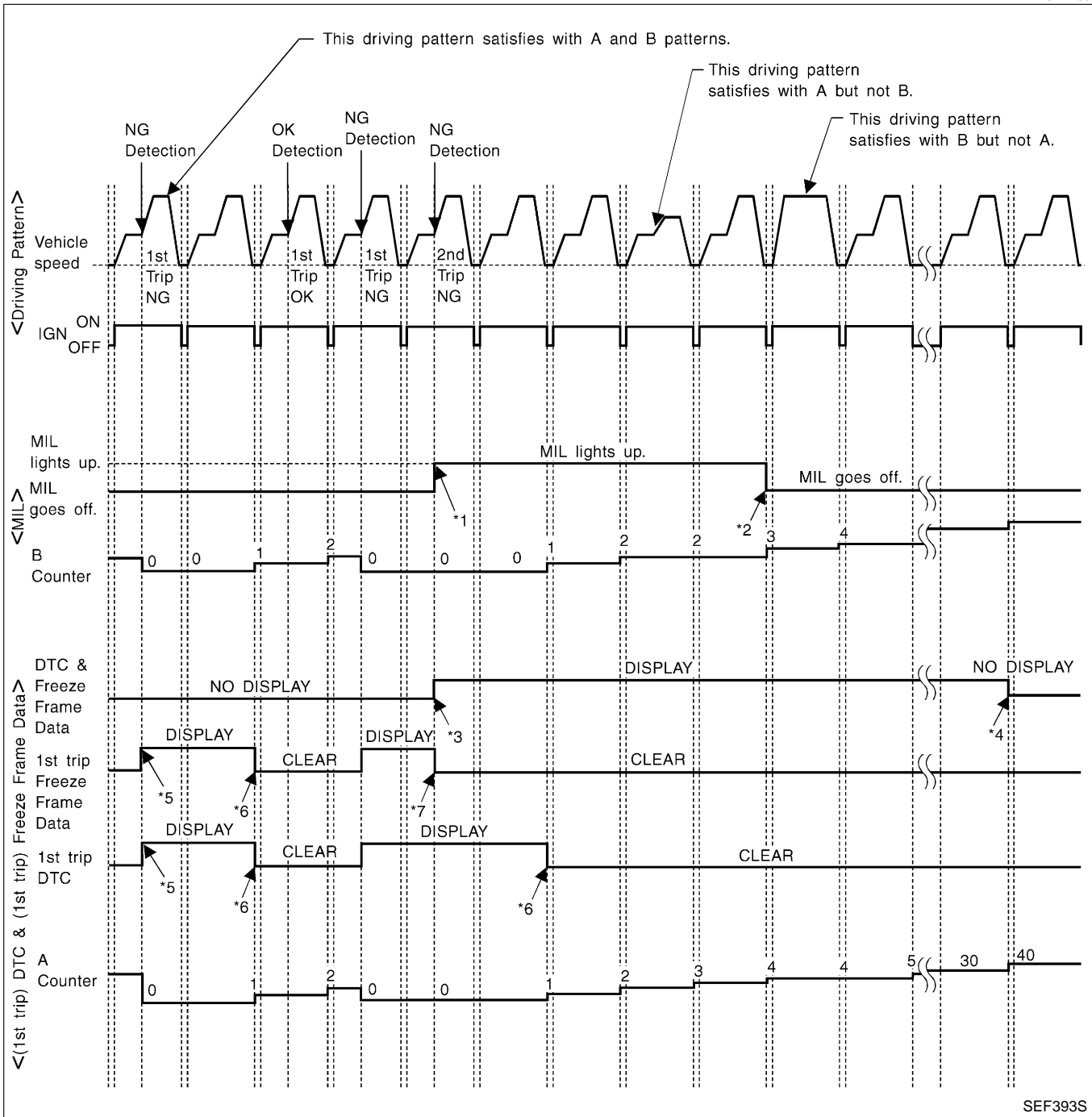
ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

OBD System Operation Chart (Cont'd)

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NIEC1227S05



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

- *4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC

- and the 1st trip freeze frame data will be stored in ECM.
- *6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

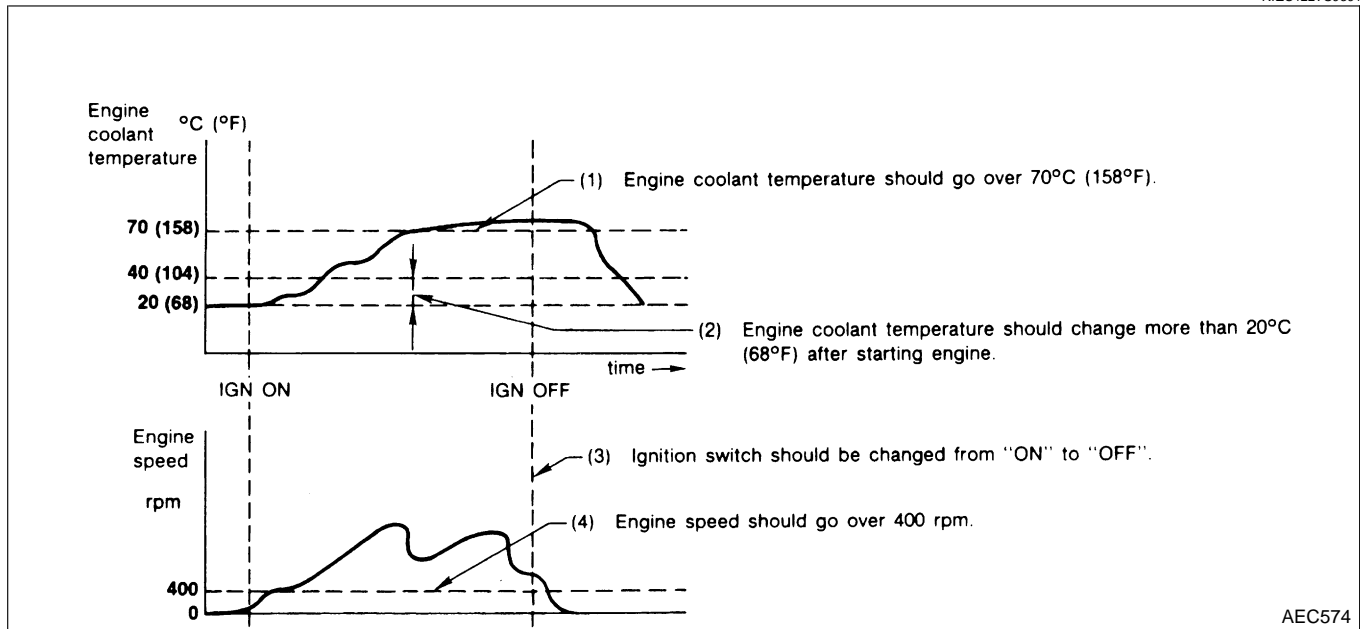
OBD System Operation Chart (Cont'd)

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

Driving Pattern A

NIEC1227S06

NIEC1227S0601



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

Driving Pattern B

NIEC1227S0602

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in "OBD SYSTEM OPERATION CHART").

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

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RS

BT

HA

SC

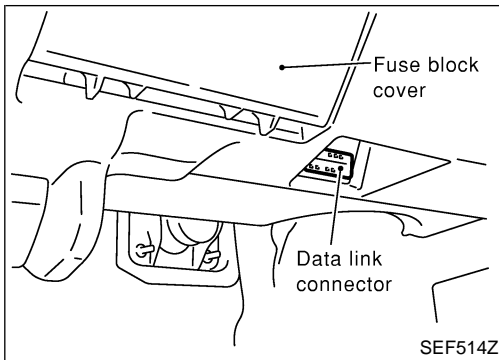
EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II



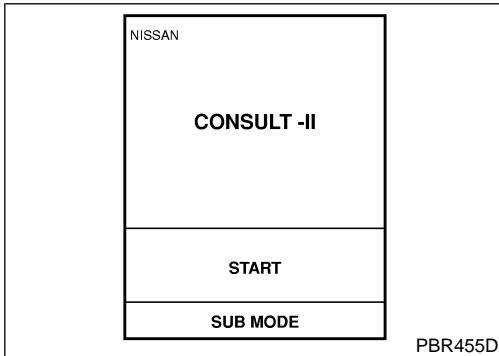
CONSULT-II

CONSULT-II INSPECTION PROCEDURE

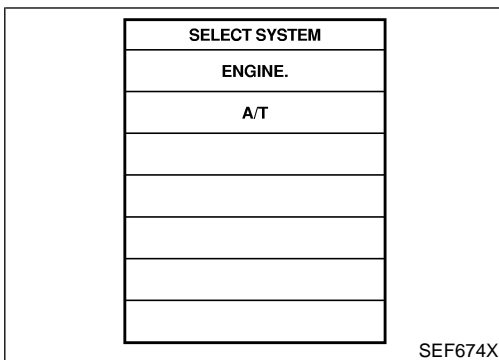
=NIEC1228

NIEC1228S01

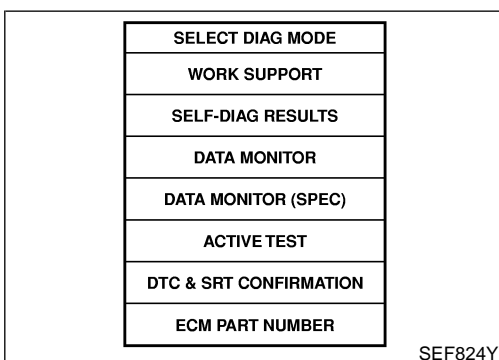
1. Turn ignition switch OFF.
2. Connect CONSULT-II to data link connector, which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)
CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NIEC1228S02

Item		DIAGNOSTIC TEST MODE							
		WORK SUP- PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI- TOR	DATA MONI- TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STA- TUS	DTC WORK SUP- PORT
ENGINE CONTROL COMPONENT PARTS INPUT	Camshaft position sensor (PHASE)		X	X					GI
	Crankshaft position sensor (POS)		X			X			MA
	Mass air flow sensor		X		X	X			EM
	Engine coolant temperature sensor		X	X	X	X	X		LC
	A/F sensor 1		X		X			X	X
	Heated oxygen sensor 2 (rear)		X		X	X		X	X
	Heated oxygen sensor 3		X		X	X		X	X
	Vehicle speed sensor		X	X	X	X			
	Throttle position sensor		X		X	X			
	Fuel tank temperature sensor		X		X	X	X		
	EVAP control system pressure sensor		X		X	X			
	MAP sensor		X	X	X	X			
	BARO sensor		X						
	EGR temperature sensor		X		X	X			
	Intake air temperature sensor		X	X	X	X			
	Knock sensor		X						
	Ignition switch (start signal)				X	X			
	Closed throttle position switch		X		X	X			
	Closed throttle position switch (throttle position sensor signal)				X	X			
	Air conditioner switch				X	X			
	Park/neutral position (PNP) switch		X		X	X			
	Power steering oil pressure switch				X	X			
	Battery voltage				X	X			
	Load signal				X	X			
Swirl control valve position sensor		X		X	X				
Fuel level sensor		X		X	X				

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STA-TUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				X	X	X		
	Power transistor (Ignition timing)	X	X (Ignition signal)		X	X	X		
	IACV-AAC valve		X		X	X	X		
	EVAP canister purge volume control solenoid valve		X		X	X	X		X
	Air conditioner relay				X	X			
	Fuel pump relay	X			X	X	X		
	Cooling fan		X		X	X	X		
	EGR volume control valve		X		X	X	X		
	A/F sensor 1 heater		X		X			X	
	Heated oxygen sensor 2 heater		X		X	X		X	
	Heated oxygen sensor 3 heater		X		X	X		X	
	EVAP canister vent control valve		X		X	X	X		
	Vacuum cut valve bypass valve		X		X	X	X		X
	Swirl control valve		X		X	X	X		
	Intake valve timing control solenoid valve		X		X	X	X		
Calculated load value			X		X	X			

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-758.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

FUNCTION

—NIEC1228S03

Diagnostic test mode	Function
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1
Data monitor	Input/Output data in the ECM can be read.
Data monitor (SPEC)	Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.
ECM part number	ECM part number can be read.

*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

WORK SUPPORT MODE

NIEC1228S04

WORK ITEM	CONDITION	USAGE
TP SW/TP SEN IDLE POSI ADJ	<ul style="list-style-type: none"> ● FOLLOW THE BASIC INSPECTION INSTRUCTION IN THE SERVICE MANUAL. 	When adjusting the idle throttle position
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> ● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. 	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> ● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. 	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> ● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. 	When clear the coefficient of self-learning control value

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

WORK ITEM	CONDITION	USAGE
EVAP SYSTEM CLOSE	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> ● IGN SW "ON" ● ENGINE NOT RUNNING ● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). ● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM ● TANK FUEL TEMP. IS MORE THAN 0°C (32°F). ● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" ● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> ● IDLE CONDITION 	When setting target idle speed
TARGET IGNITION TIMING ADJ*	<ul style="list-style-type: none"> ● IDLE CONDITION 	<ul style="list-style-type: none"> ● When adjusting target ignition timing After adjustment, confirm target ignition timing with a timing light. ● If once the "TARGET IDLE RPM ADJ" has been done, the Idle Air Volume Learning procedure will not be completed.

*: This function is not necessary in the usual service procedure.

SELF-DIAGNOSTIC MODE

DTC and 1st Trip DTC

NIEC1228S05

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-700.)

NIEC1228S0501

Freeze Frame Data and 1st Trip Freeze Frame Data

NIEC1228S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> ● The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-700.)
FUEL SYS-B1	<ul style="list-style-type: none"> ● "Fuel injection system status" at the moment a malfunction is detected is displayed. ● One mode in the following is displayed. "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> ● The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> ● The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> ● "Short-term fuel trim" at the moment a malfunction is detected is displayed. ● The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

Freeze frame data item*1	Description	
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> ● "Long-term fuel trim" at the moment a malfunction is detected is displayed. ● The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim. 	GI MA
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> ● The engine speed at the moment a malfunction is detected is displayed. 	EM
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> ● The vehicle speed at the moment a malfunction is detected is displayed. 	LC
INT MANI PRES [kPa]	<ul style="list-style-type: none"> ● The intake manifold absolute pressure at the moment a malfunction is detected is displayed. 	EC
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> ● The throttle valve opening angle at the moment a malfunction is detected is displayed. 	FE
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> ● The base fuel schedule at the moment a malfunction is detected is displayed. 	CL
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> ● The intake air temperature at the moment a malfunction is detected is displayed. 	CL MT AT AX SU BR ST RS BT HA SC EL IDX

*1: The items are the same as those of 1st trip freeze frame data.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

DATA MONITOR MODE

-NIEC1228S06

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the POS signal of the crankshaft position sensor. 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]		○	<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	○	○	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
A/F SEN1 (B1) [V]	○	○	<ul style="list-style-type: none"> The A/F signal computed from the input signal of the A/F sensor 1 is displayed. 	
HO2S2 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 (rear) is displayed. 	
HO2S2 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 2 (rear) signal: RICH ... means the amount of oxygen after TWC (Manifold three way catalyst) is relatively small. LEAN ... means the amount of oxygen after TWC (Manifold three way catalyst) is relatively large. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
VHCL SPEED SE [km/h] or [mph]	○	○	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed sensor signal is displayed. 	
BATTERY VOLT [V]	○	○	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
THRTL POS SEN [V]	○	○	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	
FUEL T/TMP SE [°C] or [°F]			<ul style="list-style-type: none"> The fuel temperature judged from the tank fuel temperature sensor signal voltage is displayed. 	
INT/A TEMP SE [°C] or [°F]	○	○	<ul style="list-style-type: none"> The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated. 	
EGR TEMP SEN [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the EGR temperature sensor is displayed. 	
EVAP SYS PRES [V]	○		<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 	
ABSOL PRES/SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the BARO sensor is displayed. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
FUEL LEVEL SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 		GI
START SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the starter signal. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. 	MA EM
CLSD THL POS [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the throttle position sensor signal. 		LC
AIR COND SIG [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 		EC
P/N POSI SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. 		FE
PW/ST SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering oil pressure switch determined by the power steering oil pressure signal is indicated. 		CL
LOAD SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on. 		MT AT AX
IGNITION SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		SU
INJ PULSE-B1 [msec]		○	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. 	BR
IGN TIMING [BTDC]		○	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. 	ST
CAL/LD VALUE [%]			<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 		RS
ABSOL TH-P/S [degree]			<ul style="list-style-type: none"> "Absolute throttle position sensor" indicates the throttle valve opening angle computed by ECM according to the signal voltage of the throttle position sensor. 		BT
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor. 		HA
IACV-AAC/V [step]		○	<ul style="list-style-type: none"> Indicates the IACV-AAC valve control value computed by ECM according to the input signals. 		SC EL
PURG VOL C/V [%]			<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 		IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
EGR VOL CON/V [step]		○	<ul style="list-style-type: none"> Indicates the EGR volume control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
SWRL C/V (B1) [step]			<ul style="list-style-type: none"> Indicates the swirl control valve control value computed by the ECM according to the input signals. The opening becomes larger as the value increases. 	
INT/V SOL-B1 [ON/OFF]			<ul style="list-style-type: none"> The control condition of the intake valve timing control solenoid valve is indicated. ON ... Intake valve timing control solenoid is operating. OFF ... Intake valve timing control solenoid is not operating. 	
AIR COND RLY [ON/OFF]		○	<ul style="list-style-type: none"> The air conditioner relay control condition (determined by ECM according to the input signal) is indicated. 	
FUEL PUMP RLY [ON/OFF]		○	<ul style="list-style-type: none"> Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VC/V BYPASS/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. ON ... Open OFF ... Closed 	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. ON ... Closed OFF ... Open 	
COOLING FAN [ON/OFF]		○	<ul style="list-style-type: none"> Indicates the control condition of the cooling fan (determined by ECM according to the input signal). HIGH ... High speed operation LOW ... Low speed operation OFF ... Stop 	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 2 heater determined by ECM according to the input signals. 	
IDL A/V LEAN			<ul style="list-style-type: none"> Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully. INCMP ... Idle air volume learning has not been performed successfully. 	
TRVL AFTER MIL [km] or [Mile]			<ul style="list-style-type: none"> Distance traveled while MIL is activated 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
MAP SENSOR [V]			<ul style="list-style-type: none"> The signal voltage of MAP sensor is displayed. 		GI
HO2S3 (B1) [V]	○		<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 3 is displayed. 		MA EM
A/F S1 HTR (B1) [%]			<ul style="list-style-type: none"> Indicates A/F sensor 1 heater control value computed by ECM according to the input signal. The current flow to the heater become larger as the value increases. 		LC
HO2S3 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of heated oxygen sensor 3 heater determined by ECM according to the input signals. 		EC FE
SWL/C POSI SE [degree]	○		<ul style="list-style-type: none"> Indicates the swirl control value opening angle computed by ECM according to signal voltage of the swirl control valve position sensor. 		CL
Voltage [V]			<ul style="list-style-type: none"> Voltage measured by the voltage probe. 		MT
Frequency [msec] or [Hz] or [%]			<ul style="list-style-type: none"> Pulse width, frequency or duty cycle measured by the pulse probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured. 	AT AX

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

DATA MONITOR (SPEC) MODE

-NIEC1228S07

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the POS signal of the crankshaft position sensor. 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated.
B/FUEL SCHDL [msec]		○	<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated.
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When engine is running, specification range is indicated. This data also includes the data for the air-fuel ratio learning control.

ACTIVE TEST MODE

NIEC1228S08

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Fuel injectors A/F sensor 1
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> "Idle Air Volume Learning" (Refer to EC-755.) Crankshaft position sensor (POS) Crankshaft position sensor (PHASE) Engine component parts and installing conditions
IACV-AAC/V OPENING	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. Change the IACV-AAC valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> Harness and connector IACV-AAC valve
POWER BALANCE	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. A/C switch "OFF" Shift lever "N" Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> Harness and connector Compression Injectors Power transistor Spark plugs Ignition coils
COOLING FAN	<ul style="list-style-type: none"> Ignition switch: ON Turn the cooling fan "ON" and "OFF" using CONSULT-II. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connector Cooling fan motor Cooling fan relay
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Engine coolant temperature sensor Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connector Fuel pump relay

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II (Cont'd)

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
EGR VOL CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Change EGR volume control valve opening step using CONSULT-II. 	EGR volume control valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● EGR volume control valve
VALVE TIMING SOL	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with CONSULT-II and listen for operating sound 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
PURG VOL CONT/V	<ul style="list-style-type: none"> ● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
SWIRL CONTROL VALVE	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Change swirl control valve opening step using CONSULT-II. 	Swirl control valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Swirl control valve

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DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

NIEC1228S09

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-759.

NIEC1228S0901

SRT Work Support Mode

NIEC1228S0902

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

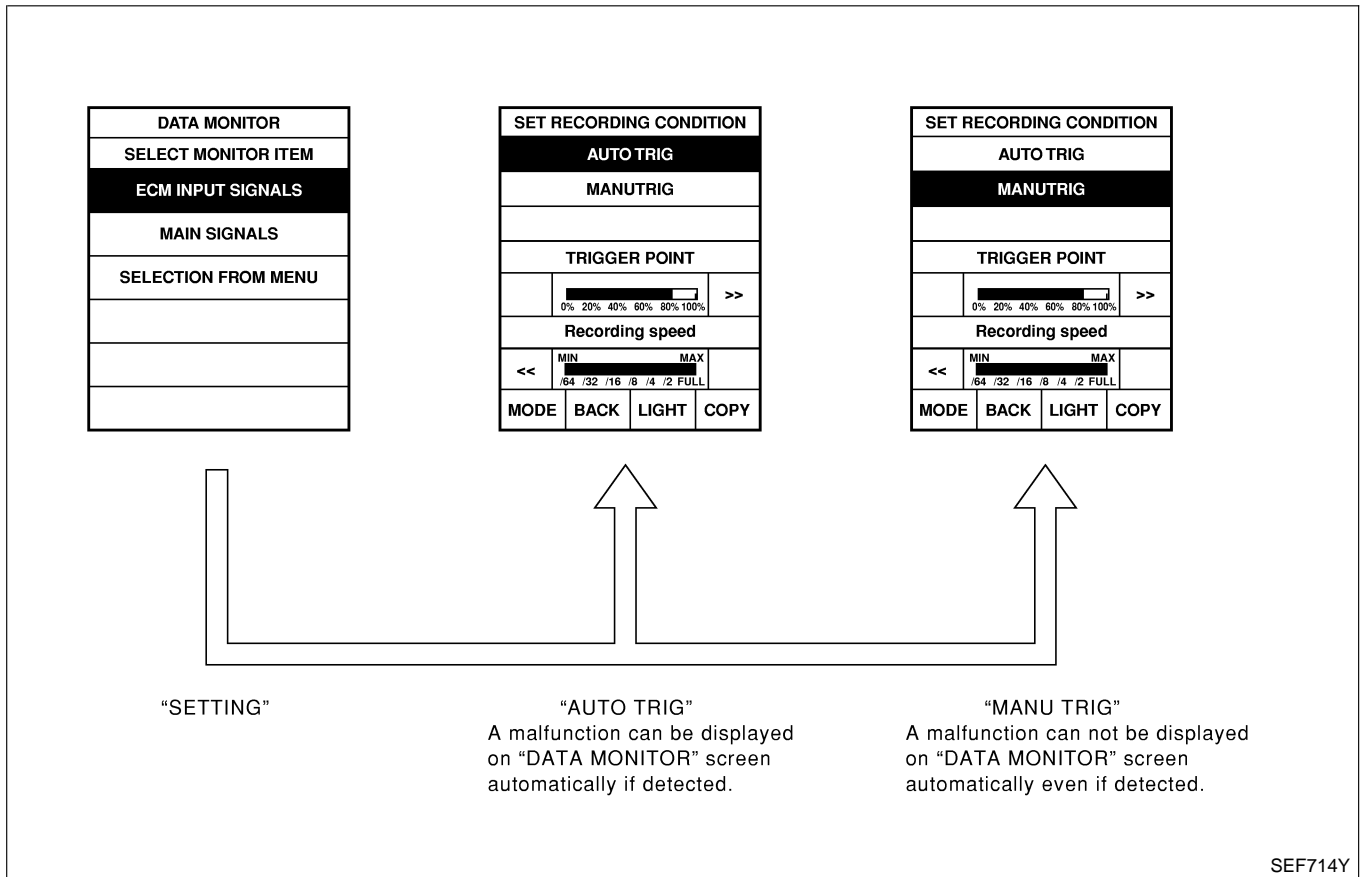
CONSULT-II (Cont'd)

automatically on CONSULT-II screen even though a malfunction is detected by ECM.

DATA MONITOR can be performed continuously even though a malfunction is detected.

Use these triggers as follows:

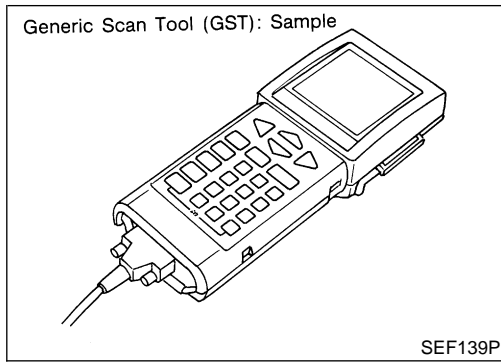
- 1) "AUTO TRIG"
 - While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent.
- When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to **GI-25**, "Incident Simulation Tests".)
- 2) "MANU TRIG"
 - If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Generic Scan Tool (GST)

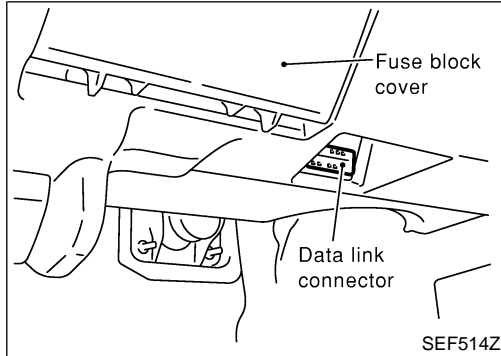


Generic Scan Tool (GST) DESCRIPTION

-NIEC1229

NIEC1229S01

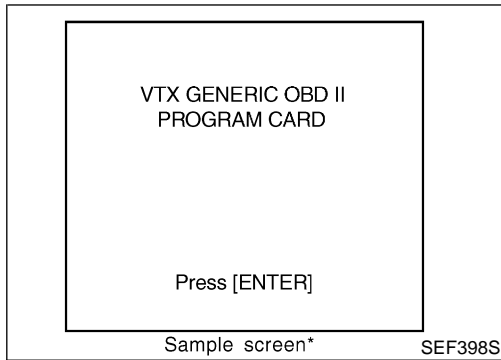
Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 8 different functions explained on the next page. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.



GST INSPECTION PROCEDURE

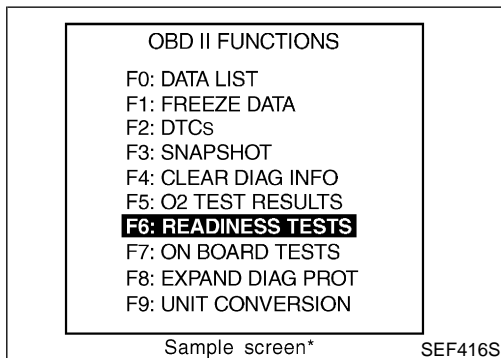
NIEC1229S02

1. Turn ignition switch OFF.
2. Connect GST to data link connector for GST which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

(*: Regarding GST screens in this section, sample screens are shown.)



5. Perform each diagnostic mode according to each service procedure.

For further information, see the GST Operation Manual of the tool maker.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

QG18DE (CALIF CA)

Generic Scan Tool (GST) (Cont'd)

FUNCTION

NIEC1229S03

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" (EC-782).]
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. <ul style="list-style-type: none"> ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch "OFF" ● Low fuel temperature ● Too much pressure is applied to EVAP system
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.

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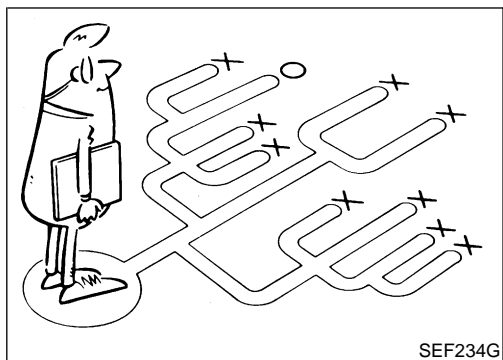
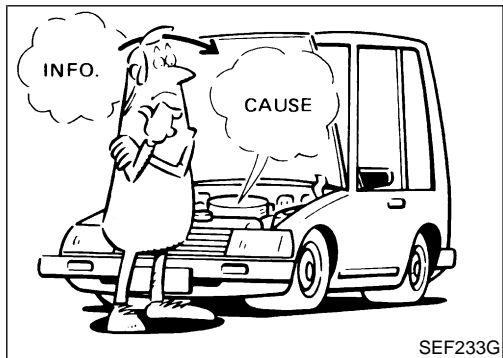
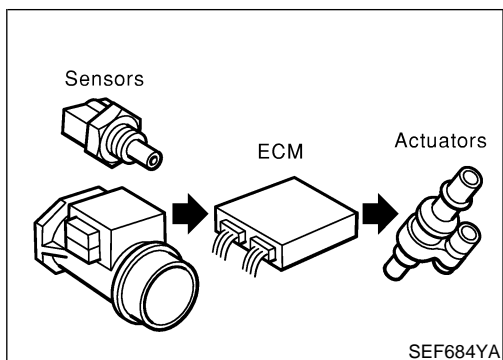
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KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE..... Road conditions
HOW Operating conditions,
 Weather conditions,
 Symptoms

SEF907L

Introduction

NIEC1230

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on EC-796.

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.

Start your diagnosis by looking for "conventional" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

DIAGNOSTIC WORKSHEET

NIEC1230S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting faster and more accurate.

In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

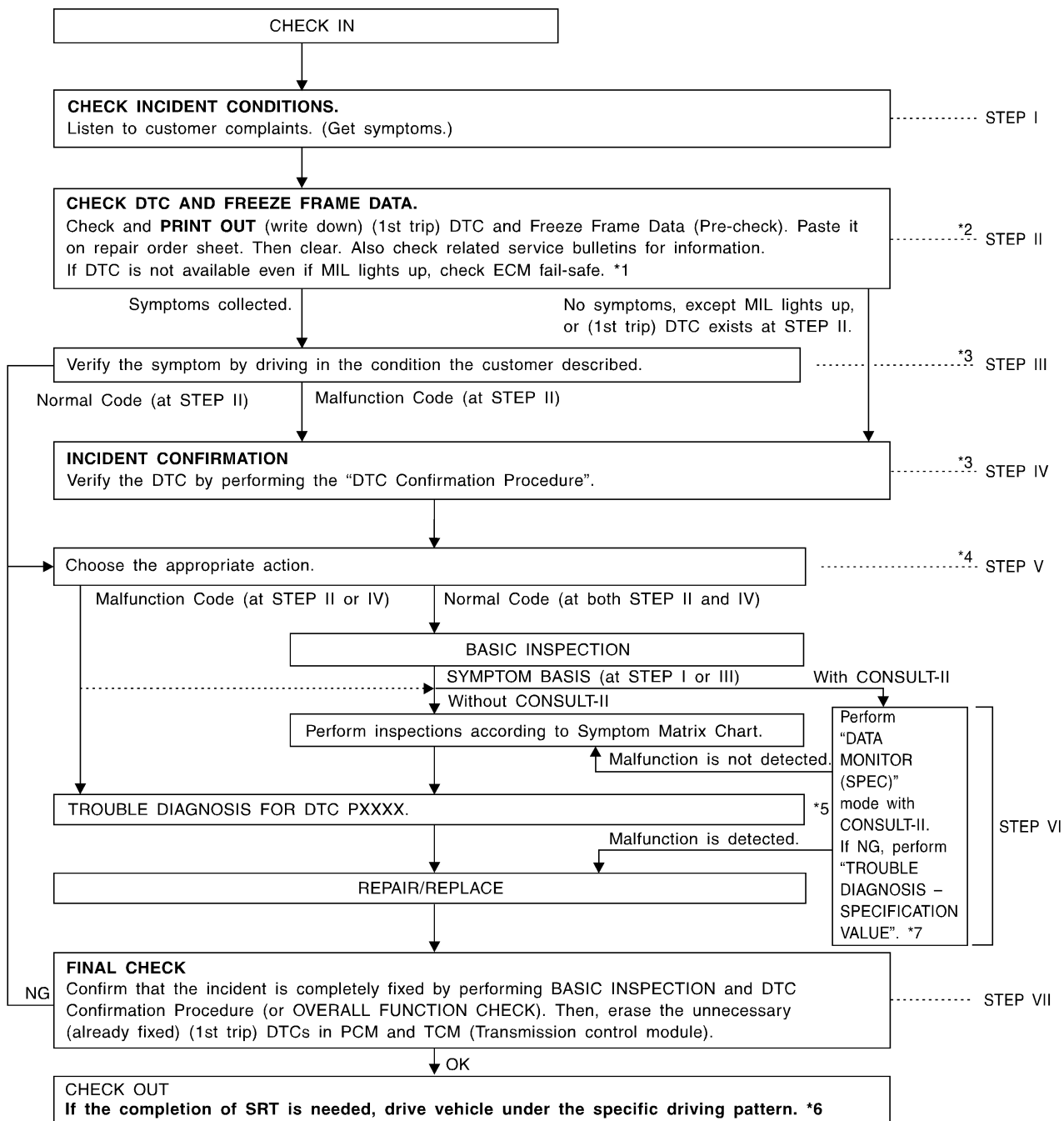
Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Example:

- Vehicle ran out of fuel, which caused the engine to misfire.

Work Flow

NIEC1231



SEF510Z

*1: EC-814

*2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT", EC-838.

*3: If the incident cannot be duplicated, refer to "TROUBLE

DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.

*4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-839.

*5: If the malfunctioning part cannot be found, refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.

*6: EC-764

*7: EC-834

TROUBLE DIAGNOSIS — INTRODUCTION

QG18DE (CALIF CA)

Work Flow (Cont'd)

DESCRIPTION FOR WORK FLOW

NIEC1231S01

STEP	DESCRIPTION	
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-795.	GI
STEP II	Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to EC-769.) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV. Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-815.) Also check related service bulletins for information.	MA EM LC
STEP III	Try to confirm the symptom and under what conditions the incident occurs. The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25 .) If the malfunction code is detected, skip STEP IV and perform STEP V.	EC FE
STEP IV	Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or Generic Scan Tool. During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results. If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25 .) In case the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative. The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.	CL MT AT
STEP V	Take the appropriate action based on the results of STEP I through IV. If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX. If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-798.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE", EC-834. (If malfunction is detected, proceed to "REPAIR/REPLACE". Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-815.)	AX SU
STEP VI	Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode. Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-824. The "DIAGNOSTIC PROCEDURE" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the DIAGNOSTIC PROCEDURE. For details, refer to GI section ("HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT", "Circuit Inspection"). Repair or replace the malfunction parts. If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	BR ST RS BT
STEP VII	Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint. Perform the "DTC CONFIRMATION PROCEDURE" and confirm the normal code [DTC No. P0000 or 0505] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one. Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-769.)	HA SC EL

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TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection

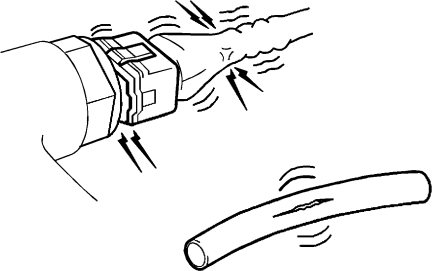
Basic Inspection

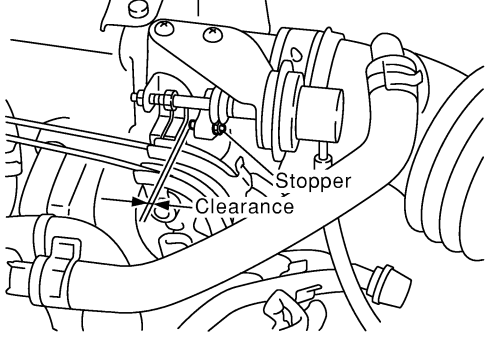
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Precaution:

Perform Basic Inspection without electrical or mechanical loads applied;

- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear window defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.

1	INSPECTION START
<p>1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> ● Harness connectors for improper connections ● Vacuum hoses for splits, kinks and improper connections ● Wiring for improper connections, pinches and cuts ● Air cleaner clogging ● Hoses and ducts for leaks 	
	
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▶ GO TO 2.	

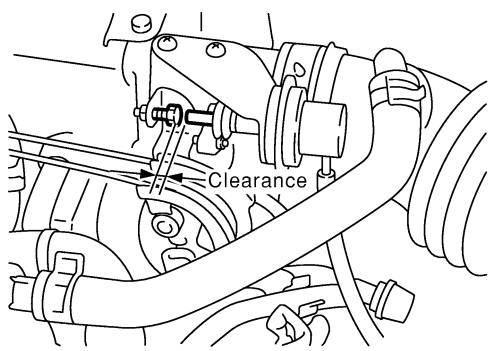
2	CHECK THROTTLE OPENER OPERATION-I
<p>Confirm that there is a clearance between throttle drum and stopper.</p>	
	
SEF456Y	
OK or NG	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

3	CHECK THROTTLE OPENER FIXING BOLTS
<p>Check throttle opener fixing bolts for loosening.</p>	
OK or NG	
OK	▶ Repair or replace throttle body assembly.
NG	▶ Retighten the fixing bolts.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

4	CHECK THROTTLE OPENER OPERATION-II	
<p>1. Start engine and let it idle. 2. Confirm that throttle opener rod moves backward and there is a clearance between throttle drum and throttle opener rod.</p>		
		
SEF457Y		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

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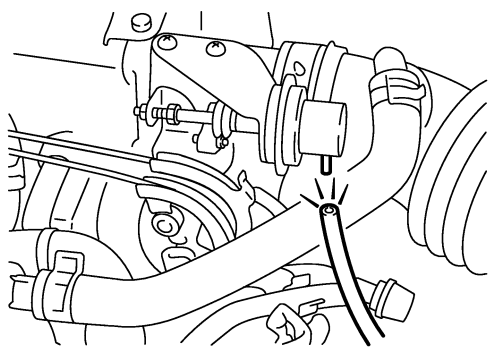
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5	CHECK VACUUM SOURCE FOR THROTTLE OPENER	
<p>1. Disconnect vacuum hose connected to throttle opener. 2. Check vacuum existence with engine running.</p>		
		
SEF458Y		
OK or NG		
OK	▶	Repair or replace throttle body assembly.
NG	▶	GO TO 6.

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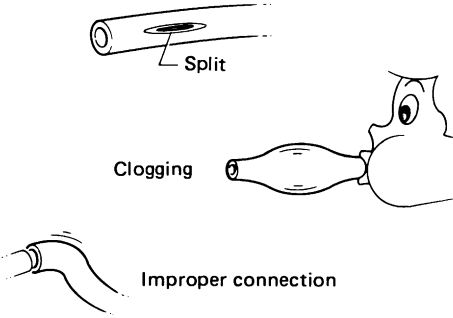
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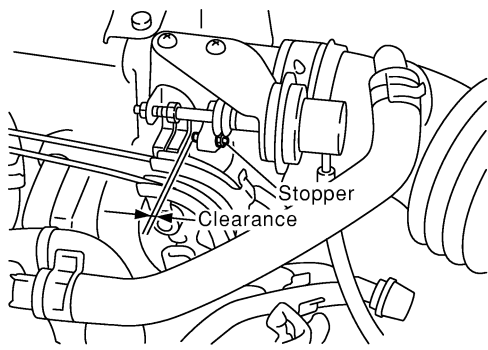
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TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

6	CHECK VACUUM HOSE	
<p>1. Stop engine. 2. Remove the vacuum hose. 3. Check the vacuum hose for splits, kinks and clogging.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Split</p> <p style="margin-left: 100px;">Clogging</p> <p style="margin-left: 100px;">Improper connection</p> </div> <p style="text-align: right;">SEF109L</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	Clean vacuum port by blowing air.
NG	▶	Replace vacuum hose.

7	CHECK THROTTLE DRUM OPERATION	
<p>Confirm that throttle drum moves to contact the stopper.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Stopper</p> <p style="margin-left: 100px;">Clearance</p> </div> <p style="text-align: right;">SEF456Y</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	GO TO 8.

8	CHECK ACCELERATOR WIRE INSTALLATION	
<p>1. Stop engine. 2. Check accelerator wire for slack.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	Adjust accelerator wire. Refer to FE-3 , "Adjusting Accelerator Wire".

9	CHECK THROTTLE VALVE OPERATION	
<p>1. Remove intake air ducts. 2. Check throttle valve operation when moving throttle drum by hand.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	Retighten the throttle drum fixing nuts.
NG	▶	Clean the throttle body and throttle valve.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

10	CHECK THROTTLE POSITION SWITCH CLOSED POSITION-I
<p>NOTE: Always check ignition timing before performing the following.</p> <ol style="list-style-type: none"> 1. Warm up engine to normal operating temperature. 2. Stop engine. 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to vacuum pump as shown below. <div style="text-align: center; margin: 10px 0;"> </div> <p style="text-align: right; margin-right: 50px;">SEF793WA</p> <ol style="list-style-type: none"> 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum is free from the throttle opener rod. 	
With CONSULT-II	▶ GO TO 11.
Without CONSULT-II	▶ GO TO 17.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

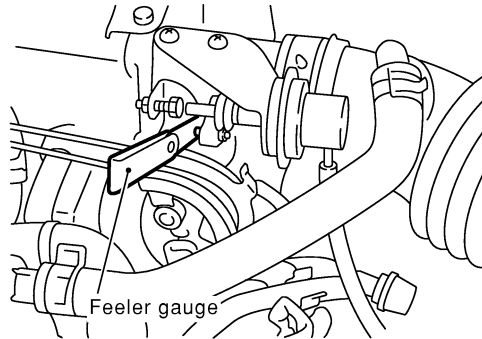
QG18DE (CALIF CA)

Basic Inspection (Cont'd)

11 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "A/T", then "DATA MONITOR" mode with CONSULT-II.
3. Select "CLOSED THL/SW" from the menu.
4. Read "CLOSED THL/SW" signal under the following conditions.
 - Insert a 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between stopper and throttle drum as shown in the figure and check the signal.



SEF459Y

DATA MONITOR	
MONITOR	NO DTC
CLOSED THL/SW	ON

SEF059Y

"CLOSED THL/SW" signal should remain "ON" while inserting 0.05 mm (0.0020 in) feeler gauge.
 "CLOSED THL/SW" signal should remain "OFF" while inserting 0.15 mm (0.0059 in) feeler gauge.

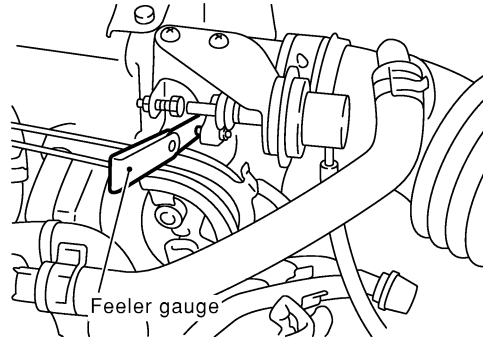
OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 12.

12 | ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

Ⓜ With CONSULT-II

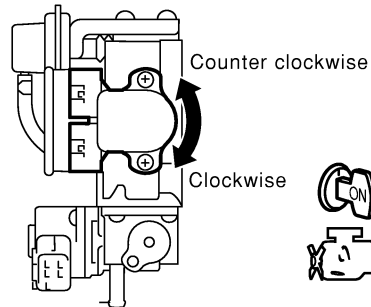
1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.



SEF459Y

4. Turn throttle position sensor body counterclockwise until "CLOSED THL/SW" signal switches to "OFF".

DATA MONITOR	
MONITOR	NO DTC
CLOSED THL/SW	OFF



SEF511Z

▶ GO TO 13.

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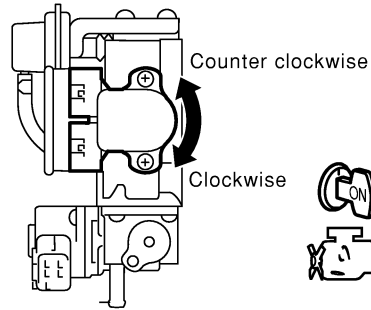
13 ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II

With CONSULT-II

1. Temporarily tighten sensor body fixing bolts as follows.

- Gradually move the sensor body clockwise and stop it when “CLOSED THL/SW” signal switches from “OFF” to “ON”, then temporarily tighten sensor body fixing bolts.

DATA MONITOR	
MONITOR	NO DTC
CLOSED THL/SW	ON



SEF512Z

2. Make sure two or three times that the signal is “ON” when the throttle valve is closed and “OFF” when it is opened.
3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.
4. Make sure two or three times that the signal remains “OFF” when the throttle valve is closed.
5. Tighten throttle position sensor.
6. Check the “CLOSED THL/SW” signal again.

The signal remains “OFF” while closing throttle valve.

OK or NG

OK	▶	GO TO 14.
NG	▶	GO TO 12.

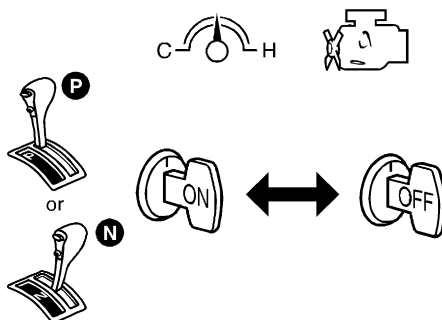
14 RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

Ⓜ With CONSULT-II

NOTE:

Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.

1. Remove 0.15 mm (0.0059 in) feeler gauge.
2. Confirm that proper vacuum is applied. Refer to Test No. 10.
3. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.
4. Start engine.
5. Warm up engine to normal operating temperature.
6. Select "ENGINE", then select "CLSD THL POS" in "DATA MONITOR" mode.
7. Stop engine. (Turn ignition switch "OFF".)
8. Turn ignition switch "ON" and wait at least 5 seconds.



9. Turn ignition switch "OFF" and wait at least 10 seconds.
10. Repeat steps 8 and 9 until "CLSD THL POS" signal changes to "ON".

SEF864V

DATA MONITOR	
MONITOR	NO DTC
CLSD THL POS	ON

SEF061Y

▶ GO TO 19.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

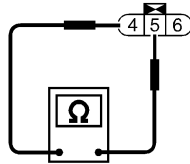
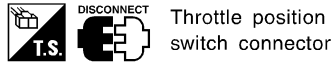
QG18DE (CALIF CA)

Basic Inspection (Cont'd)

15 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

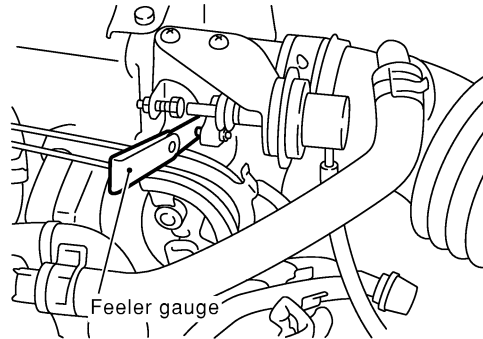
⊗ Without CONSULT-II

1. Disconnect closed throttle position switch harness connector.
2. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions.



SEF711X

- Insert the 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between the stopper and throttle drum as shown in the figure.



SEF459Y

“Continuity should exist” while inserting 0.05 mm (0.0020 in) feeler gauge.
“Continuity should not exist” while inserting 0.15 mm (0.0059 in) feeler gauge.

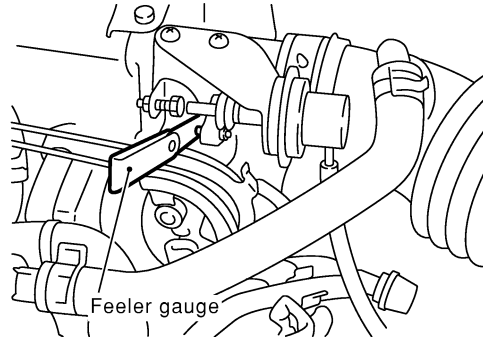
OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 16.

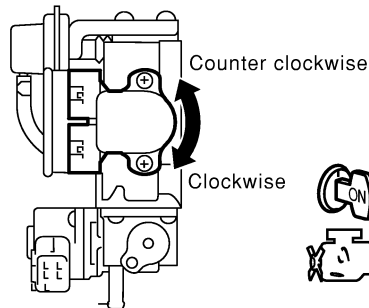
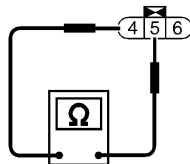
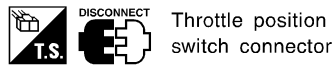
16 | ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

⊗ Without CONSULT-II

1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to Test No. 10. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.



4. Turn throttle position sensor body counterclockwise until continuity does not exist.



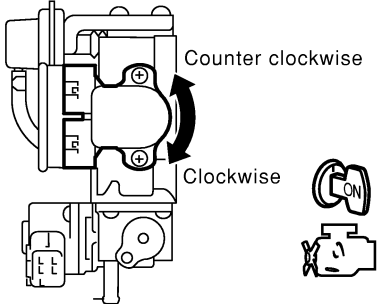
SEF459Y

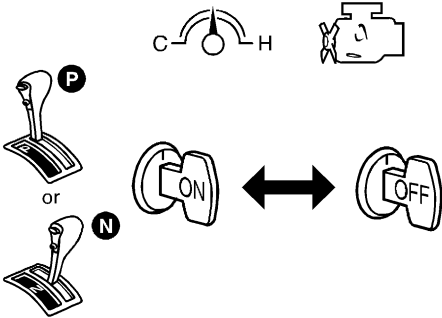
SEF711X

SEF460Y

▶ GO TO 17.

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17	ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II
<p>⊗ Without CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> ● Gradually move the sensor body clockwise and stop it when the continuity comes to exist, then temporarily tighten sensor body fixing bolts. 	
	
SEF460Y	
<p>2. Make sure two or three times that the continuity exists when the throttle valve is closed and continuity does not exist when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the continuity does not exist when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the continuity again.</p> <p style="color: blue;">Continuity does not exist while closing the throttle valve.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ GO TO 16.

18	RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY
<p>⊗ Without CONSULT-II</p> <p>NOTE:</p> <p>Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.</p>	
<ol style="list-style-type: none"> 1. Remove 0.15 mm (0.0059 in) feeler gauge. 2. Reconnect throttle position switch harness connector. 3. Confirm that proper vacuum is applied. Refer to Test No. 10. 4. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected. 5. Start engine. 6. Warm up engine to normal operating temperature. 7. Stop engine. (Turn ignition switch "OFF".) 8. Turn ignition switch "ON" and wait at least 5 seconds. 	
	
SEF864V	
<ol style="list-style-type: none"> 9. Turn ignition switch "OFF" and wait at least 10 seconds. 10. Repeat steps 8 and 9, 20 times. 	
▶	GO TO 19.

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

19	CHECK (1ST TRIP) DTC	
<p>1. Turn ignition switch "OFF".</p> <p>2. Release vacuum from throttle opener.</p> <p>3. Remove vacuum pump and vacuum hose from throttle opener.</p> <p>4. Reinstall original vacuum hose to throttle opener securely.</p> <p>5. Start engine and warm it up to normal operating temperature.</p> <p>6. Rev engine (2,000 to 3,000 rpm) two or three times.</p> <p>7. Make sure no (1st trip) DTC is displayed with CONSULT-II or GST.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	▶	GO TO 21.
OK (Without CONSULT-II)	▶	GO TO 22.
NG	▶	GO TO 20.

GI
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20	REPAIR OR REPLACE	
Repair or replace components as necessary according to corresponding "Diagnostic Procedure".		
	▶	GO TO 19.

FE
CL

21	CHECK TARGET IDLE SPEED	
<p> With CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Select "ENG SPEED" in "DATA MONITOR" mode.</p> <p>3. Check idle speed.</p> <p style="text-align: center;">800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 28.
NG	▶	GO TO 23.

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22	CHECK TARGET IDLE SPEED	
<p> Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="text-align: center;">800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 28.
NG	▶	GO TO 23.

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23	PERFORM IDLE AIR VOLUME LEARNING	
<p>Refer to "Idle Air Volume Learning", EC-755.</p> <p>Which is the result CMPLT or INCMP?</p> <p style="text-align: center;">CMPLT or INCMP</p>		
CMPLT	▶	GO TO 24.
INCMP	▶	1. Follow the instruction of "Idle Air Volume Learning", EC-755. 2. GO TO 23.

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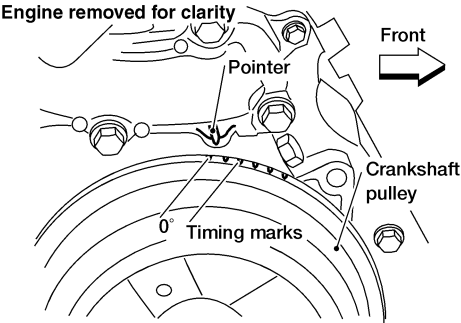
TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

24	CHECK TARGET IDLE SPEED AGAIN	
<p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed. 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 26.
NG	▶	GO TO 25.

25	CHECK ECM FUNCTION	
<p>1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.)</p> <p>2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-771.</p>		
▶		GO TO 23.

26	CHECK IGNITION TIMING	
<p>1. Rev engine (2,000 to 3,000 rpm) two or three times and let it idle.</p> <p>2. Check ignition timing at idle using a timing light.</p>		
		
<p>Ignition timing: 9°±5° BTDC (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 35.
NG	▶	GO TO 27.

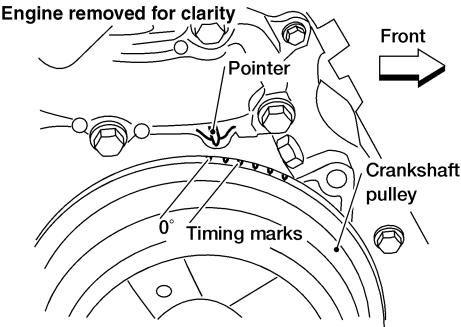
LEC245

27	CHECK TIMING CHAIN INSTALLATION	
<p>Check timing chain installation, refer to EM-20, "Components".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 25.
NG	▶	<p>1. Repair the timing chain installation.</p> <p>2. GO TO 23.</p>

TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

28	CHECK IGNITION TIMING
<p>1. Rev engine (2,000 to 3,000 rpm) two or three times and let it idle. 2. Check ignition timing at idle using a timing light.</p> <div style="text-align: center;">  <p style="text-align: center;">Engine removed for clarity Pointer Front Crankshaft pulley 0° Timing marks</p> </div> <p style="text-align: right;">LEC245</p> <p style="color: blue; text-align: center;">Ignition timing: 9°±5° BTDC (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 35.
NG	▶ GO TO 29.

29	PERFORM IDLE AIR VOLUME LEARNING
<p>Refer to "Idle Air Volume Learning", EC-755. Which is the result CMPLT or INCMP?</p> <p style="text-align: center;">CMPLT or INCMP</p>	
CMPLT	▶ GO TO 30.
INCMP	▶ 1. Follow the construction of "Idle Air Volume Learning". 2. GO TO 29.

30	CHECK IGNITION TIMING AGAIN
<p>Check ignition timing, refer to Test No. 28.</p> <p style="text-align: center;">OK or NG</p>	
OK (With CONSULT-II)	▶ GO TO 33.
OK (Without CONSULT-II)	▶ GO TO 34.
NG	▶ GO TO 31.

31	CHECK TIMING CHAIN INSTALLATION
<p>Check timing chain installation, refer to EM-20, "Components".</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 32.
NG	▶ 1. Repair the timing chain installation. 2. GO TO 29.

32	CHECK ECM FUNCTION
<p>1. Substitute another known-good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.) 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-771.</p>	
▶	GO TO 29.

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TROUBLE DIAGNOSIS — BASIC INSPECTION

QG18DE (CALIF CA)

Basic Inspection (Cont'd)

33	CHECK TARGET IDLE SPEED AGAIN
Ⓜ With CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Select "ENG SPEED" in "DATA MONITOR" mode. 3. Make sure idle speed is within the range below. 800±50 rpm (in "P" or "N" position)	
▶ GO TO 35.	

34	CHECK TARGET IDLE SPEED AGAIN
ⓧ Without CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Make sure idle speed is within the range below. 800±50 rpm (in "P" or "N" position)	
▶ GO TO 35.	

35	ERASE UNNECESSARY DTC
After this inspection, unnecessary DTC No. might be displayed. Erase the stored memory in ECM and TCM (Transmission control module). Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769 and AT-37 , "HOW TO ERASE DTC".	
▶ INSPECTION END	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)
DTC Inspection Priority Chart

DTC Inspection Priority Chart

NIEC1233

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)	
1	<ul style="list-style-type: none"> ● P0100 Mass air flow sensor ● P0110 Intake air temperature sensor ● P0115, P0125 Engine coolant temperature sensor ● P0120 Throttle position sensor ● P0180 Fuel tank temperature sensor ● P0325 Knock sensor ● P0335 Crankshaft position sensor (POS) ● P0340 Camshaft position sensor (PHASE) ● P0403 EGR volume control valve ● P0460, P0461, P0464, P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1126 Thermostat function ● P1320 Ignition signal ● P1605 A/T diagnosis communication line ● P1706 Park/Neutral position (PNP) switch 	GI MA EM LC EC FE CL
2	<ul style="list-style-type: none"> ● P0105 Barometric pressure sensor ● P1271-P1276 A/F sensor 1 ● P1277 A/F sensor 1 heater ● P0137-P0140 Heated oxygen sensor 2 (rear) ● P0141 Heated oxygen sensor 2 heater (rear) ● P0143-P0146 Heated oxygen sensor 3 ● P0147 Heated oxygen sensor 3 heater ● P0217 Coolant overtemperature enrichment protection ● P0443, P1444 EVAP canister purge volume control solenoid valve ● P0446, P1446, P1448 EVAP canister vent control valve ● P0450 EVAP control system pressure sensor ● P0510 Closed throttle position switch ● P0705-P0725, P0740-P1760 A/T related sensors, solenoid valves and switches ● P1108 Manifold absolute pressure sensor ● P1137 Swirl control valve ● P1138 Swirl control valve position sensor ● P1140 Intake valve timing control position sensor circuit ● P1401 EGR temperature sensor ● P1447 EVAP control system purge flow monitoring ● P1490, P1491 Vacuum cut valve bypass valve 	MT AT AX SU BR ST
3	<ul style="list-style-type: none"> ● P0171, P0172 Fuel injection system function ● P0300-P0304 Misfire ● P0400, P1402 EGR function ● P0420 Three way catalyst function ● P0440/P1440 EVAP control system (SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0505 IACV-AAC valve ● P0600 A/T communication line ● P0731-P0734, P0744 A/T function ● P1110 Intake valve timing control function ● P1111 Intake valve timing control solenoid valve ● P1132 Swirl control valve ● P1148 Closed loop control 	RS BT HA SC

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

Fail-safe Chart

Fail-safe Chart

=NIEC1234

The ECM enters fail-safe mode if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0100	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0115	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-II display)
		Just as ignition switch is turned ON or Start	40°C (104°F)
		More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
		Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
P0120	Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
		Condition	Driving condition
		When engine is idling	Normal
		When accelerating	Poor acceleration
P0403	EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.	
Unable to access ECM	ECM	ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.	
		Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and IACV-AAC valve operation are controlled under certain limitations.	
		ECM fail-safe operation	
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multiport fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		IACV-AAC valve	Full open
		Replace ECM, if ECM fail-safe condition is confirmed.	

*: In Diagnostic Test Mode II (Self-diagnostic results)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

Symptom Matrix Chart

Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

NIEC1235

NIEC1235S01

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-1333
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			FE section
	Injector circuit	1	1	2	3	2		2	2			2			EC-1324
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-725
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-741
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-798
	IACV-AAC valve circuit	1	1	2	3	3	2	2	2	2		2		2	EC-1105
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-798
	Ignition circuit	1	1	2	2	2		2	2			2			EC-1228
EGR	EGR volume control valve circuit		2	2	3	3						3			EC-1026
	EGR system	2	1	2	3	3	3	2	2	3		3			EC-1017, EC-1246
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	EC-839
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	HA section

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

Symptom Matrix Chart (Cont'd)

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor circuit	2	2	3	3	3		3	3			3			EC-1011
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			EC-846
A/F sensor 1		1	2	3	2		2	2			2			EC-1190
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			EC-866, 882
Throttle position sensor circuit		1	2		2	2	2	2	2		2			EC-871
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			EC-798
Swirl control valve circuit	3	3						2						EC-1147
Intake valve timing control system		3	3		3		3				3			EC-1134
Vehicle speed sensor circuit		2	3		3						3			EC-1101
Knock sensor circuit			2								3			EC-1002
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-1125, 814
Start signal circuit	2													EC-1329
PNP switch circuit			3		3		3	3			3			EC-1320
Power steering oil pressure switch circuit		2					3	3						EC-1339
Electrical load signal circuit							3	3						EC-1348

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)
Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NIEC1235S02

		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5	5												FE section	
	Fuel piping			5	5	5	5	5	5	5	5	5				
	Vapor lock															
	Valve deposit															
	Poor fuel (Heavy weight gasoline, Low octane)	5			5	5	5		5	5			5			—
Air	Air duct														FE section	
	Air cleaner															
	Air leakage from air duct (Mass air flow sensor — throttle body)		5	5		5		5	5			5			—	
	Throttle body, Throttle wire	5			5		5			5						
	Air leakage from intake manifold/Collector/Gasket														—	
Cranking	Battery	1	1	1		1		1	1					1	EL section	
	Alternator circuit															
	Starter circuit	3											1			
	Flywheel/Drive plate/Signal plate	6													EM section	
	PNP switch	4													AT section	

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

Symptom Matrix Chart (Cont'd)

		SYMPTOM												Reference page		
		HARD/NO START/RESTART (EXCP: HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Engine	Cylinder head	5	5	5	5	5		5	5			5	3		EM section	
	Cylinder head gasket															4
	Cylinder block	6	6	6	6	6		6	6			6	4			
	Piston															
	Piston ring															
	Connecting rod															
	Bearing															
	Crankshaft															
Valve mechanism	Timing chain	5	5	5	5	5		5	5			5	3		EM section	
	Camshaft															
	Intake valve															
	Exhaust valve															
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			FE section	
	Three way catalyst															
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			MA, EM and LC sections	
	Oil level (Low)/Filthy oil															
Cooling	Radiator/Hose/Radiator filler cap	5	5	5	5	5		5	5			4	5		LC section	
	Thermostat															5
	Water pump															
	Water gallery															
	Cooling fan															5
	Coolant level (low)/Contaminated coolant															
															EC-1173	
																MA section

1 - 6: The numbers refer to the order of inspection.

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC12.36

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

(i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)

- If the real-time diagnosis results are NG, and the on board diagnostic system results are OK, when diagnosing the mass air flow sensor, first check to see if the fuel pump control circuit is normal.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.0 - 1.7V
		2,500 rpm 1.5 - 2.4V
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.0 - 1.6 msec
		2,000 rpm 0.7 - 1.3 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm 53 - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> ● Engine: After warming up 	More than 70°C (158°F)
A/F SEN1 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm Fluctuates around 1.5V
HO2S2 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> ● Turn drive wheels and compare speedometer indication with the CONSULT-II value 	Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) 	11 - 14V
THRTL POS SEN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed 0.15 - 0.85V
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) ● Vacuum is applied using a vacuum pump 	Throttle valve: fully opened 3.5 - 4.7V
FUEL T/TMP SE	<ul style="list-style-type: none"> ● Engine: After warming up 	Less than 60°C (140°F)
EGR TEMP SEN	<ul style="list-style-type: none"> ● Engine: After warming up 	Less than 4.5V
EVAP SYS PRES	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 3.4V
ABSOL PRES/SE	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 4.4V
FUEL LEVEL SE	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 0 - 2.5V
START SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON → START → ON 	OFF → ON → OFF

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
CLSD THL POS	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) ● Vacuum is applied using a vacuum pump 	Throttle valve: Idle position ON
		Throttle valve: Slightly open OFF
AIR COND SIG	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	A/C switch "OFF" OFF
		A/C switch "ON" (Compressor operates) ON
P/N POSI SW	<ul style="list-style-type: none"> ● Ignition switch: ON 	Shift lever "P" or "N" ON
		Except above OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction) OFF
		The steering wheel is turned ON
LOAD SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON 	Rear window defogger or headlamp is "ON" ON
		Rear window defogger and headlamp is "OFF" OFF
IGNITION SW	<ul style="list-style-type: none"> ● Ignition switch: ON → OFF 	ON → OFF
INJ PULSE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 2.4 - 3.2 msec
		2,000 rpm 1.9 - 3.2 msec
IGN TIMING	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 9°±2° BTDC
		2,000 rpm More than 25° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 20.0 - 35.5%
		2,500 rpm 12.0 - 30.0%
ABSOL TH-P/S	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed 0.0%
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: fully opened Approx. 80.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle 1.4 - 4.0 g·m/s
		2,500 rpm 5.0 - 10.0 g·m/s
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 5 - 20 steps
		2,000 rpm —
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle 0 %
		2,000 rpm —

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION		
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" 	Idle	0 step	GI
	<ul style="list-style-type: none"> ● Shift lever: "N" ● No-load 	Engine speed: Revving from idle up to 3,000 rpm quickly	10 - 55 step	MA
SWL C/V (B1)	<ul style="list-style-type: none"> ● Engine: Idle the engine 	Engine coolant temperature is below 44°C (111°F)	0 - 5 step	EM
		Engine coolant temperature is above 45°C (113°F)	115 - 120 step	LC
INT/V SOL-B1	<ul style="list-style-type: none"> ● Engine is running ● Engine speed is more than 2,000 rpm ● Quickly depressed accelerator pedal. ● Vehicle speed is more than 4 km/h (2 MPH) 		OFF → ON	EC
AIR COND RLY	<ul style="list-style-type: none"> ● Air conditioner switch: OFF → ON 		OFF → ON	FE
FUEL PUMP RLY	<ul style="list-style-type: none"> ● Ignition switch is turned to ON (Operates for 5 seconds) ● Engine running and cranking ● When engine is stopped (stops in 1.0 seconds) 		ON	CL
	<ul style="list-style-type: none"> ● Except as shown above 		OFF	MT
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON 		OFF	AT
VENT CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON 		OFF	AT
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less	OFF	AX
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	LOW	SU
		Engine coolant temperature is 105°C (221°F) or more	HIGH	BR
HO2S2 HTR (B1) HO2S3 HTR (B1)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 		OFF	ST
	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 		ON	RS
TRVL AFTER MIL	<ul style="list-style-type: none"> ● Ignition switch: ON 	MIL is not illuminated	0 km (0 mile)	BT
		MIL is illuminated	0 km (0 mile) or more	HA
MAP SENSOR	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 		Approx. 1.3V	SC
HO2S3 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm	Approx. 0 - 1.0V	EL
A/F S1 HTR (B1)	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 		0 - 100%	EL
SWL/C POSI SE	<ul style="list-style-type: none"> ● Engine: Idle the engine 	Engine coolant temperature is below 44°C (111°F)	Approx. 0 deg.	EL
		Engine coolant temperature is above 45°C (113°F)	Approx. 80 deg.	IDX

Major Sensor Reference Graph in Data Monitor Mode

NIEC1237

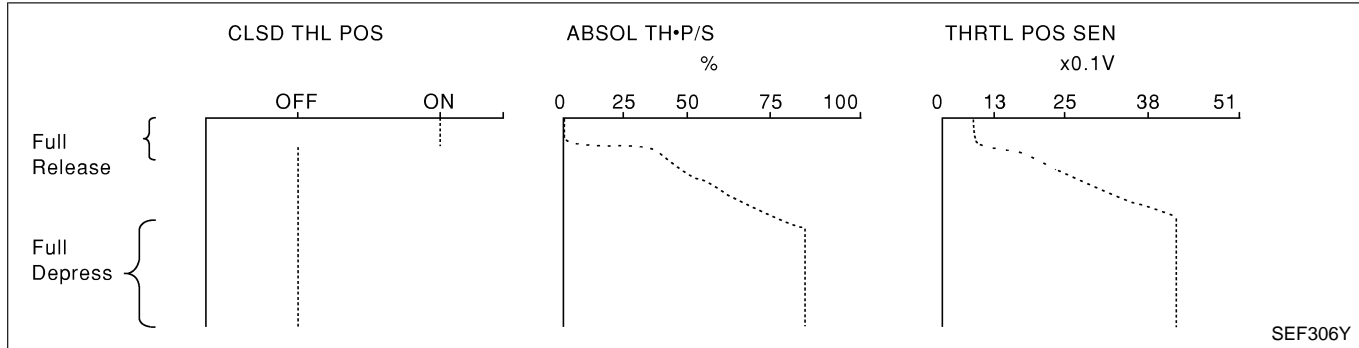
The following are the major sensor reference graphs in "DATA MONITOR" mode.

THRTL POS SEN, ABSOL TH·P/S, CLSD THL POS

NIEC1237S01

Below is the data for "THRTL POS SEN", "ABSOL TH·P/S" and "CLSD THL POS" when depressing the accelerator pedal with the ignition switch "ON".

The signal of "THRTL POS SEN" and "ABSOL TH·P/S" should rise gradually without any intermittent drop or rise after "CLSD THL POS" is changed from "ON" to "OFF".

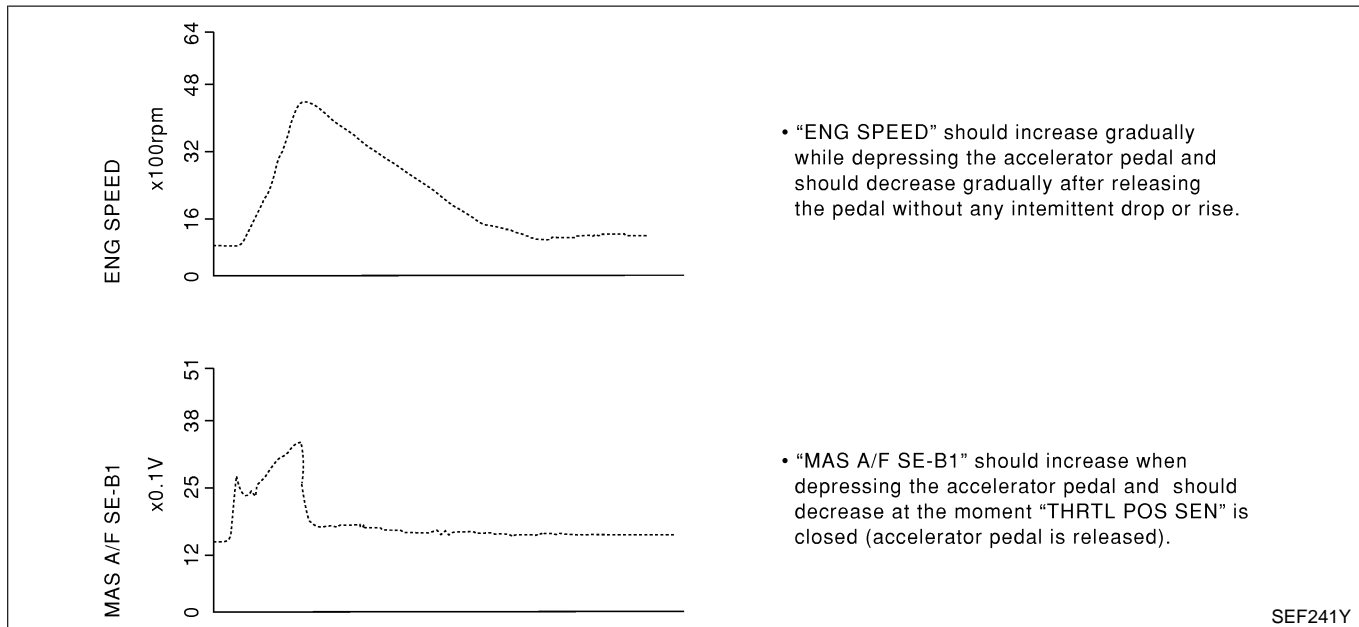


ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), INJ PULSE-B1

NIEC1237S02

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1/B2)" and "INJ PULSE" when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

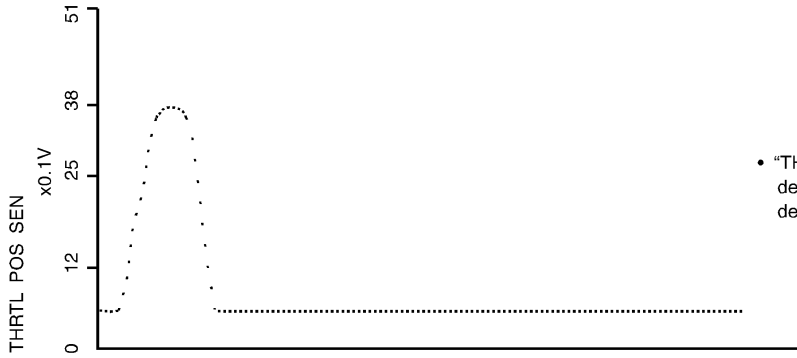
Each value is for reference, the exact value may vary.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

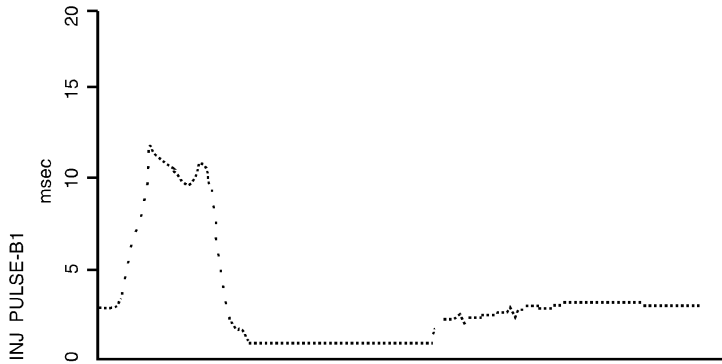
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

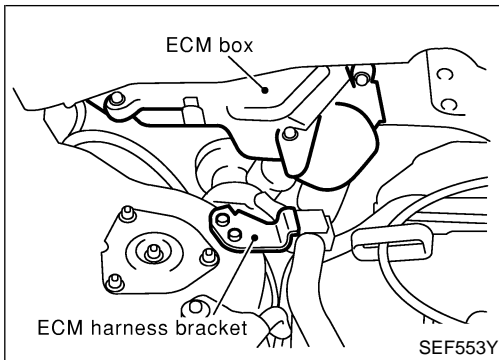
HA

SC

EL

IDX

SEF600Z



ECM Terminals and Reference Value

NIEC1238

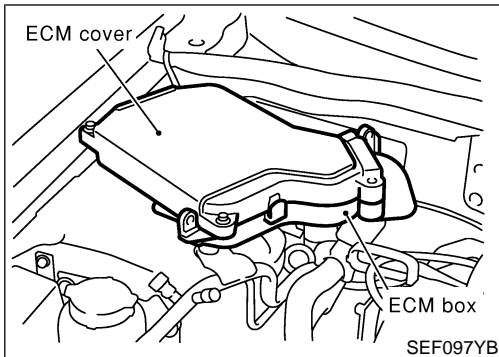
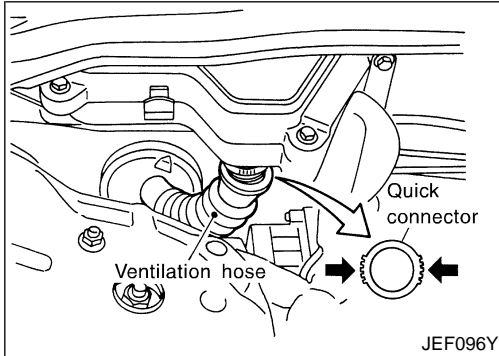
PREPARATION

NIEC1238S01

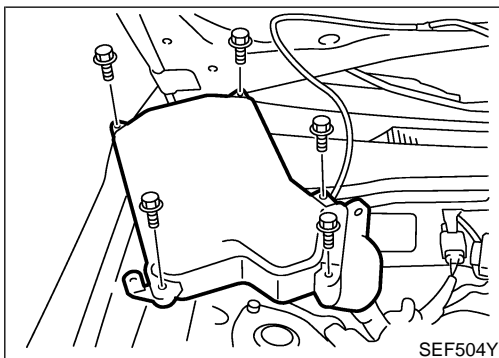
1. ECM is located in the right side of the cowl top (behind the strut tower).

For this inspection:

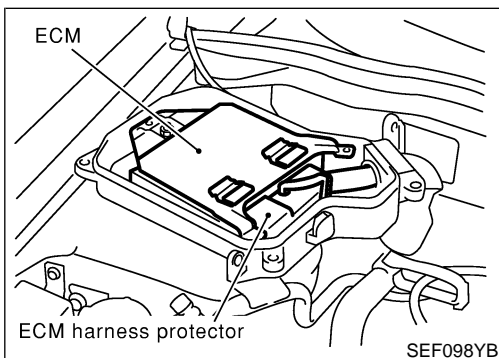
- Remove engine control harness bracket on the strut tower.
- Remove quick connector on the ventilation hose.
- Remove ECM fixing bolts and pull it out all the way.



- Remove ECM cover fixing bolts.



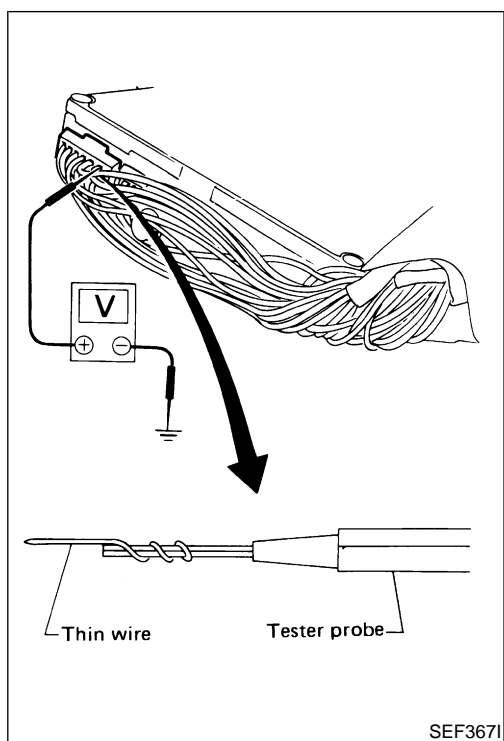
- Remove ECM fixing bolts.
 - Remove ECM with it's harness from the cover.
2. Remove ECM harness protector.



TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

ECM Terminals and Reference Value (Cont'd)



3. Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
 - Open harness securing clip to make testing easier.
 - Use extreme care not to touch 2 pins at one time.
 - Data is for comparison and may not be exact.

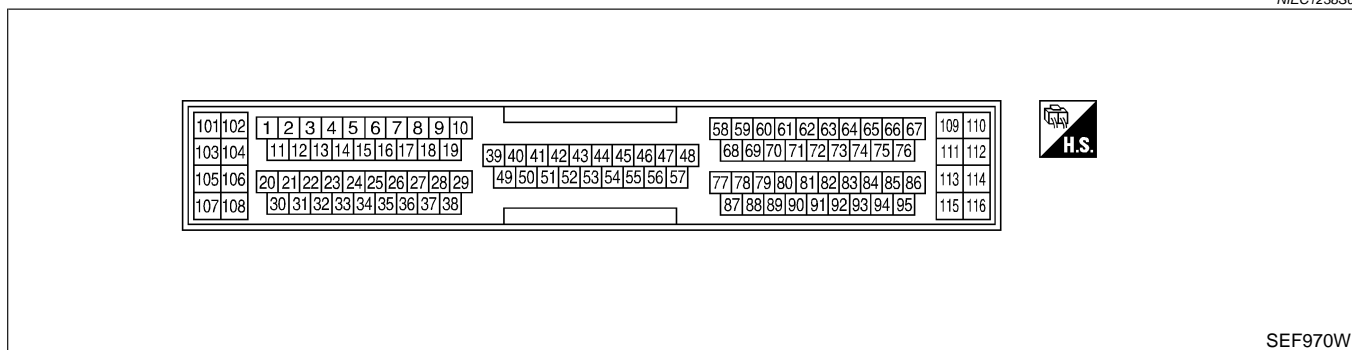
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

GI
MA
EM
LC
EC

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NIEC1238S02



FE
CL
MT
AT
AX
SU
BR
ST

ECM INSPECTION TABLE

NIEC1238S03

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

RS
BT
HA
SC
EL
IDX

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
1	Y/R	Intake valve timing control solenoid valve	[Engine is running] ● Intake valve timing control is operating	0 - 1V
			[Engine is not running] ● Intake valve timing control is not operating	BATTERY VOLTAGE (11 - 14V)
2	L/B	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

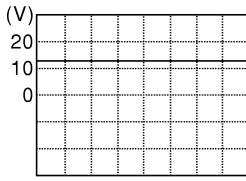
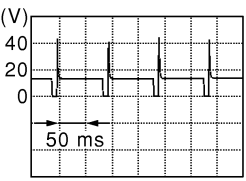
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	W/R	Heated oxygen sensor 3 heater	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)
5	R	A/F sensor 1 heater	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 5V
6 7 15 16	BR LG P OR	IACV-AAC valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
8 9 17 18	SB W/B R/Y BR/R	EGR volume control valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
10	Y/B	A/T signal No. 3	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Voltage fluctuates between 0 and 9V.
11	R/B	Heated oxygen sensor 2 (rear) heater	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more 	0 - 1.0V
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm 	BATTERY VOLTAGE (11 - 14V)
12	LG/B	Cooling fan relay (High)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan (High) is operating 	0 - 0.6V
13	LG/R	Cooling fan relay (Low)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is operating 	0 - 0.6V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

ECM Terminals and Reference Value (Cont'd)

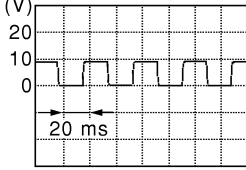
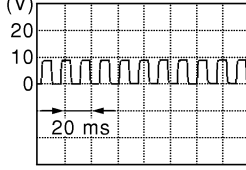
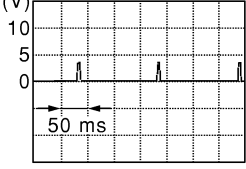
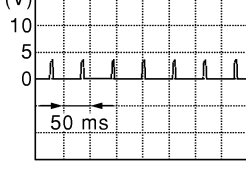
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
14	GY/L	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)  <small>SEF462Y</small>	GI MA EM LC
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	BATTERY VOLTAGE (11 - 14V)  <small>SEF461Y</small>	EC FE CL
19	BR/W	A/T signal No. 5	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Voltage fluctuates between 0 and 9V.	MT
21	B/P	Fuel pump relay	[Ignition switch "ON"] <ul style="list-style-type: none"> ● For 5 seconds after turning ignition switch "ON" 	0 - 1V	AT
			[Engine is running] <ul style="list-style-type: none"> ● More than 5 seconds after turning ignition switch "ON" 	BATTERY VOLTAGE (11 - 14V)	AX SU
22	OR/L	Malfunction indicator lamp	[Ignition switch "ON"]	0 - 1.0V	ST
			[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V)	BR
23	L	Air conditioner relay	[Engine is running] <ul style="list-style-type: none"> ● Both A/C switch and blower switch are "ON" (Compressor operates) 	0 - 0.6V	RS
			[Engine is running] <ul style="list-style-type: none"> ● A/C switch is "OFF" 	BATTERY VOLTAGE (11 - 14V)	BT
24 25 26 27	L/R G R/B G/OR	Swirl control valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V	HA
31	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] <ul style="list-style-type: none"> ● For 7 seconds after turning ignition switch "OFF" 	0 - 1.0V	SC
			[Ignition switch "OFF"] <ul style="list-style-type: none"> ● More than 7 seconds passed after turning ignition switch "OFF" 	BATTERY VOLTAGE (11 - 14V)	EL

IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

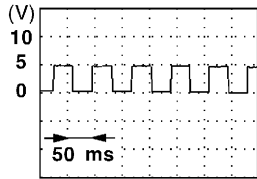
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
32	L/OR	Tachometer	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 8 - 9V  SEF463Y
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 8 - 9V  SEF464Y
35 36 37 38	B/R PU L/R GY/R	Ignition signal	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 0.3V  SEF465Y
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 0.5V  SEF466Y
40	Y/PU	Throttle position switch (Closed position)	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Accelerator pedal fully released 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Accelerator pedal depressed 	Approximately 0V
41	B/Y	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 12V
42	G/OR	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position is "P" or "N" 	Approximately 0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	BATTERY VOLTAGE (11 - 14V)
43	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

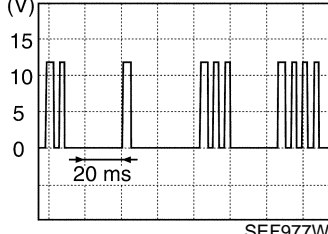
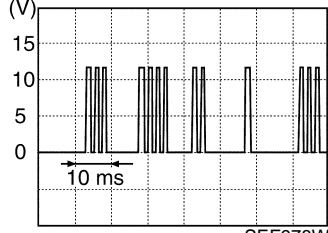
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
44	L/R	Air conditioner switch	[Engine is running] ● Both A/C switch and blower switch are "ON"	Approximately 0V	GI
			[Engine is running] ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)	MA
46	PU	Power steering oil pressure switch	[Engine is running] ● Steering wheel is being turned.	Approximately 0V	EM
			[Engine is running] ● Steering wheel is not being turned.	Approximately 5V	LC
48	B	ECM ground	[Engine is running] ● Idle speed	Engine ground	EC
50	R/W	Electrical load signal	[Ignition switch "ON"] ● Lighting switch and/or rear window defogger switch "ON"	BATTERY VOLTAGE (11 - 14V)	FE
			[Ignition switch "ON"] ● Lighting switch and rear window defogger switch "OFF"	0V	CL
51	LG/B	Heater fan switch	[Engine is running] ● Heater fan switch "ON"	Approximately 0V	MT
			[Engine is running] ● Heater fan switch "OFF"	Approximately 5V	AT
54	Y/R	A/T signal No. 1	[Engine is running] ● Idle speed	Voltage fluctuates between 0 and 9V.	AX
55	Y/G	A/T signal No. 2	[Engine is running] ● Idle speed	Voltage fluctuates between 0 and 9V.	SU
56	G/Y	A/T signal No. 4	[Engine is running] ● Idle speed	Voltage fluctuates between 0 and 9V.	BR
57	B	ECM ground	[Engine is running] ● Idle speed	Engine ground	ST
58	B	Sensor's ground	[Engine is running] ● Warmed-up condition ● Idle speed	Approximately 0V	RS
60	PU/R	Vehicle speed sensor	[Engine is running] ● Lift up the vehicle ● In 2nd gear position ● Vehicle speed is 40 km/h (25 MPH)	0 - Approximately 4.2V  SEF003W	BT HA
61	G	Mass air flow sensor	[Engine is running] ● Warmed-up condition ● Idle speed	1.0 - 1.7V	SC
			[Engine is running] ● Warmed-up condition ● Engine speed is 2,500 rpm	1.5 - 2.4V	EL IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

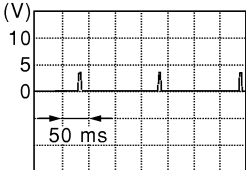
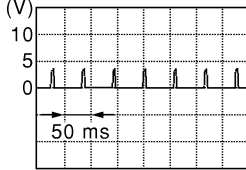
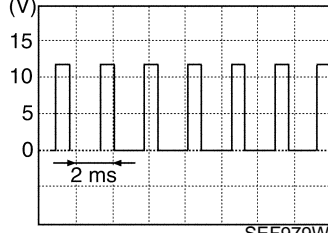
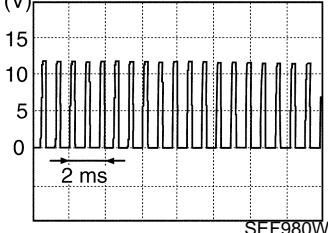
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
62	W/L	A/T sensor 1	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	2 - 3V
63	W			Approximately 2.6V
64	OR/L			Approximately 3.1V
65	OR			2 - 3V
66 75	R	Camshaft position sensor (PHASE)	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 2.0 - 3.0V  <p style="text-align: right; font-size: small;">SEF977W</p>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 2.0 - 3.0V  <p style="text-align: right; font-size: small;">SEF978W</p>
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
68	OR/L	Throttle position sensor signal output	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Accelerator pedal fully released 	Approximately 0.5V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	Approximately 4V
69	PU	A/T diagnosis communication line	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Voltage fluctuates between 0 and 9V.
70	BR/W	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
71	Y/B	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.
72	PU	EGR temperature sensor	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Less than 4.5V
			[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● EGR system is operating 	0 - 1.5V
73	B	Mass air flow sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 0V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

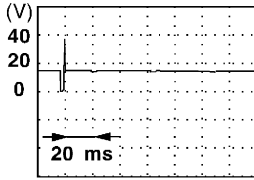
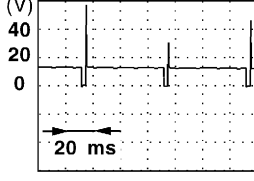
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
74	R/L	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates) 	0.36 - 3.88V
78	R	Intake valve timing control position sensor	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 0.5 - 0.6V 
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 0.5 - 0.6V 
79	B/W	Fuel level sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V
80	G	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
81	W	Knock sensor	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 2.5V
82	G/OR	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
83	W	BARO sensor	[Ignition switch "ON"]	Approximately 4.4V
85	R	Crankshaft position sensor (POS)	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 3.0 - 4.0V 
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 3.0 - 4.0V 

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
86	W	Heated oxygen sensor 2 (rear)	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Engine speed is 2,000 rpm 	0 - Approximately 1.0V
89	P	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V
90	P/L	Swirl control valve position sensor	[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Engine coolant temperature is below 44°C (111°F). 	Approximately 5V
			[Engine is running] <ul style="list-style-type: none"> ● Idle speed ● Engine coolant temperature is above 45°C (113°F). 	0 - 1.0V
91	W	MAP sensor	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	Approximately 1.3V
92	W	Throttle position sensor	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Accelerator pedal fully released ● Vacuum is created using vacuum pump 	0.15 - 0.85V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed ● Vacuum is created using vacuum pump 	3.5 - 4.7V
95	L	Heated oxygen sensor 3	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Engine speed is 2,000 rpm 	0 - approximately 1.0V
101 103 105 107	R/B Y/B G/B L/B	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V) <div style="text-align: right;">  <p style="font-size: small; margin: 0;">SEF011W</p> </div>
			[Engine is running] <ul style="list-style-type: none"> ● Warmed-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V) <div style="text-align: right;">  <p style="font-size: small; margin: 0;">SEF012W</p> </div>
102	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
106 108	B B	ECM ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Engine ground
110 112	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

QG18DE (CALIF CA)

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
115	LG	DATA link connector	[Ignition switch "ON"] ● CONSULT-II or GST is disconnected.	Approximately 8V

GI

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EL

IDX

Description

Description

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of the Engine Control System. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the Engine Control System is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the Engine Control System may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the Engine Control System, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction)
- A/F ALPHA-B1 (The mean value of air-fuel ratio feedback correction factor per cycle)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor)

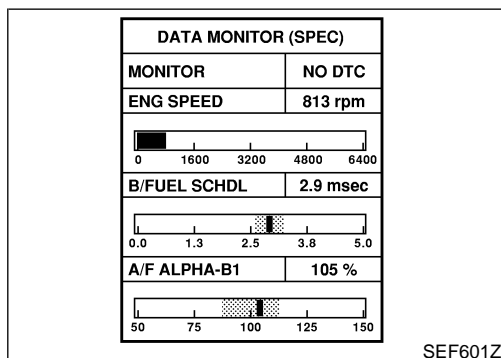
Testing Condition

- Vehicle driven distance: More than 5,000 km (3,017 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 14.25 - 15.12 psi)
- Atmospheric temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up*1
- Electrical load: Not applied*2
- Engine speed: Idle

NIEC1240

*1: For A/T or CVT models, after the engine is warmed up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T or CVT fluid temperature sensor signal) indicates more than 60°C (140°F). For MT models, drive vehicle for 5 minutes after the engine is warmed up to normal operating temperature.

*2: Rear window defogger switch, air conditioner switch, lighting switch are “OFF”. Cooling fans are not operating. Steering wheel is straight ahead.



Inspection Procedure

NIEC1241

NOTE:

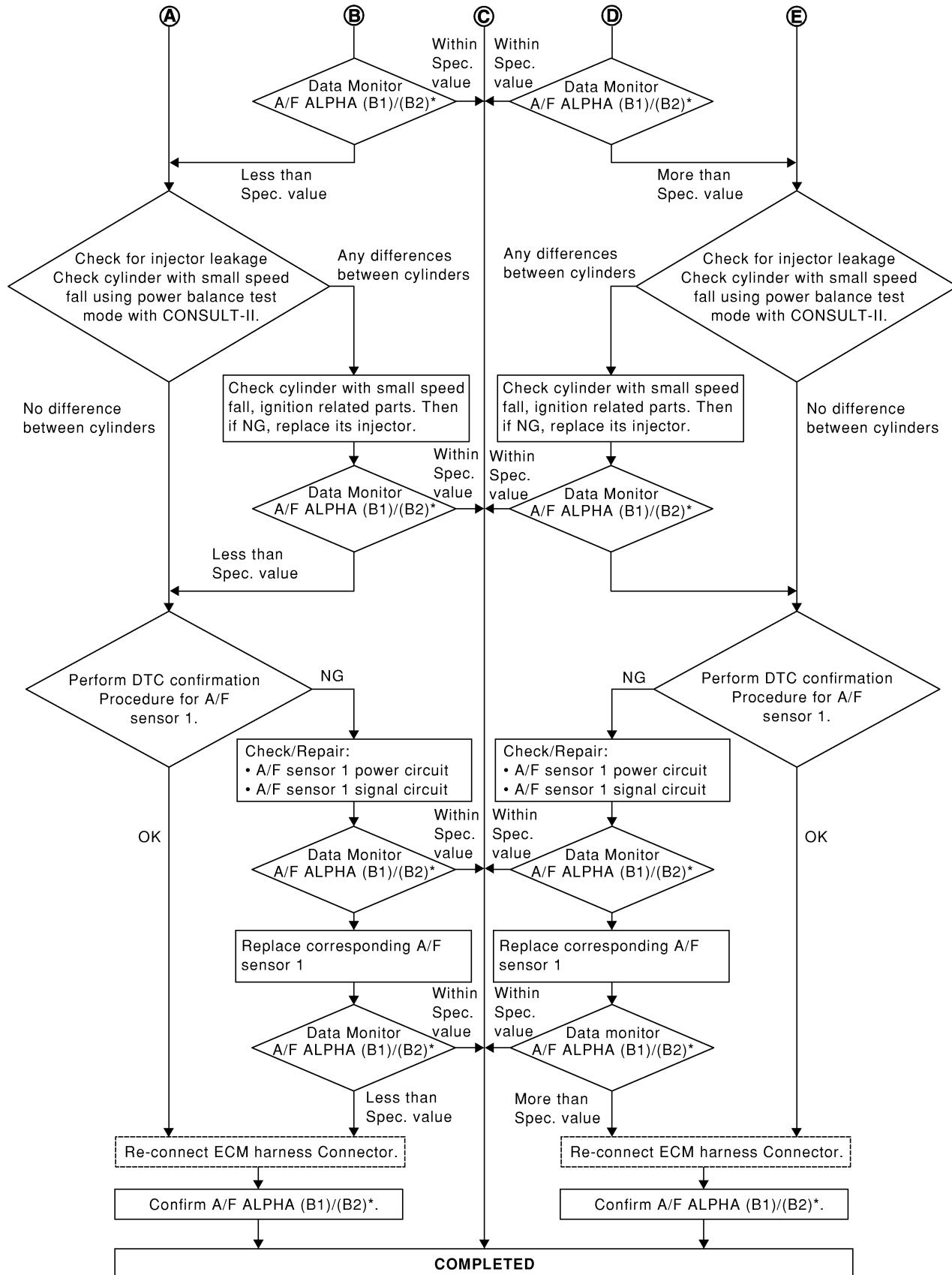
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform “Basic Inspection”, EC-798.
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1” and “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to “Diagnostic Procedure”, EC-835.

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

QG18DE (CALIF CA)

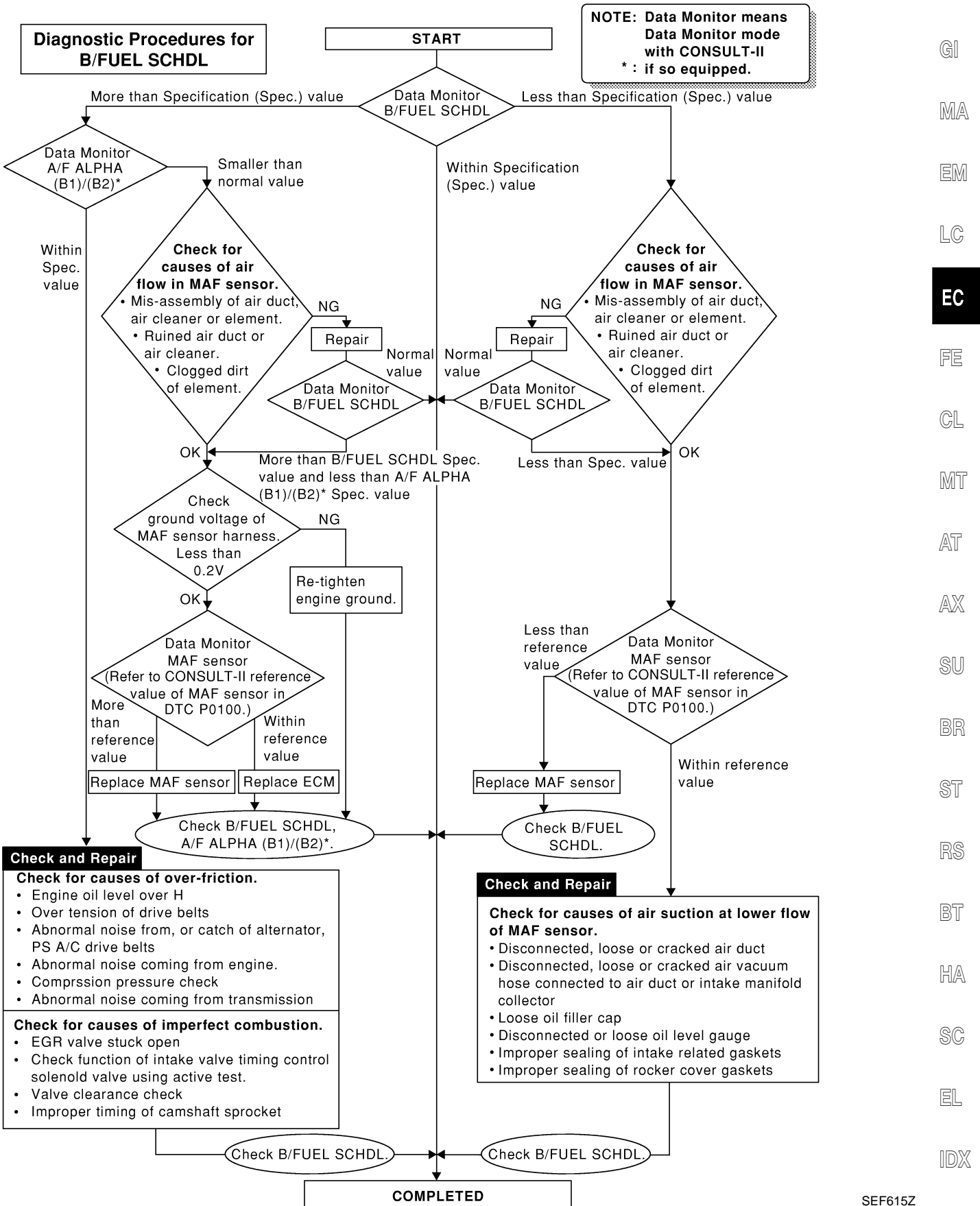
Diagnostic Procedure (Cont'd)



SEF614Z

TROUBLE DIAGNOSIS — SPECIFICATION VALUE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)



GI
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IDX

TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT

QG18DE (CALIF CA)

Description

Description

NIEC1243

Intermittent incidents (I/I) may occur. In many cases, the problem resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific problem area.

COMMON I/I REPORT SITUATIONS

NIEC1243S01

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.
VI	The TROUBLE DIAGNOSIS for PXXXX does not indicate the problem area.

Diagnostic Procedure

NIEC1244

1	INSPECTION START	
Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION-RELATED INFORMATION", EC-769.		
▶		GO TO 2.

2	CHECK GROUND TERMINALS	
Check ground terminals for corroding or loose connection. Refer to GI-30 , "GROUND INSPECTION".		
OK or NG		
OK ▶		GO TO 3.
NG ▶		Repair or replace.

3	SEARCH FOR ELECTRICAL INCIDENT	
Refer to GI-25 , "Incident Simulation Tests".		
OK or NG		
OK ▶		GO TO 4.
NG ▶		Repair or replace.

4	CHECK CONNECTOR TERMINALS	
Refer to GI-22 , "How to Check Enlarged Contact Spring of Terminal".		
OK or NG		
OK ▶		INSPECTION END
NG ▶		Repair or replace connector.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

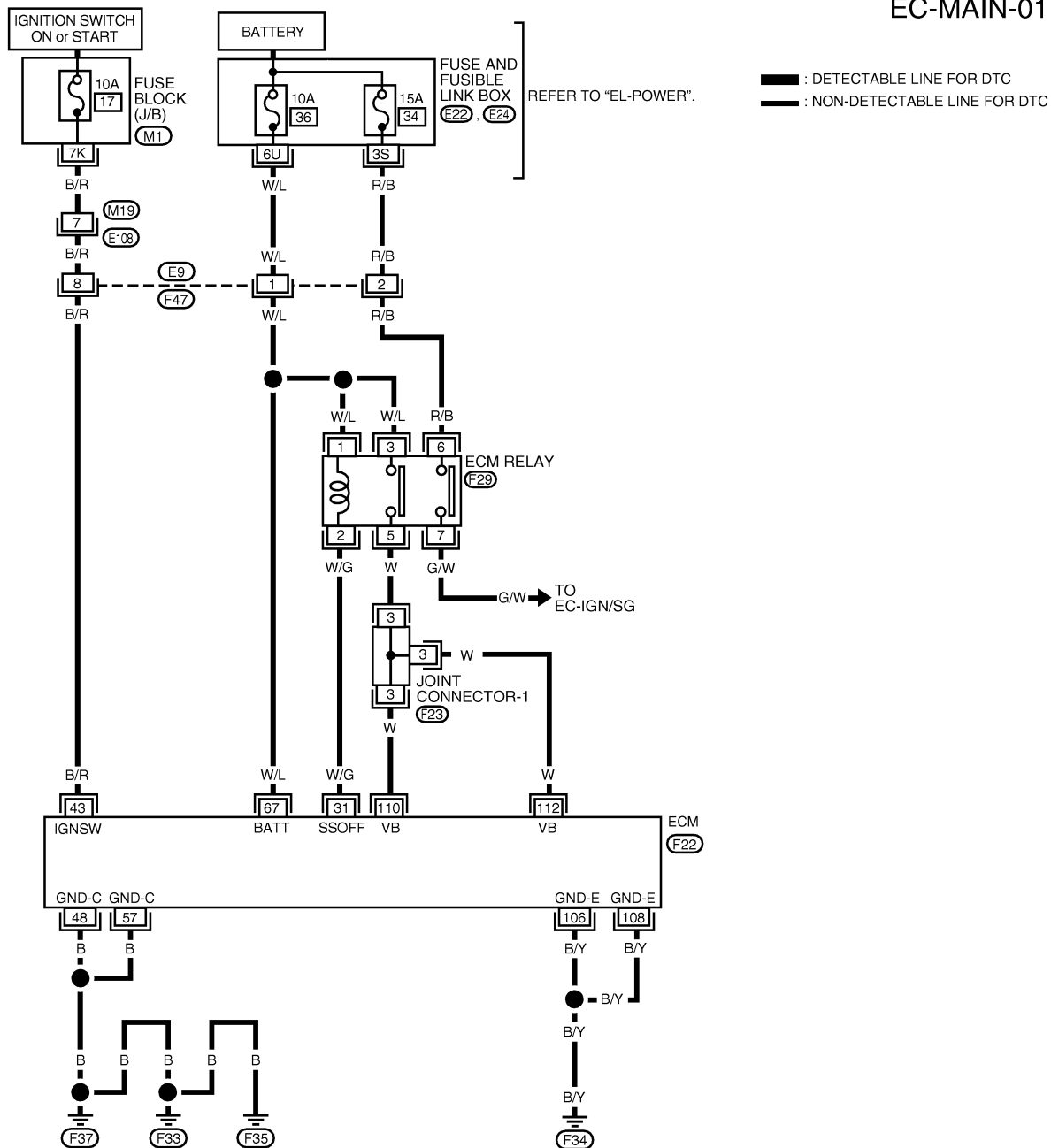
QG18DE (CALIF CA)

Main Power Supply and Ground Circuit

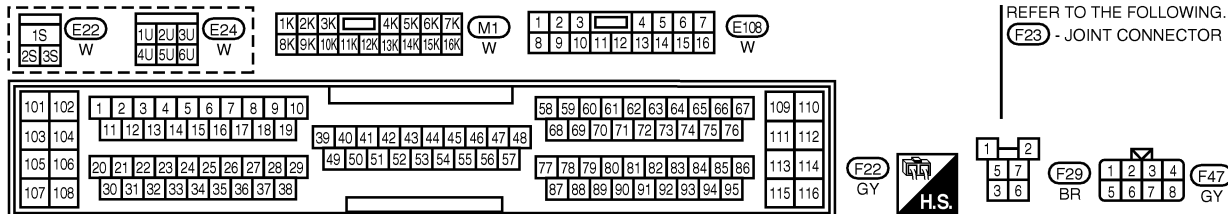
Main Power Supply and Ground Circuit WIRING DIAGRAM

NIEC1245

EC-MAIN-01



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

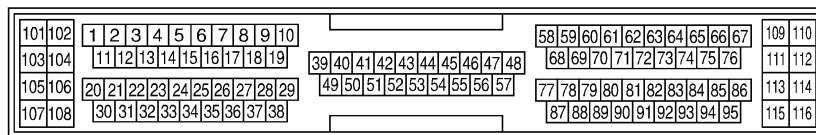


WEC379

TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)



SEF970W

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
31	W/G	ECM RELAY (SELF-SHUTOFF)	ENGINE RUNNING FOR 5 SECONDS AFTER TURNING IGN OFF	0 - 1.0V
			5 SECONDS PASSED AFTER TURNING IGN OFF	BATTERY VOLTAGE
43	B/R	IGN	IGN OFF	0V
			IGN ON	BATTERY VOLTAGE
48	B	ECM GROUND	ENGINE RUNNING	ENGINE GROUND
57	B			
67	W/L	POWER SUPPLY (BACK-UP)	IGN OFF	BATTERY VOLTAGE
106	B/Y	ECM GROUND	ENGINE RUNNING AT IDLE SPEED	ENGINE GROUND
108	B/Y			
110	W	POWER SUPPLY FOR ECM	IGN ON	BATTERY VOLTAGE
112	W			

SEF603Z

DIAGNOSTIC PROCEDURE

NIEC1246

1	INSPECTION START	
Start engine. Is engine running?		
Yes or No		
Yes	▶	GO TO 8.
No	▶	GO TO 2.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

2	CHECK POWER SUPPLY-I		
<p>1. Turn ignition switch "OFF" and then "ON".</p> <p>2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.</p>			
OK		▶	GO TO 4.
NG		▶	GO TO 3.

3	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors M19, E108 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between ECM and 10A fuse 			
		▶	Repair harness or connectors.

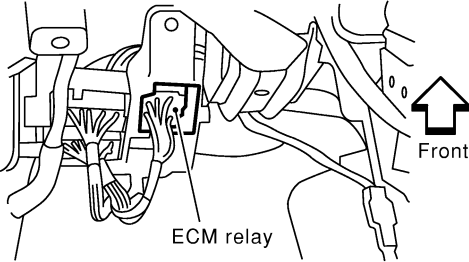
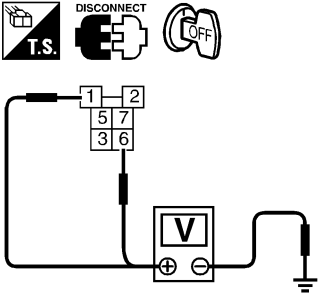
4	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I		
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to WIRING DIAGRAM. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK		▶	GO TO 5.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

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TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

5	CHECK POWER SUPPLY-II		
<p>1. Disconnect ECM relay.</p> <div style="text-align: center;"> <p>Passenger side view with instrument panel removed for clarity</p>  <p>ECM relay</p> </div>			
SEF387Z			
<p>2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div>			
SEF516Z			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

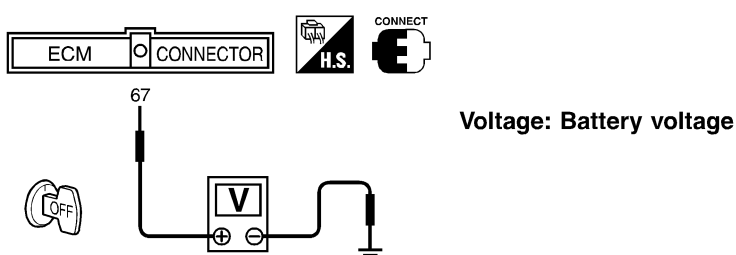
6	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse and fusible link box connectors E22, E24 ● 10A fuse ● 15A fuse ● Harness for open or short between ECM relay and battery 			
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT		
<p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 1. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK	▶	Go to "DTC P1320 IGNITION SIGNAL", EC-1228.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

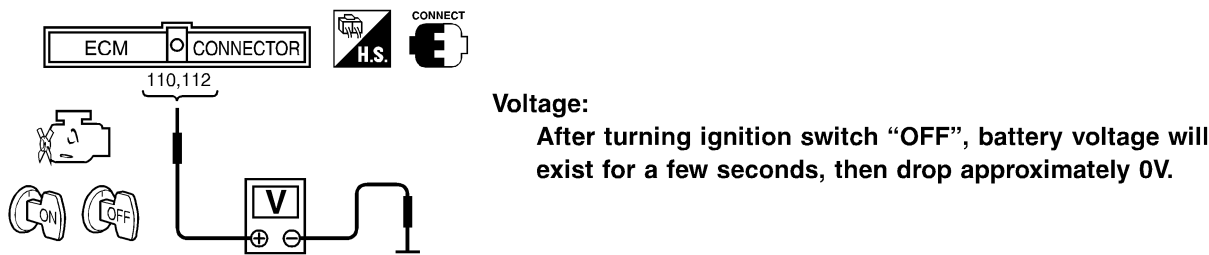
TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

8	CHECK POWER SUPPLY-III		
<p>1. Stop engine. 2. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.</p>			
			
SEF293X			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	GO TO 9.	

9	DETECT MALFUNCTIONING PART		
Check the harness for open or short between ECM and harness connector F47.			
▶		Repair harness or connectors.	

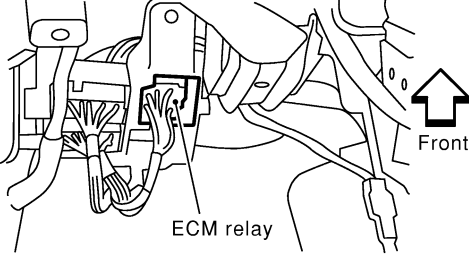
10	CHECK POWER SUPPLY-III		
<p>1. Turn ignition switch "ON" and then "OFF". 2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>			
			
SEF294X			
OK or NG			
OK	▶	GO TO 14.	
NG (Battery voltage does not exist.)	▶	GO TO 7.	
NG (Battery voltage exists for more than a few seconds.)	▶	GO TO 13.	

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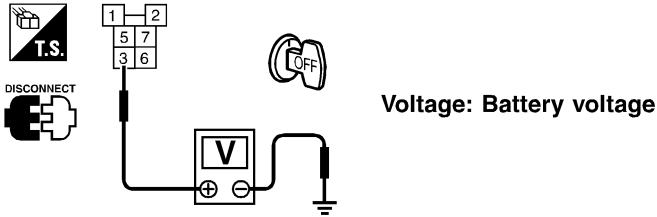
TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

11	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM	
<p>1. Disconnect ECM harness connector. 2. Disconnect ECM relay.</p> <p style="text-align: center;">Passenger side view with instrument panel removed for clarity</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF387Z</p> <p>3. Check harness continuity between ECM terminals 110, 112 and ECM relay terminal 5. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 13.
NG	▶	GO TO 12.

12	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between ECM relay and ECM 	
▶	
Repair open circuit or short to ground or short to power in harness or connectors.	

13	CHECK VOLTAGE BETWEEN ECM RELAY AND GROUND	
<p>Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF295X</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 15.
NG	▶	GO TO 14.

14	DETECT MALFUNCTIONING PART
<p>Check the harness for open or short between ECM relay and harness connector F47.</p>	
▶	
Repair harness or connectors.	

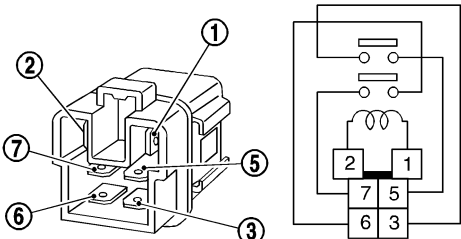
TROUBLE DIAGNOSIS FOR POWER SUPPLY

QG18DE (CALIF CA)

Main Power Supply and Ground Circuit (Cont'd)

15	CHECK OUTPUT SIGNAL CIRCUIT	
<p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 16.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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16	CHECK ECM RELAY							
<p>1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>			Condition	Continuity	12V direct current supply between terminals 1 and 2	Yes	OFF	No
Condition	Continuity							
12V direct current supply between terminals 1 and 2	Yes							
OFF	No							
SEF296X								
OK or NG								
OK	▶	GO TO 17.						
NG	▶	Replace ECM relay.						

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17	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 18.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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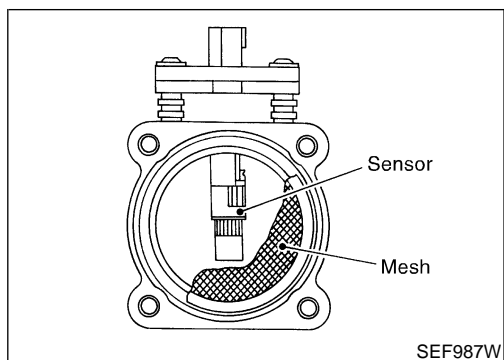
18	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

Component Description



Component Description

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot film that is supplied with electric current from the ECM. The temperature of the hot film is controlled by the ECM a certain amount. The heat generated by the hot film is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot film as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.0 - 1.7V
	2,500 rpm	1.5 - 2.4V
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	20.0 - 35.5%
	2,500 rpm	12.0 - 30.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.4 - 4.0 g-m/s
	2,500 rpm	5.0 - 10.0 g-m/s

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0100	A)	An excessively high voltage from the sensor is sent to ECM when engine is not running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
	C)	A high voltage from the sensor is sent to ECM under light load driving condition.	
	B)	An excessively low voltage from the sensor is sent to ECM* when engine is running.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor
	D)	A low voltage from the sensor is sent to ECM under heavy load driving condition.	
	E)	A voltage from the sensor exists constantly approx. 1.0V when engine is running.	

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

DTC Confirmation Procedure

DTC Confirmation Procedure

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B and E". If there is no problem on "PROCEDURE FOR MALFUNCTION B and E", perform "PROCEDURE FOR MALFUNCTION C". If there is no problem on "PROCEDURE FOR MALFUNCTION C", perform "PROCEDURE FOR MALFUNCTION D".

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

NIEC1250

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DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC1250S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-851.

With GST

Follow the procedure "With CONSULT-II" above.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B AND E

NIEC1250S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-851.

With GST

Follow the procedure "With CONSULT-II" above.

NOTE:

If 1st trip DTC is confirmed after more than 5 seconds, there may be malfunction C.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION C

NIEC1250S03

NOTE:

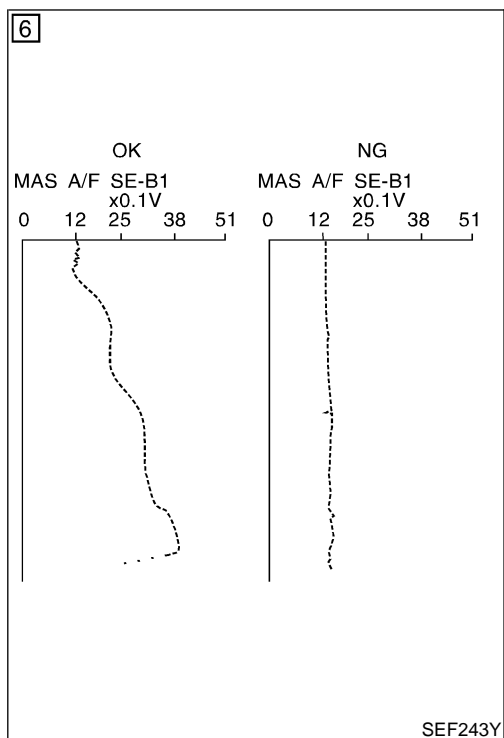
If engine will not start or stops soon wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Run engine for at least 10 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-851.

With GST

Follow the procedure "With CONSULT-II" above.



PROCEDURE FOR MALFUNCTION D

NIEC1250S04

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature. If engine cannot be started, go to "Diagnostic Procedure", EC-851.
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
- 5) Increases engine speed to about 4,000 rpm.
- 6) Monitor the linear voltage rise in response to engine speed increases.
If NG, go to "Diagnostic Procedure", EC-851.
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL POS SEN	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

7	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	THRTL POS SEN	XXX V

SEF719Y

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-851.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

Overall Function Check

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

Overall Function Check

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed.

NIEC1251

PROCEDURE FOR MALFUNCTION D

NIEC1251S01

With GST

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Select "MODE 1" with GST.
- 4) Check the mass air flow sensor signal with "MODE 1".
- 5) Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.
- 6) If NG, go to "Diagnostic Procedure", EC-851.

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

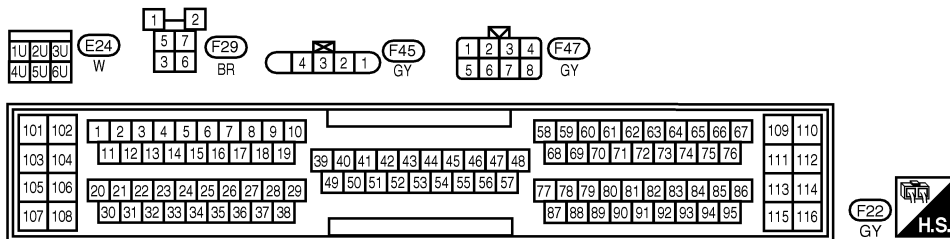
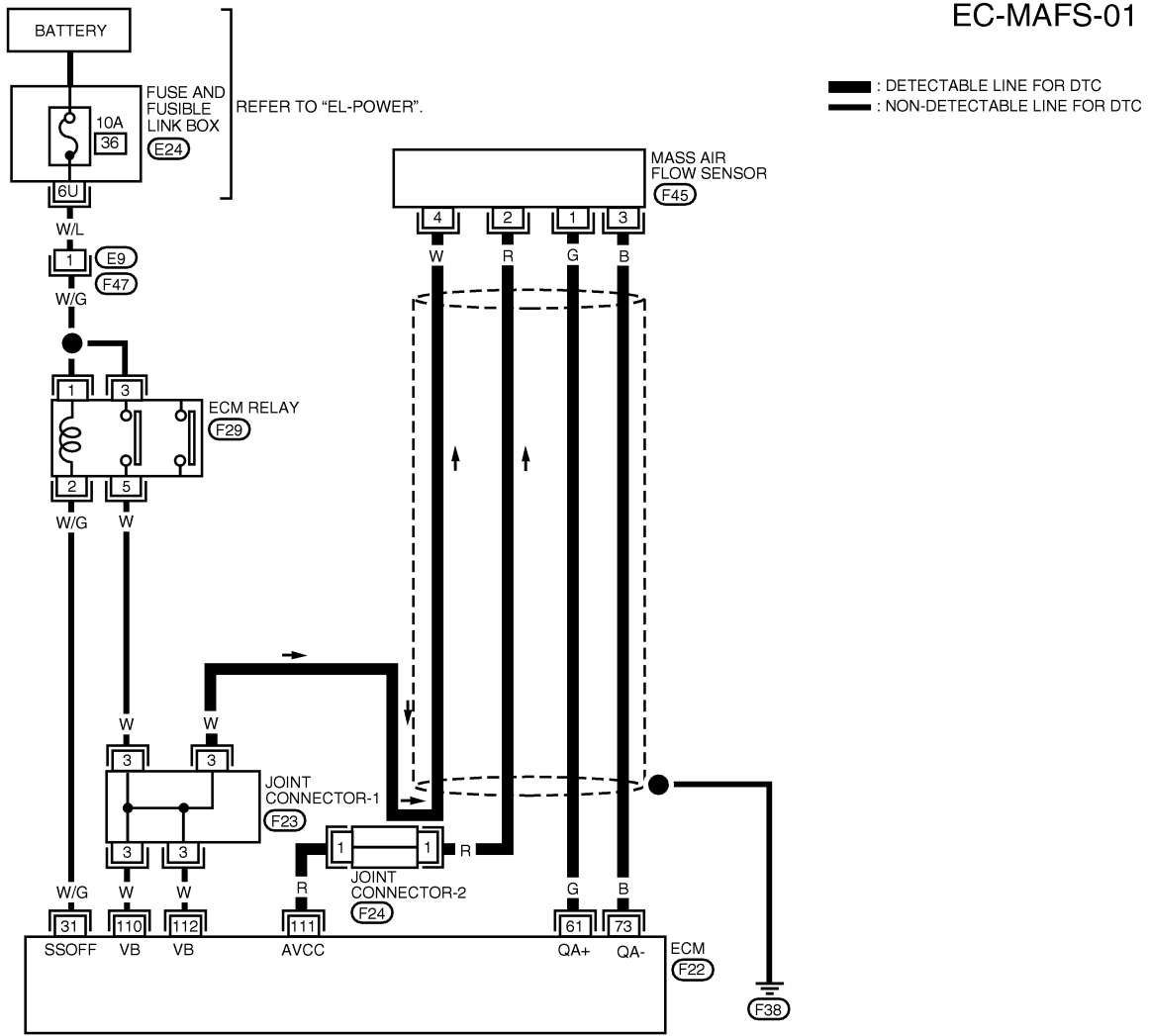
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1252

EC-MAFS-01



REFER TO THE FOLLOWING.
 (F23), (F24) -JOINT CONNECTOR

WEC384

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
61	G	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.3 - 1.7V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.8 - 2.4V
73	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

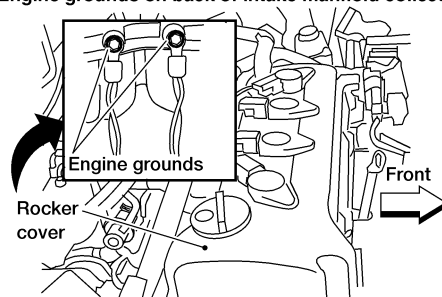
Diagnostic Procedure

Diagnostic Procedure

NIEC1253

1	INSPECTION START							
Which malfunction (A, B, C, D or E) is duplicated?								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A and/or C</td> <td style="text-align: center;">I</td> </tr> <tr> <td style="text-align: center;">B, D and/or E</td> <td style="text-align: center;">II</td> </tr> </tbody> </table>			MALFUNCTION	Type	A and/or C	I	B, D and/or E	II
MALFUNCTION	Type							
A and/or C	I							
B, D and/or E	II							
MTBL0373								
Type I or Type II								
Type I	▶	GO TO 3.						
Type II	▶	GO TO 2.						

2	CHECK INTAKE SYSTEM	
Check the followings for connection.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to collector 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

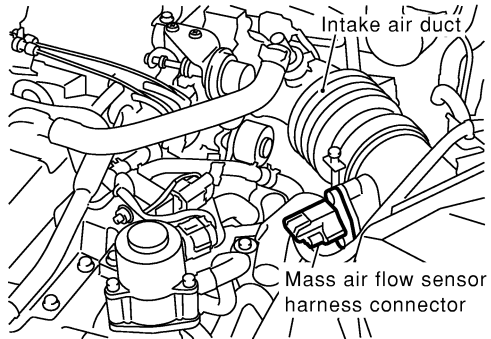
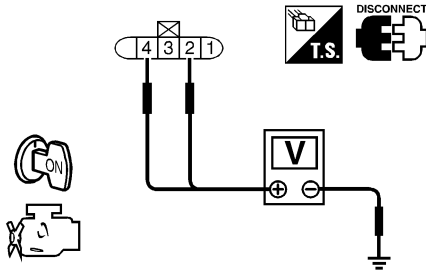
3	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
▶		GO TO 4.

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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK POWER SUPPLY								
<p>1. Disconnect mass air flow sensor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Intake air duct</p> <p style="margin-left: 100px;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right;">SEF388Z</p>									
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between MAFS terminal 4 and ground with CONSULT-II or tester.</p>									
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 50%;">Terminal</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Approximately 5</td> </tr> <tr> <td style="text-align: center;">4</td> <td style="text-align: center;">Battery voltage</td> </tr> </tbody> </table>		Terminal	Voltage	2	Approximately 5	4	Battery voltage
Terminal	Voltage								
2	Approximately 5								
4	Battery voltage								
SEF297X									
OK or NG									
OK		▶	GO TO 6.						
NG		▶	GO TO 5.						

5	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Joint connector-2 ● Harness for open or short between ECM relay and mass air flow sensor ● Harness for open or short between mass air flow sensor and ECM 			
		▶	Repair harness or connectors.

6	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between MAFS terminal 3 and ECM terminal 73. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK		▶	GO TO 7.
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

7	CHECK INPUT SIGNAL CIRCUIT	
1. Check harness continuity between MAFS terminal 1 and ECM terminal 61. Refer to Wiring Diagram. Continuity should exist.		
2. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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8	CHECK MASS AIR FLOW SENSOR	
Refer to "Component Inspection", EC-854. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 9.
NG	▶	Replace mass air flow sensor.

EC
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9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838. <p style="text-align: center;">INSPECTION END</p>		

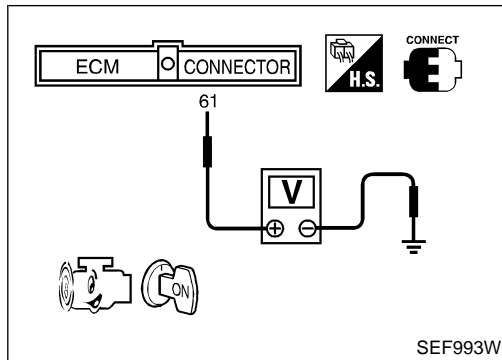
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DTC P0100 MASS AIR FLOW SENSOR (MAFS)

QG18DE (CALIF CA)

Component Inspection



Component Inspection MASS AIR FLOW SENSOR

=NIEC1254

NIEC1254S01

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 61 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.0 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.5 - 2.4
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

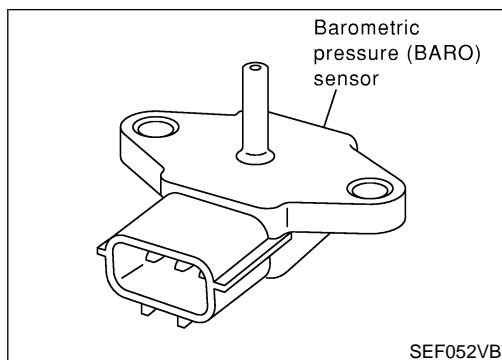
*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Repeat above check.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

DTC P0105 BAROMETRIC PRESSURE (BARO) SENSOR

QG18DE (CALIF CA)

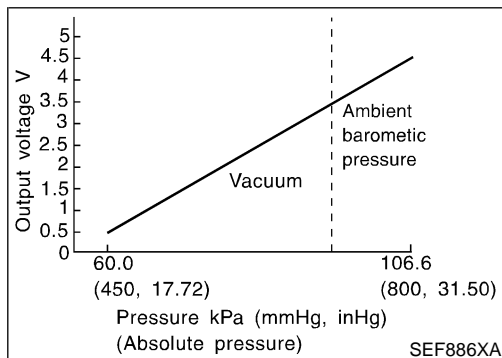
Component Description



Component Description

The barometric pressure (BARO) sensor detects ambient barometric pressure and sends the voltage signal to the ECM. As the pressure increases, the voltage rises.

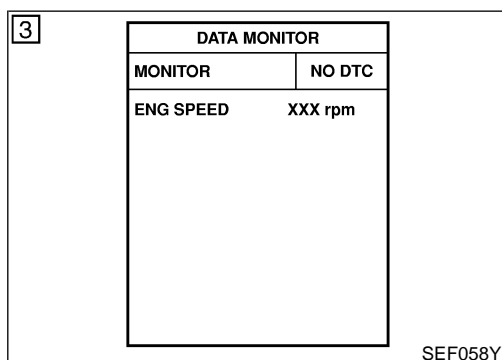
NIEC1255



On Board Diagnosis Logic

NIEC1256

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0105	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Barometric pressure sensor circuit is open or shorted.) • Barometric pressure sensor



DTC Confirmation Procedure

NIEC1257

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-857.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0105 BAROMETRIC PRESSURE (BARO) SENSOR

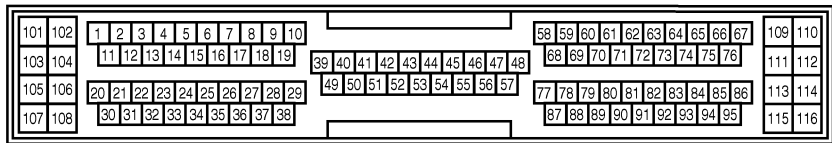
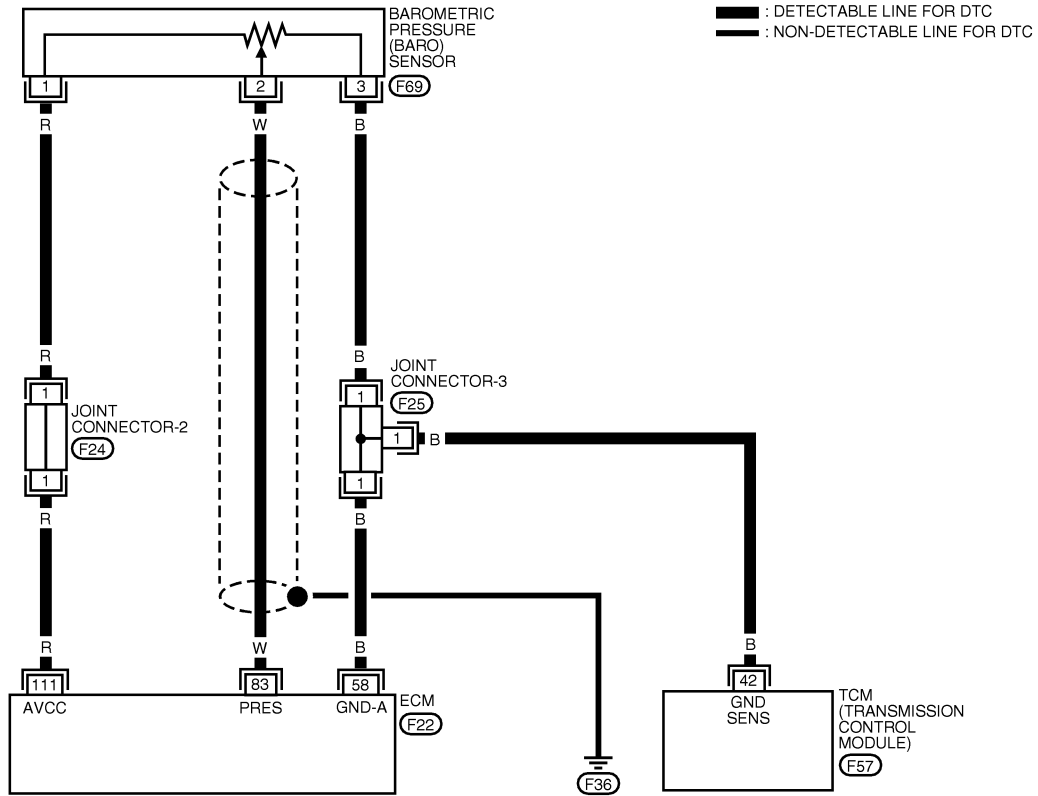
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1258

EC-BARO-01



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR

WEC382

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
83	W	BARO SENSOR	IGN ON	APPROX. 4.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF604Z

DTC P0105 BAROMETRIC PRESSURE (BARO) SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1259

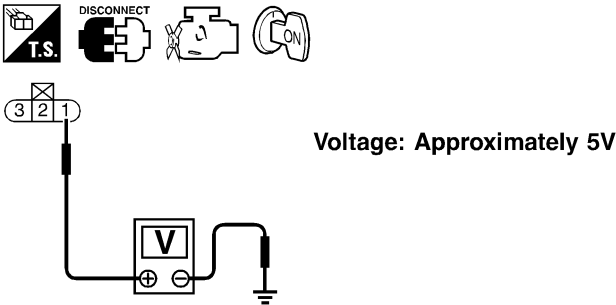
1	RETIGHTEN GROUND SCREWS	<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">WEC249</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p>
▶		GO TO 2.	

2	CHECK CONNECTOR	<p>1. Disconnect barometric pressure (BARO) sensor harness connector.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF390Z</p> <p>2. Check sensor harness connector for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>	<p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 3.	
NG	▶	Repair or replace harness connector.	

DTC P0105 BAROMETRIC PRESSURE (BARO) SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK POWER SUPPLY	
<p>1. Turn ignition switch "ON". 2. Check voltage between BARO sensor terminal 1 and engine ground with CONSULT-II or tester.</p>		
		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

SEF299X

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between ECM and BARO sensor 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between BARO sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

6	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and BARO sensor ● Harness for open or short between TCM and BARO sensor 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and BARO sensor terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0105 BAROMETRIC PRESSURE (BARO) SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK BARO SENSOR							
<ol style="list-style-type: none"> 1. Reconnect ECM harness connector. 2. Reconnect BARO sensor harness connector. 3. Install a vacuum pump to BARO sensor. 4. Turn ignition switch "ON" and check output voltage between ECM terminal 83 and engine ground under the following conditions. 								
		<table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Applied vacuum kPa (mmHg, inHg)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Not applied</td> <td style="text-align: center;">3.2 - 4.8</td> </tr> <tr> <td style="text-align: center;">-26.7 (-200, -7.87)</td> <td style="text-align: center;">1.0 to 1.4V lower than above value</td> </tr> </tbody> </table>	Applied vacuum kPa (mmHg, inHg)	Voltage V	Not applied	3.2 - 4.8	-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value
Applied vacuum kPa (mmHg, inHg)	Voltage V							
Not applied	3.2 - 4.8							
-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value							
SEF542Z								
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or over 101.3 kPa (760 mmHg, 29.92 inHg) of pressure. 								
OK or NG								
OK	▶	GO TO 9.						
NG	▶	Replace BARO sensor.						

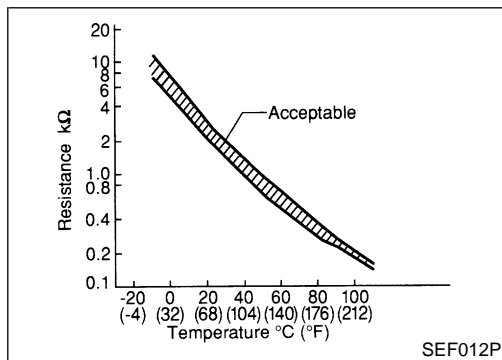
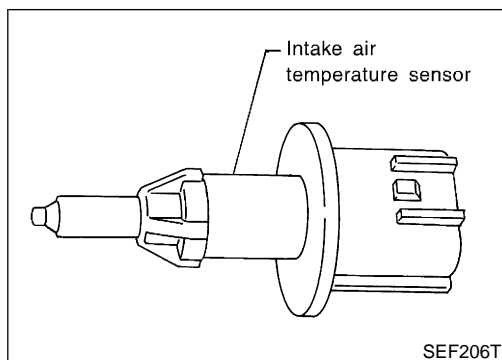
9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

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 BT
 HA
 SC
 EL
 IDX

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1260

The intake air temperature sensor is mounted to the air duct housing. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
80 (176)	1.23	0.27 - 0.38

*: These data are reference values and are measured between ECM terminal 71 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead the ECM's transistor damage. Use ground other than ECM, such as body ground.

On Board Diagnosis Logic

NIEC1261

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0110	A)	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Intake air temperature sensor
	B)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	

DTC Confirmation Procedure

NIEC1262

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC1262S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-863.

With GST

Follow the procedure "With CONSULT-II" above.

5	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S XXX °C VHCL SPEED SE XXX km/h	

SEF176Y

PROCEDURE FOR MALFUNCTION B

NIEC1262S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-II

- 1) Wait until engine coolant temperature is less than 90°C (194°F).
- a) Turn ignition switch "ON".
- b) Select "DATA MONITOR" mode with CONSULT-II.
- c) Check the engine coolant temperature.
- d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine.
- 5) Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-863.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

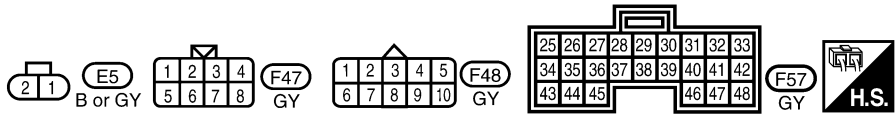
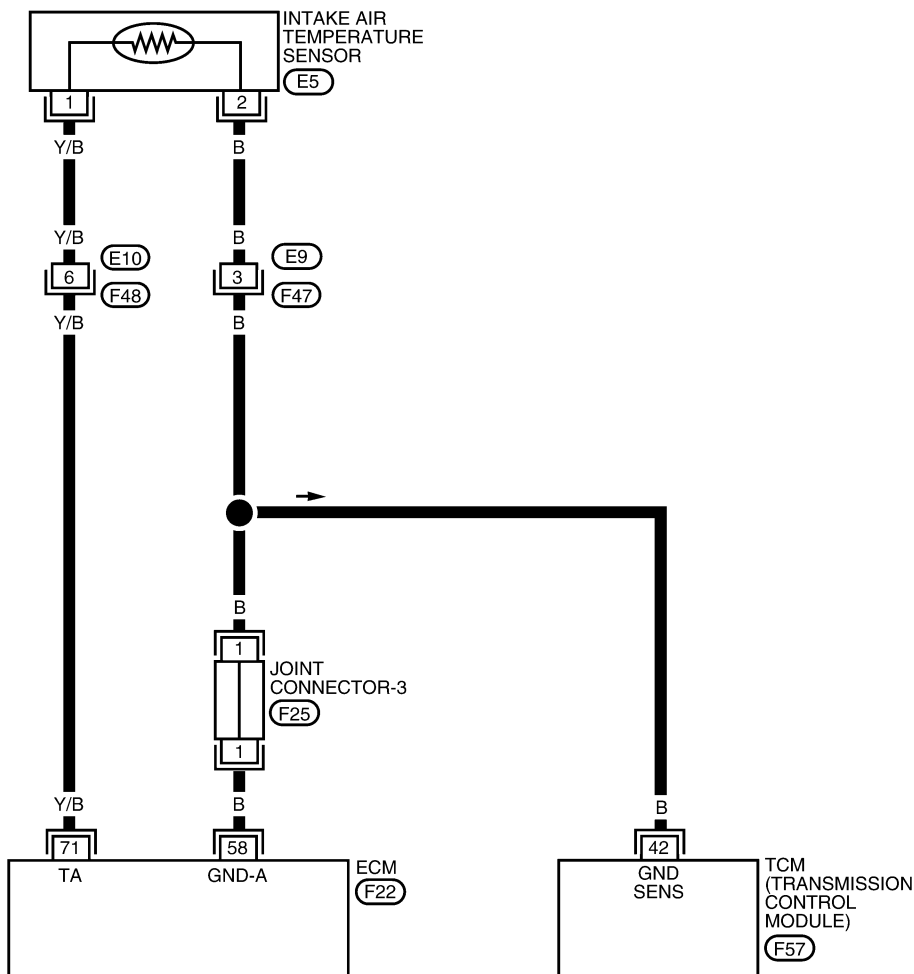
Wiring Diagram

Wiring Diagram

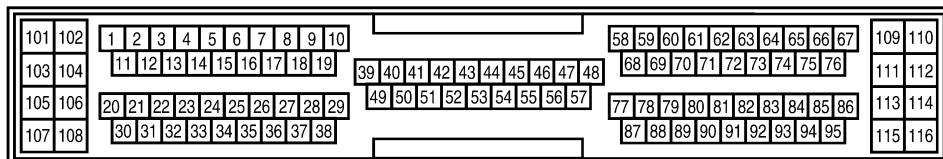
NIEC1263

EC-IATS-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (F25) - JOINT CONNECTOR



WEC159A

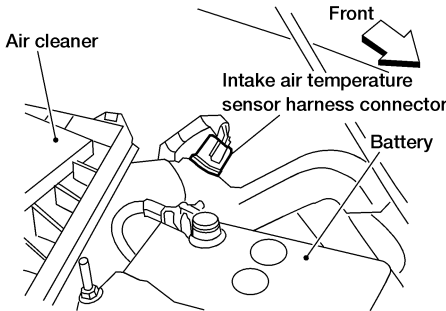
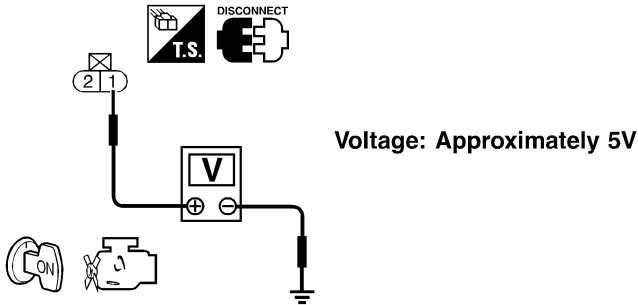
DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1264

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect intake air temperature sensor harness connector.</p>  <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between intake air temperature sensor terminal 1 and ground with CONSULT-II or tester.</p>  <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

LEC243

SEF301X

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between ECM and intake air temperature sensor <p style="text-align: center;">▶ Repair harness or connectors.</p>	

3	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between terminal 2 and engine ground. Refer to wiring diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶	GO TO 5.
	NG	▶	GO TO 4.

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

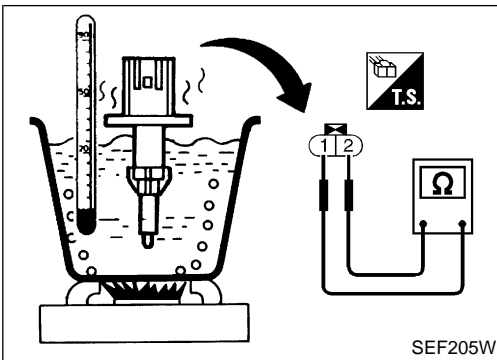
Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors E9, F47● Joint connector-3● Harness for open or short between TCM and intake air temperature sensor● Harness for open or short between ECM and intake air temperature sensor	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.
5	CHECK INTAKE AIR TEMPERATURE SENSOR
Refer to "Component Inspection", EC-865.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Replace intake air temperature sensor.
6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P0110 INTAKE AIR TEMPERATURE SENSOR

QG18DE (CALIF CA)

Component Inspection



Component Inspection INTAKE AIR TEMPERATURE SENSOR

Check resistance as shown in the figure.

-NIEC1265

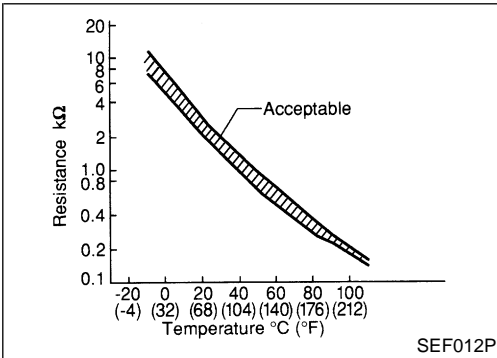
NIEC1265S01

GI

MA

EM

LC



<Reference data>

Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

EC

FE

If NG, replace intake air temperature sensor.

CL

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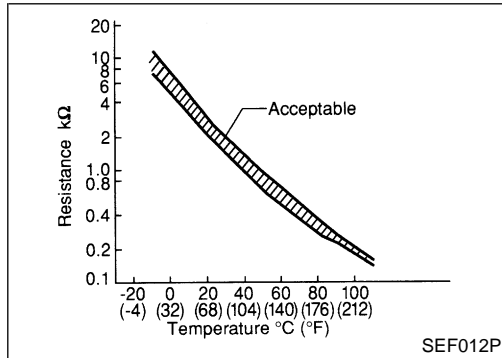
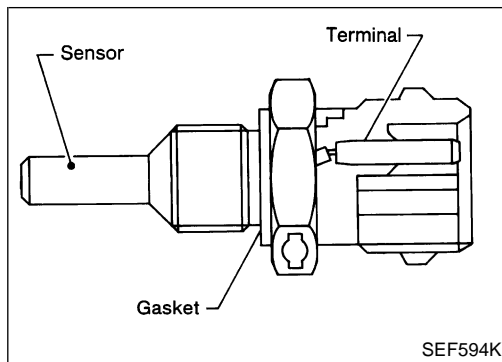
EL

IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1266

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead the ECM's transistor damage. Use ground other than ECM, such as body ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1267

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC1268

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0115	● An excessively high or low voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (CALIF CA)

On Board Diagnosis Logic (Cont'd)

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
	When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while the engine is running.	

GI

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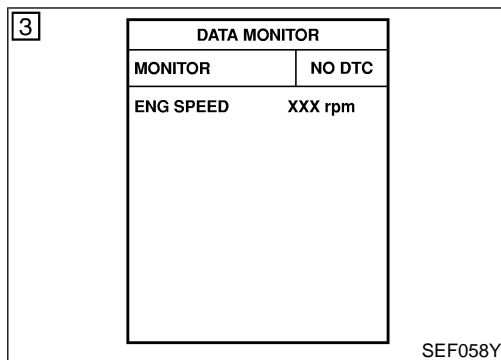
LC

EC

FE

CL

MT



DTC Confirmation Procedure

NIEC1269

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-869.

With GST

Follow the procedure "With CONSULT-II" above.

AT

AX

SU

BR

ST

RS

BT

HA

SC

EL

IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (CALIF CA)

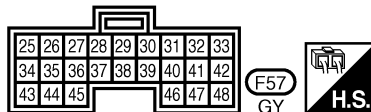
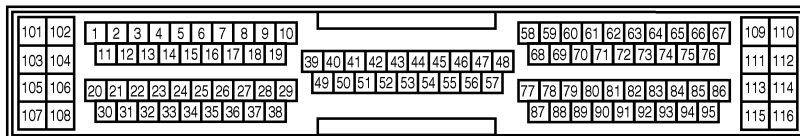
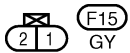
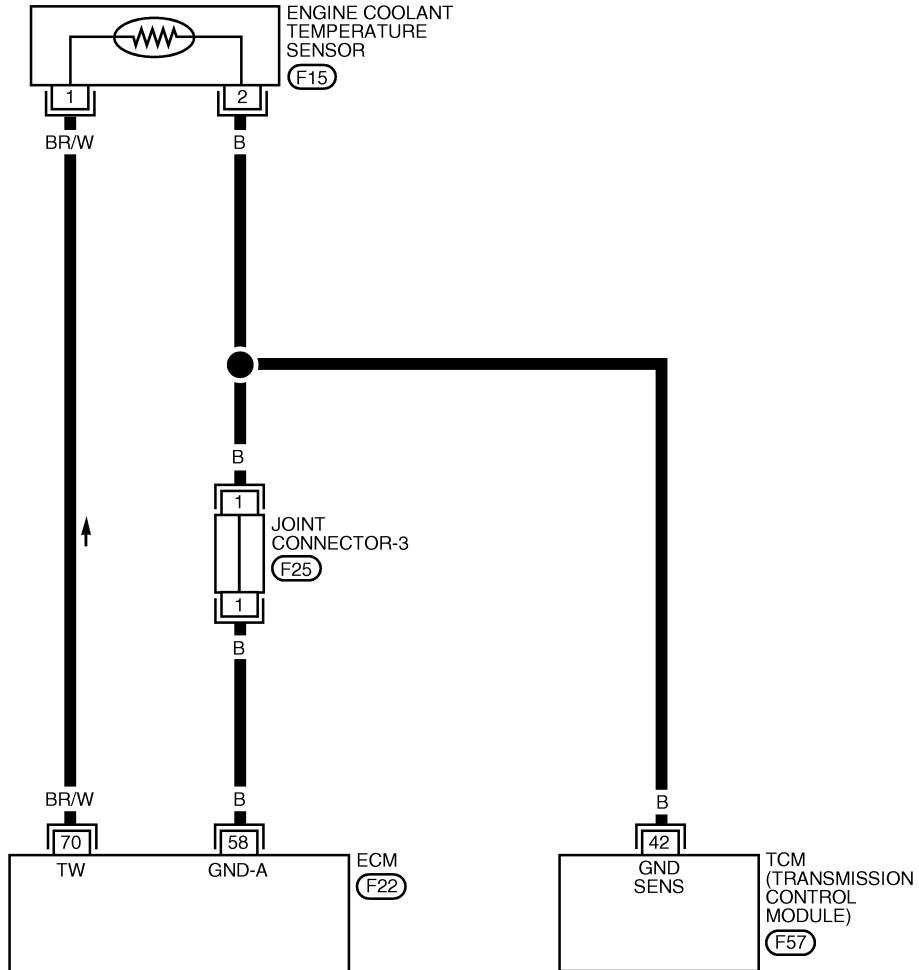
Wiring Diagram

Wiring Diagram

NIEC1270

EC-ECTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (F25) - JOINT CONNECTOR



WEC385

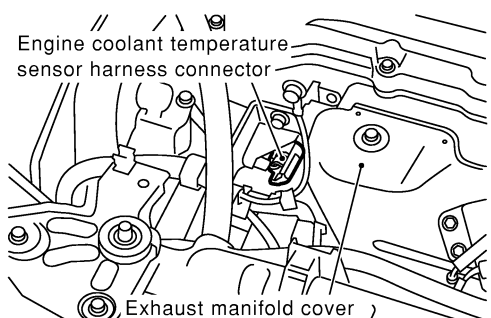
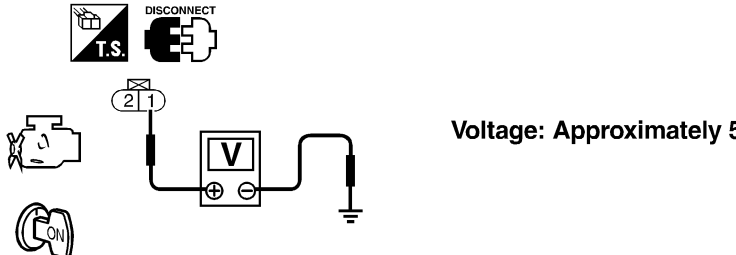
DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1271

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect engine coolant temperature sensor (ECTS) harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
	OK	▶ GO TO 2.	
	NG	▶ Repair or replace harness or connectors.	

SEF391Z

SEF585X

2	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between ECTS terminal 2 and engine ground. Refer to wiring diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p>
	OK	▶ GO TO 4.	
	NG	▶ GO TO 3.	

3	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between TCM and engine control temperature sensor ● Harness for open or short between ECM and engine coolant temperature sensor 	<p>SC</p> <p>EL</p>
		▶ Repair open circuit or short to ground or short to power in harness or connectors.	<p>IDX</p>

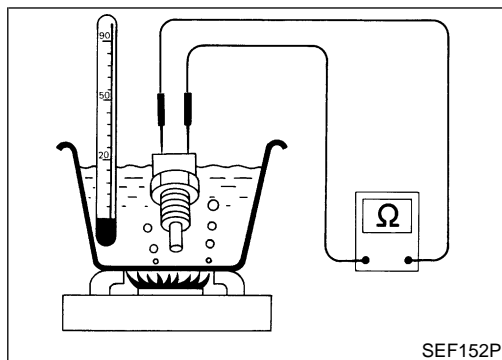
DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-870.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace engine coolant temperature sensor.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶ INSPECTION END		



Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

NIEC1272

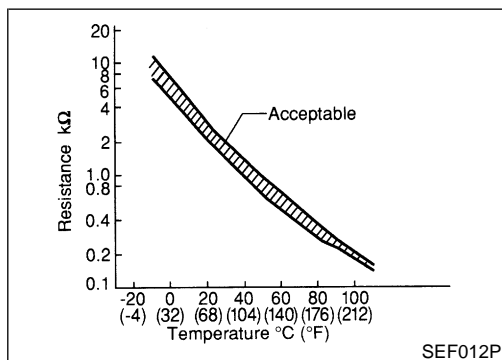
NIEC1272S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

Component Description

Component Description

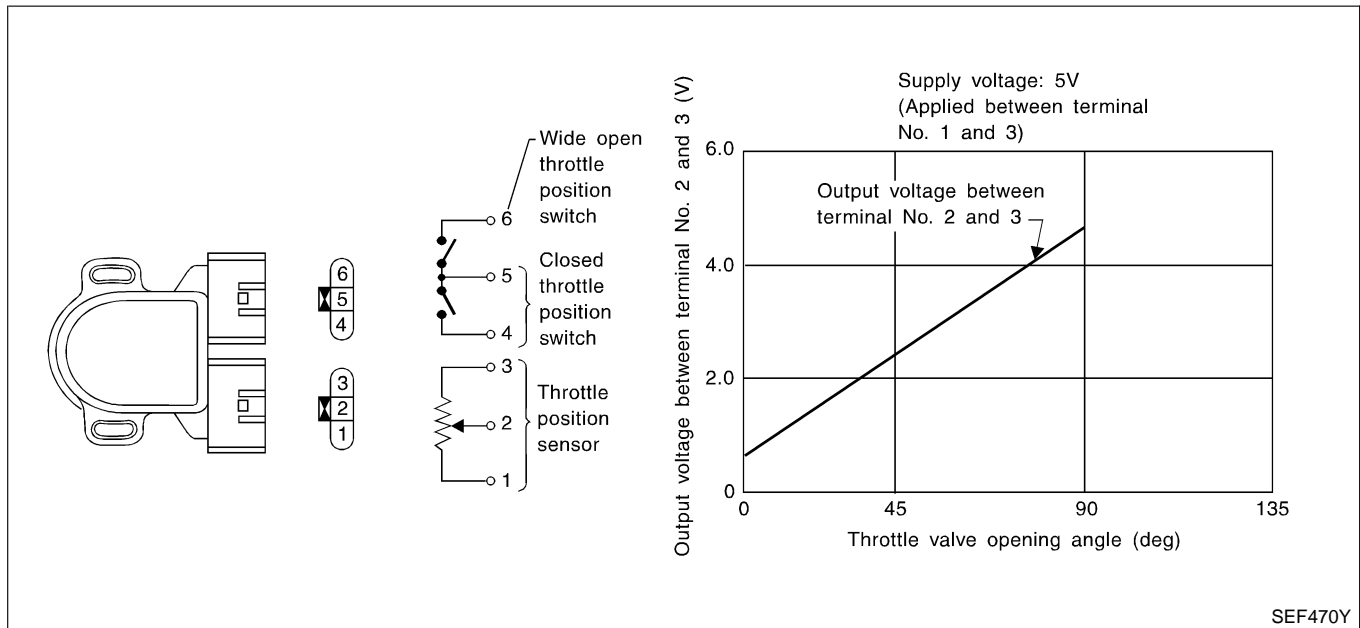
NIEC1273

NOTE:

If DTC P0120 is displayed with DTC P0510, first perform trouble diagnosis for DTC P0510, EC-1114.

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This sensor controls engine operation such as fuel cut. On the other hand, the "Wide open and closed throttle position switch", which is built into the throttle position sensor unit, is not used for engine control.



SEF470Y

CONSULT-II Reference Value in Data Monitor Mode

NIEC1274

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL POS SEN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.15 - 0.85V
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Throttle valve: fully opened	3.5 - 4.7V
ABSOL TH-P/S	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.0%
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Throttle valve: fully opened	Approx. 80.0%

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC1275

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0120	A) An excessively low or high voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor
	B) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor ● Fuel injector ● Camshaft position sensor ● Mass air flow sensor
	C) A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Intake air leaks ● Throttle position sensor

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
	Condition	Driving condition
	When engine is idling	Normal
	When accelerating	Poor acceleration

DTC Confirmation Procedure

NIEC1276

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B". If there is no problem on "PROCEDURE FOR MALFUNCTION B", perform "PROCEDURE FOR MALFUNCTION C".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

NIEC1276S01

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.
- This test may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	P/N POSI SW	OFF

SEF065Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position except "P" or "N" position

- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-877.

With GST

Follow the procedure "With CONSULT-II" above.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B

NIEC1276S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds.
If idle speed is over 1,000 rpm, maintain the following conditions for at least 10 seconds to keep engine speed below 1,000 rpm.

Selector lever	Suitable position except "P" or "N" position
Brake pedal	Depressed
Vehicle speed	0 km/h (0 MPH)

- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-877.

With GST

Follow the procedure "With CONSULT-II" above.

6	DATA MONITOR	
	MONITOR	NO DTC
	THRTL POS SEN	XXX V
	ABSOL TH·P/S	XXX %

SEF177Y

PROCEDURE FOR MALFUNCTION C

NIEC1276S03

CAUTION:

Always drive vehicle at a safe speed.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-II.
- 5) Select "THRTL POS SEN" and "ABSOL TH·P/S" in "DATA

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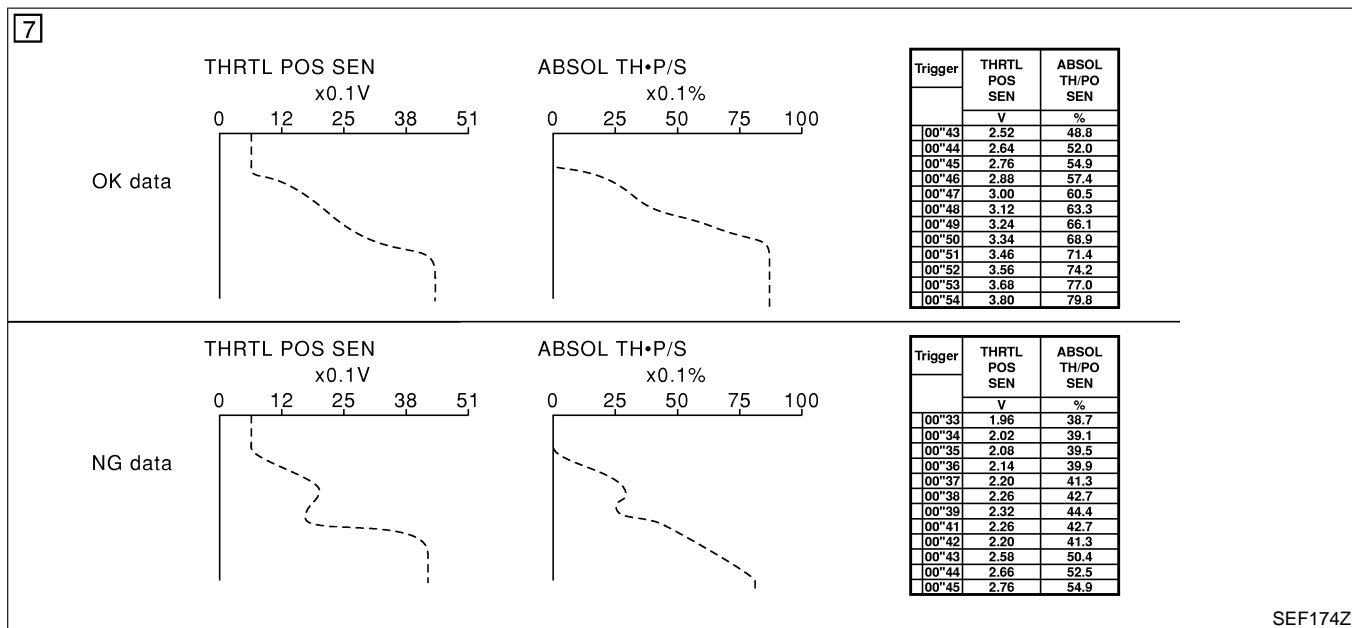
DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

MONITOR" mode with CONSULT-II.

- 6) Press RECORD on CONSULT-II SCREEN at the same time accelerator pedal is depressed.
 - 7) Print out the recorded graph and check the following:
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal is fully depressed is approximately 4V.
- If NG, go to "Diagnostic Procedure", EC-877.
If OK, go to following step.



- 8) Select "AUTO TRIG" in "DATA MONITOR" mode with CONSULT-II.

9

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C

SEF178Y

- 9) Maintain the following conditions for at least 10 consecutive seconds.

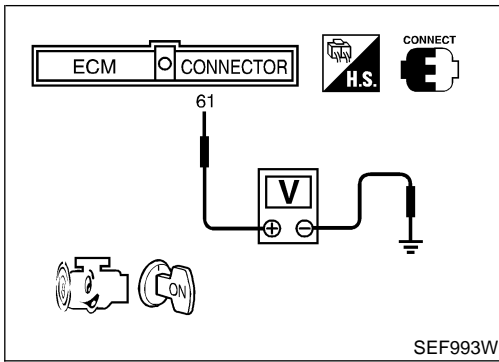
ENG SPEED	More than 2,000 rpm
MAS AIR/FL SE	More than 3V
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

- 10) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-877.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)



With GST

- 1) Maintain the following conditions for at least 10 consecutive seconds.

Gear position	Suitable position
Engine speed	More than 2,000 rpm
Engine coolant temperature	More than 70°C (158°F)
Voltage between ECM terminal 61 (Mass air flow sensor signal) and ground	More than 3V

- 2) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-877.

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DTC P0120 THROTTLE POSITION SENSOR

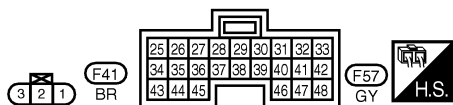
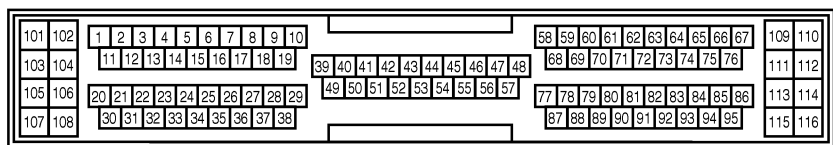
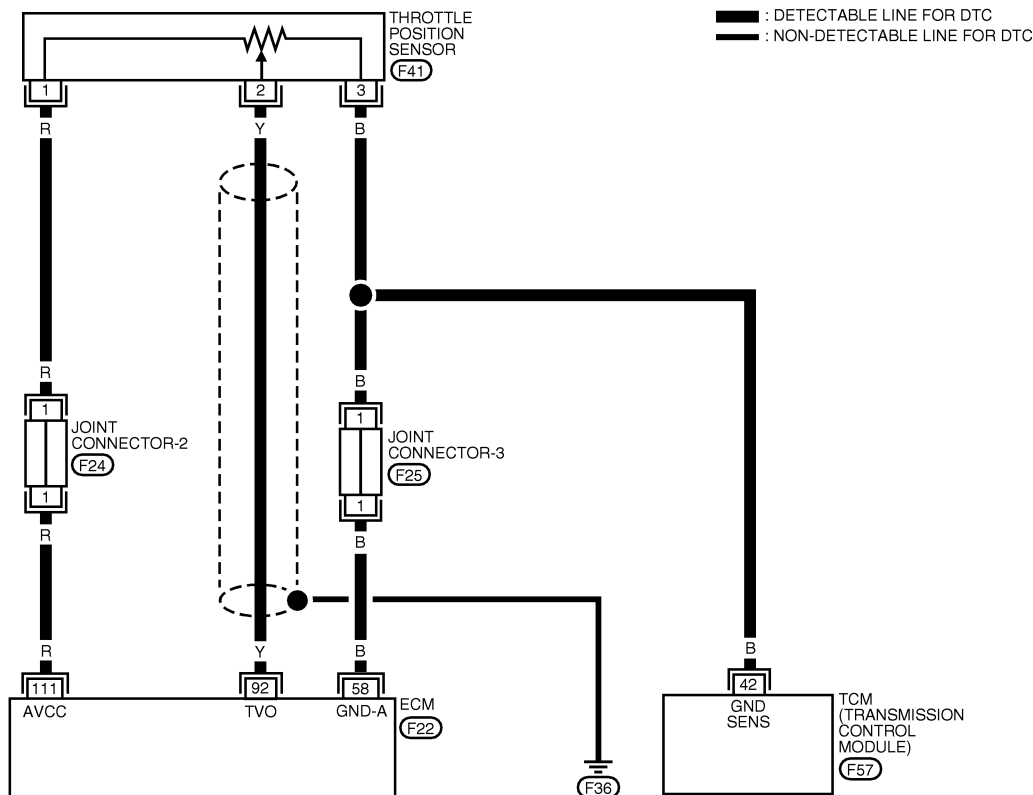
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1277

EC-TPS-01



REFER TO THE FOLLOWING.
(F24), (F25) - JOINT CONNECTOR

WEC387

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
92	Y	THROTTLE POSITION SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH ACCELERATOR PEDAL FULLY RELEASED	0.15 - 0.85V
			IGN ON WITH ACCELERATOR PEDAL FULLY DEPRESSED	3.5 - 4.7V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF566YB

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1278

1	INSPECTION START									
Which malfunction A, B or C is duplicated?										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">B</td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">C</td> </tr> </tbody> </table>			MALFUNCTION	Type	A	A	B	B	C	C
MALFUNCTION	Type									
A	A									
B	B									
C	C									
MTBL0066										
Type A, B or C										
Type A or B	▶	GO TO 4.								
Type C	▶	GO TO 2.								

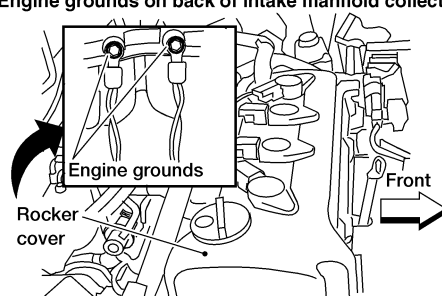
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2	ADJUST THROTTLE POSITION SENSOR	
Perform "Basic Inspection", EC-798.		
OK or NG		
OK	▶	GO TO 3.

FE
CL

3	CHECK INTAKE SYSTEM	
Check the followings for connection.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to intake manifold collector 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Reconnect the parts.

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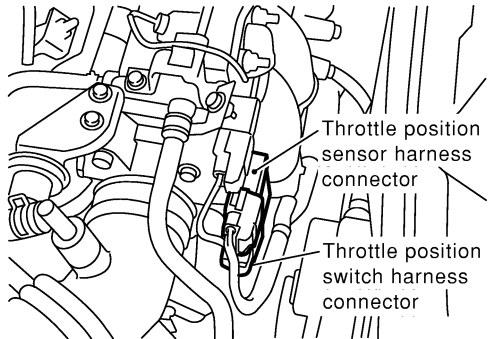
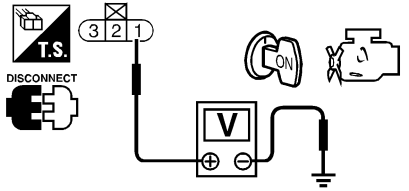
4	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
▶ GO TO 5.		

BR
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DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK POWER SUPPLY		
<p>1. Disconnect throttle position sensor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 150px;">Throttle position sensor harness connector</p> <p style="margin-left: 150px;">Throttle position switch harness connector</p> </div>			
SEF392Z			
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between throttle position sensor terminal 1 and ground with CONSULT-II or tester.</p>			
<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Voltage: Approximately 5V</p> </div> </div>			
SEF517Z			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

6	DETECT MALFUNCTIONING PARTS		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between throttle position sensor and ECM 			
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between throttle position sensor terminal 3 and engine ground. Refer to the wiring diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	GO TO 8.	

8	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between TCM and throttle position sensor ● Harness for open or short between ECM and throttle position sensor 			
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

9	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 92 and throttle position sensor terminal 2. Refer to the wiring diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK THROTTLE POSITION SENSOR	
Refer to "Component Inspection", EC-880.		
OK or NG		
OK (Type B in step1)	▶	GO TO 11.
OK (Type A or C in step1)	▶	GO TO 14.
NG	▶	Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-798.

11	CHECK MASS AIR FLOW SENSOR	
Refer to "Component Inspection", EC-854.		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace mass air flow sensor.

12	CHECK CAMSHAFT POSITION SENSOR	
Refer to "Component Inspection", EC-1016.		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace camshaft position sensor.

13	CHECK FUEL INJECTOR	
<p>1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.</p> <div style="text-align: center;"> <p style="margin-left: 200px;">Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> </div> <p style="text-align: right; margin-right: 50px;">SEF964XA</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 14.
NG	▶	Replace fuel injector.

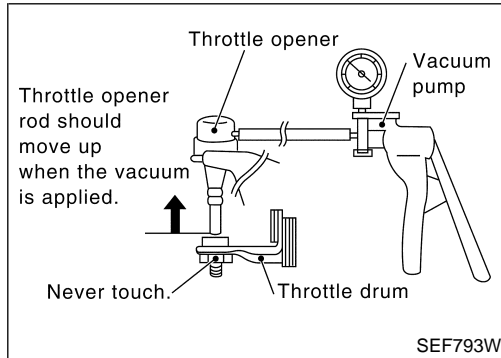
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DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF719Y

Component Inspection THROTTLE POSITION SENSOR

NIEC1279

NIEC1279S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Select "DATA MONITOR" mode with CONSULT-II.
- 8) Check voltage of "THRTL POS SEN" under the following conditions.

NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

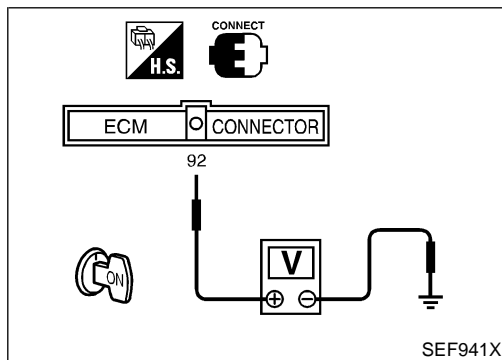
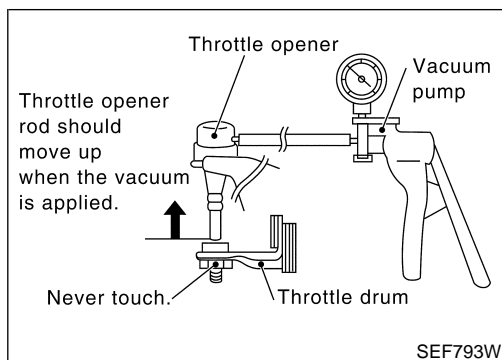
If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-798.

- 9) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

DTC P0120 THROTTLE POSITION SENSOR

QG18DE (CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground under the following conditions.

NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-798.

- 8) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

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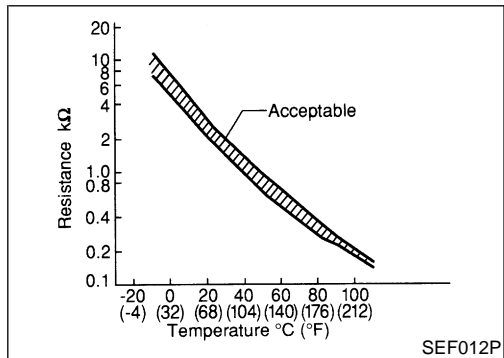
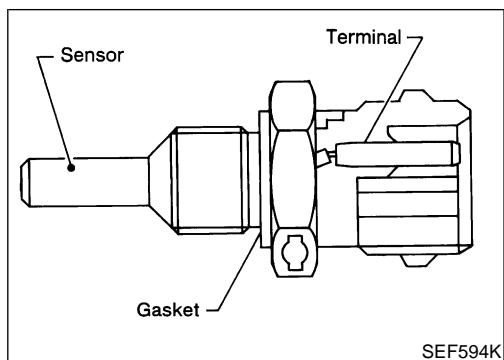
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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1280

NOTE:

If DTC P0125 (0908) is displayed with P0115 (0103), first perform trouble diagnosis for DTC P0115, EC-866.

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead the ECM's transistor damage. Use ground other than ECM, such as body ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1281

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC1282

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0125	<ul style="list-style-type: none"> ● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. ● Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> ● Harness or connectors (High resistance in the circuit) ● Engine coolant temperature sensor ● Thermostat

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (CALIF CA)
DTC Confirmation Procedure

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

-NIEC1283

CAUTION:

Be careful not to overheat engine.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Check that "COOLAN TEMP/S" is above 15°C (59°F).
If it is above 15°C (59°F), the test result will be OK. If it is below 15°C (59°F), go to following step.
- 4) Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 15°C (59°F) within 65 minutes, stop engine because the test result will be OK.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-885.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (CALIF CA)

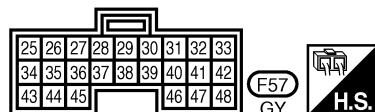
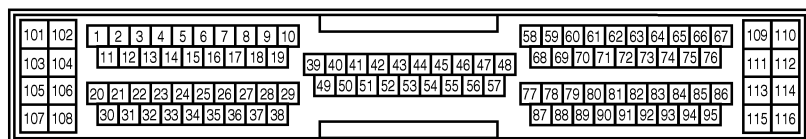
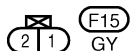
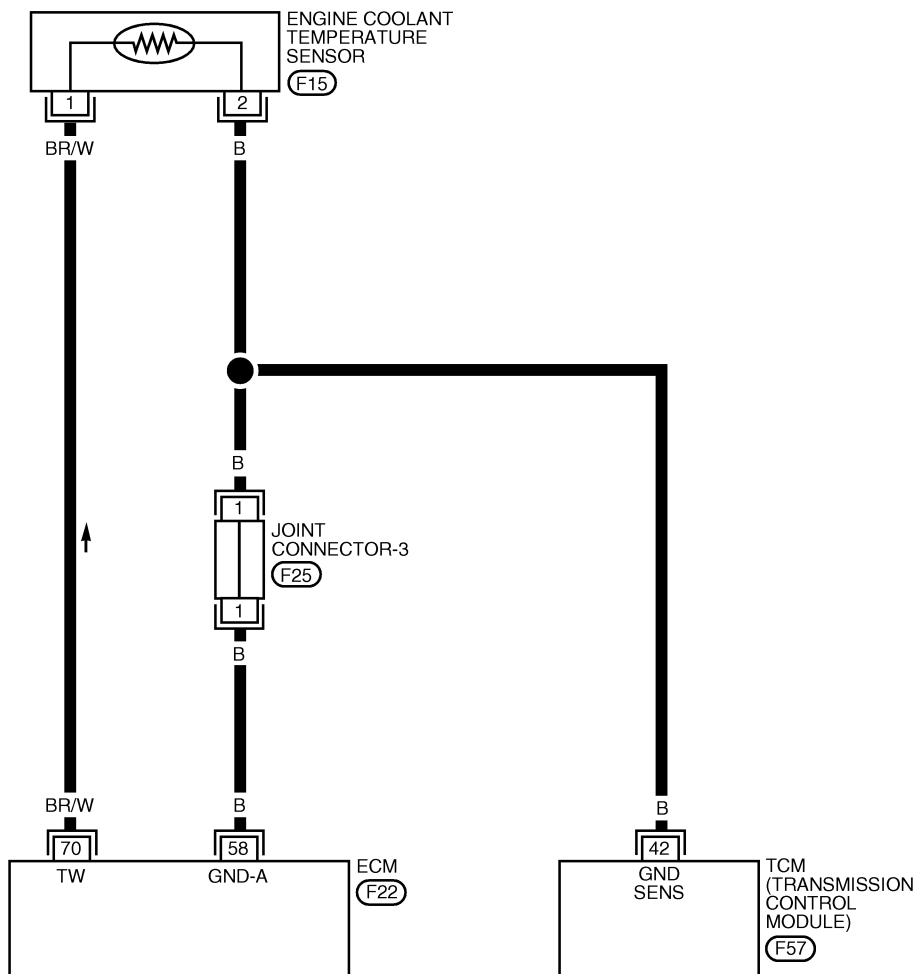
Wiring Diagram

Wiring Diagram

NIEC1284

EC-ECTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 (F25) - JOINT CONNECTOR



WEC385

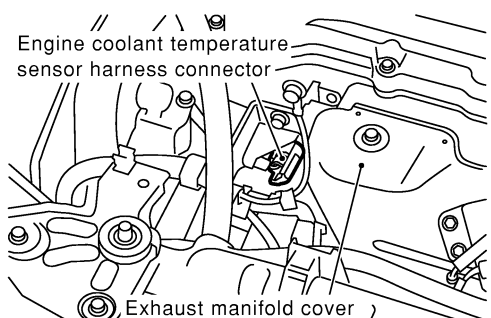
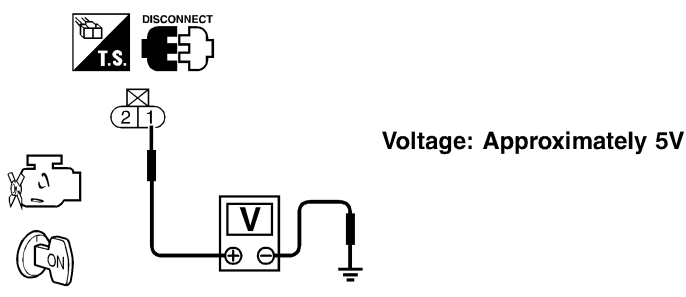
DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1285

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect engine coolant temperature sensor harness connector.</p> <div style="text-align: center;">  </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p>
		<p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div>	<p>SEF391Z</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SEF303X</p>
		OK or NG	
	OK	▶ GO TO 2.	
	NG	▶ Repair or replace harness or connectors.	

2	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between ECTS terminal 2 and engine ground. Refer to the wiring diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>	<p>ST</p> <p>RS</p> <p>BT</p>
		OK or NG	
	OK	▶ GO TO 4.	
	NG	▶ GO TO 3.	

3	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector ● Harness for open or short between TCM and engine coolant temperature sensor ● Harness for open or short between ECM and engine coolant temperature sensor 	<p>SC</p> <p>EL</p>
		OK or NG	
		▶ Repair open circuit or short to ground or short to power in harness or connectors.	<p>IDX</p>

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

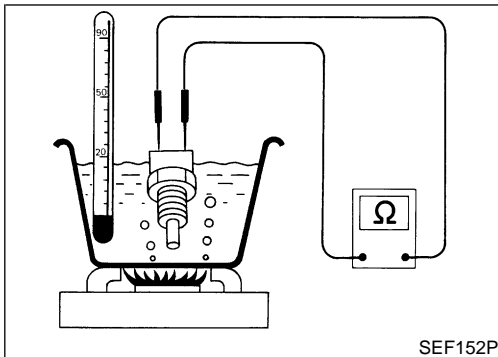
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-886.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace engine coolant temperature sensor.

5	CHECK THERMOSTAT OPERATION	
When the engine is cooled [lower than 82°C (180°F)], condition grasp lower radiator hose and confirm the engine coolant does not flow.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or replace thermostat. Refer to LC-13 , "Thermostat".

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END



Component Inspection

ENGINE COOLANT TEMPERATURE SENSOR

NIEC1286

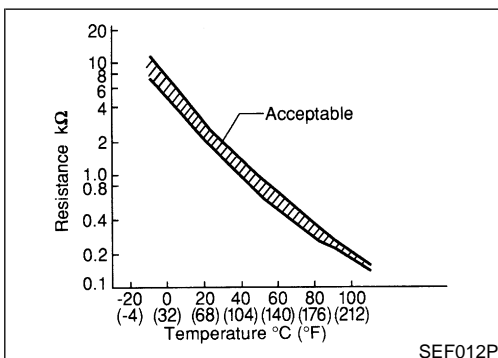
NIEC1286S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

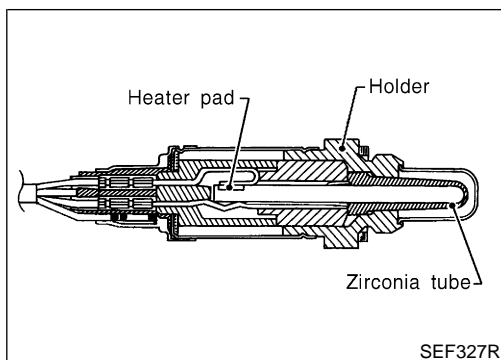
If NG, replace engine coolant temperature sensor.



DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Description



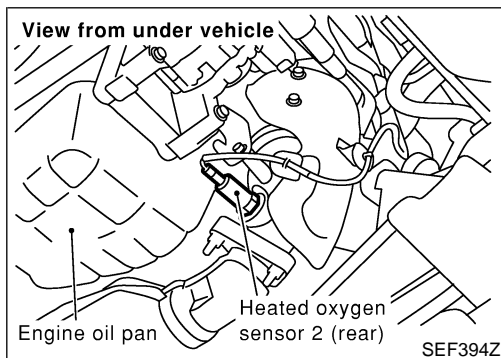
Component Description

The heated oxygen sensor 2 (rear), after TWC (Manifold three way catalyst), monitors the oxygen level in the exhaust gas. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

NIEC1287

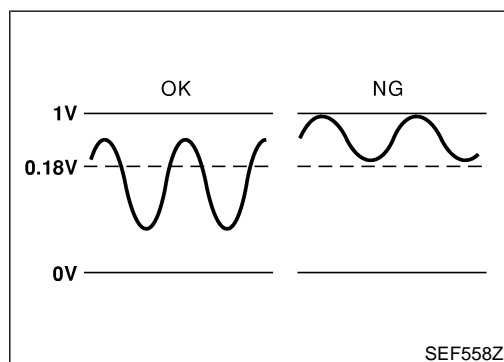


CONSULT-II Reference Value in Data Monitor Mode

NIEC1288

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

NIEC1289

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0137	● The minimum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

6

HO2S2 (B1) P0137

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF545Z

8

HO2S2 (B1) P0137

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm 2300 rpm 2800 rpm

SEF546Z

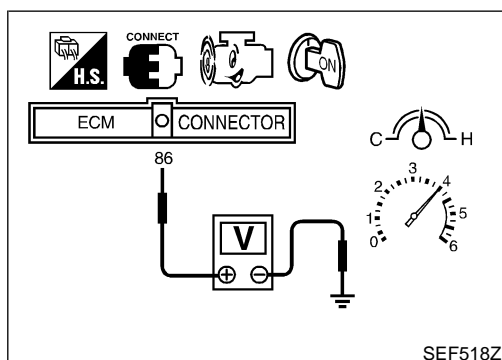
8

HO2S2 (B1) P0137

COMPLETED

SELF-DIAG RESULTS

SEF547Z



DTC Confirmation Procedure

NIEC1290

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0137" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-890. If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1291

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.43V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-890.

EC-888

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

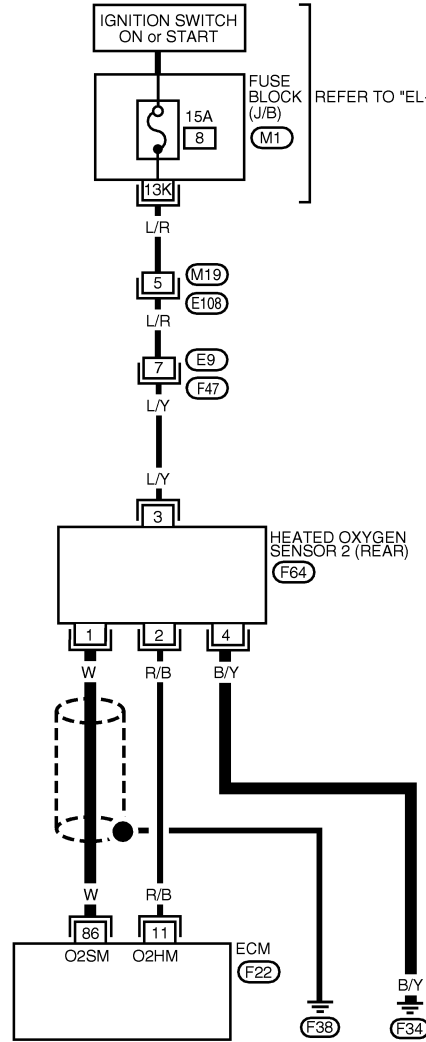
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1292

EC-HO2S2-01



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

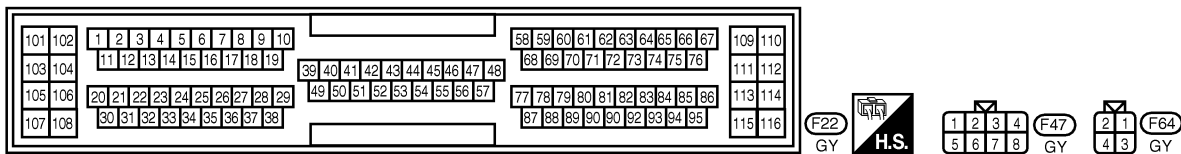
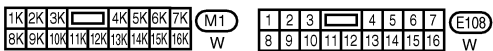
BT

HA

SC

EL

IDX



WEC390

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	W	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YA

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

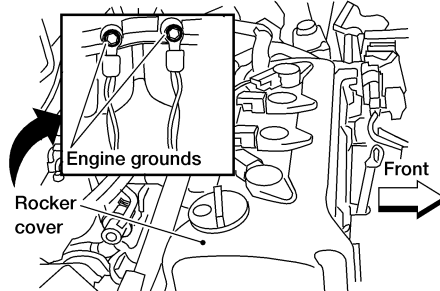
Diagnostic Procedure

NIEC1293

1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249



GO TO 2.

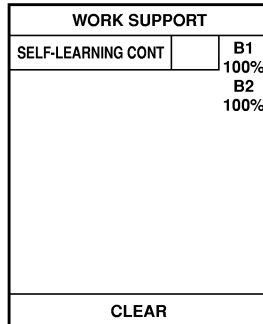
DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

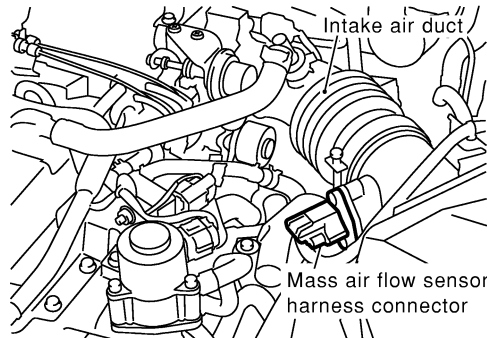


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

Yes or No

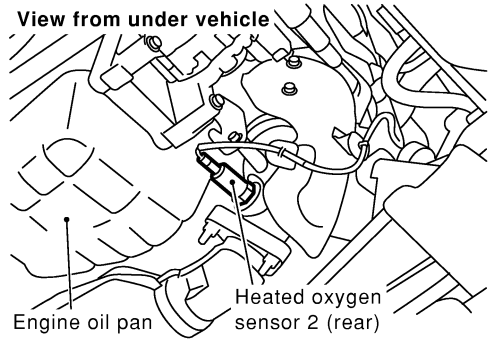
Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-967.
No	▶	GO TO 3.

GI
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IDX

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p>		
 <p style="text-align: center;">View from under vehicle</p> <p style="text-align: center;">Engine oil pan Heated oxygen sensor 2 (rear)</p>		
<p>3. Check harness continuity between ECM terminal 86 and HO2S2 (rear) terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 86 or HO2S2 (rear) terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

SEF394Z

4	CHECK GROUND CIRCUIT	
<p>1. Check harness continuity between HO2S2 (rear) terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-893.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection

HEATED OXYGEN SENSOR 2 (REAR)

NIEC1294

NIEC1294S01

With CONSULT-II

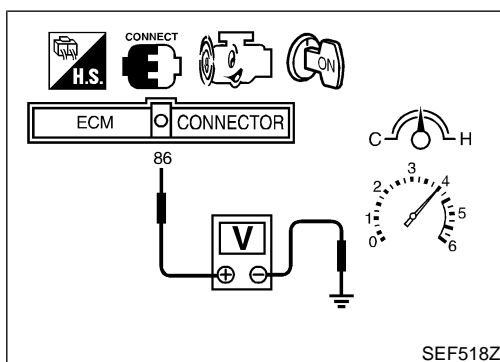
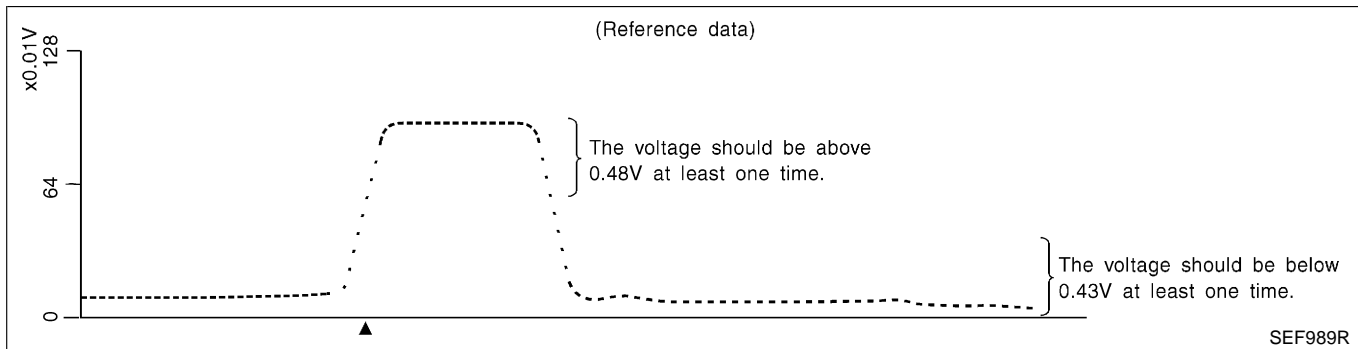
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.

If the voltage is above 0.48V at step 4, step 5 is not necessary.

- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.

The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0137 HEATED OXYGEN SENSOR 2 (REAR)
(MIN. VOLTAGE MONITORING)**

QG18DE (CALIF CA)

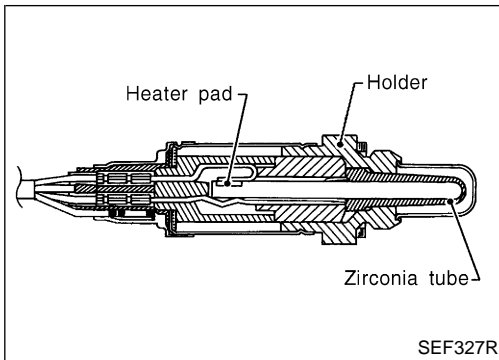
Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Description



Component Description

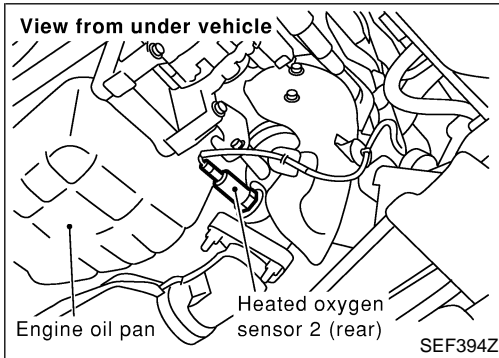
NIEC1295

The heated oxygen sensor 2 (rear), after TWC (Manifold three way catalyst), monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

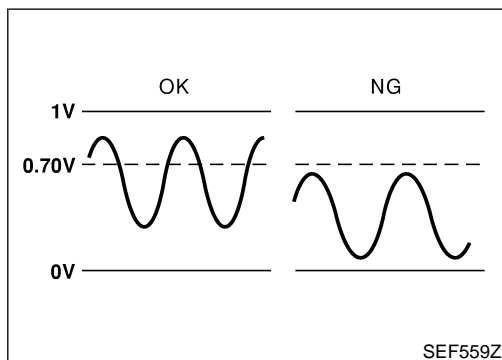


CONSULT-II Reference Value in Data Monitor Mode

NIEC1296

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC1297

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0138	<ul style="list-style-type: none"> The maximum voltage from the sensor does not reach the specified voltage. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear) Fuel pressure Injectors Intake air leaks

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

6

HO2S2 (B1) P0138

WAIT
OPEN ENGINE HOOD.
KEEP ENGINE RUNNING AT
IDLE SPEED FOR MAXIMUM
OF 5 MINUTES.

SEF663Y

8

HO2S2 (B1) P0138

MAINTAIN
1800 - 2800 RPM UNTIL FINAL
RESULT APPEARS.

1800 rpm
2300 rpm
2800 rpm

SEF664Y

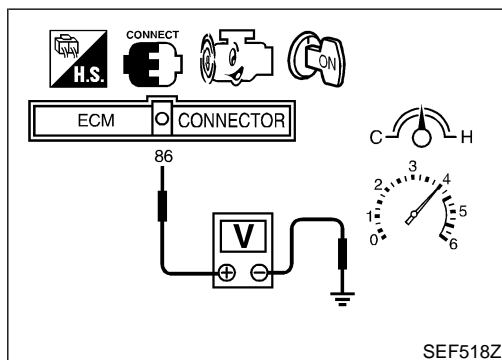
8

HO2S2 (B1) P0138

COMPLETED

SELF-DIAG RESULTS

SEF665Y



DTC Confirmation Procedure

NIEC1298

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0138" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-898.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1299

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be above 0.48V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-898.

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

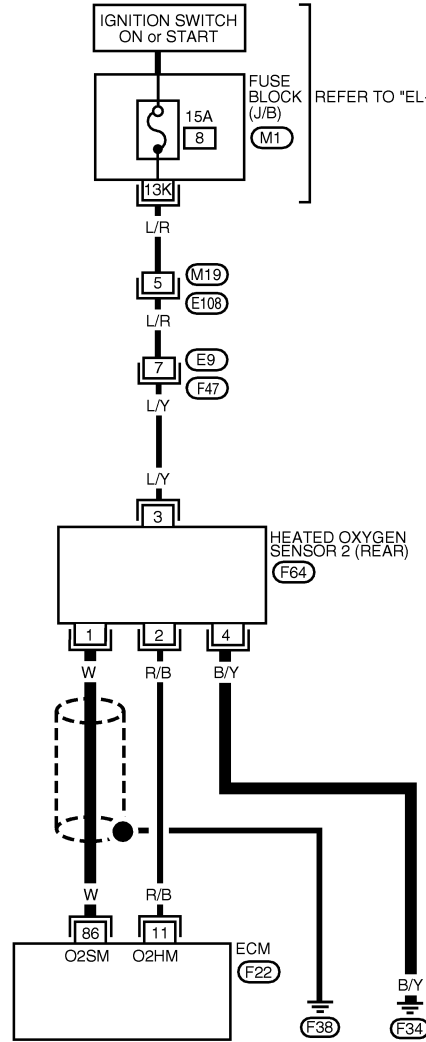
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1300

EC-HO2S2-01



REFER TO "EL-POWER".
 ■ : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

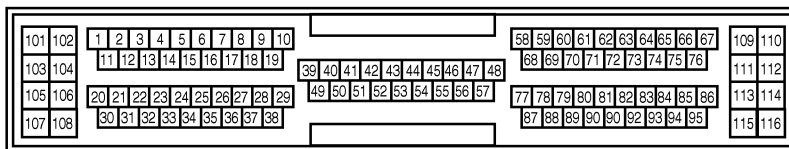
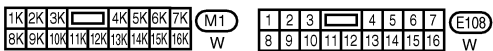
BT

HA

SC

EL

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WEC390

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	W	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YA

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

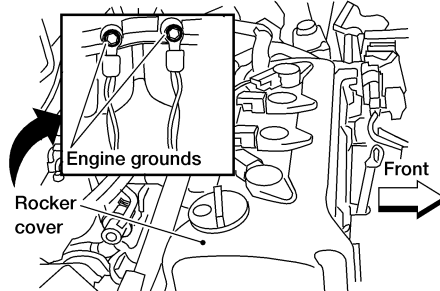
Diagnostic Procedure

NIEC1301

1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249



GO TO 2.

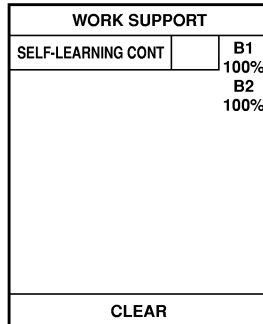
DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

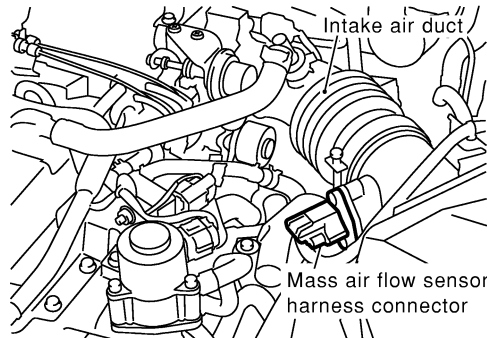


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

Yes or No

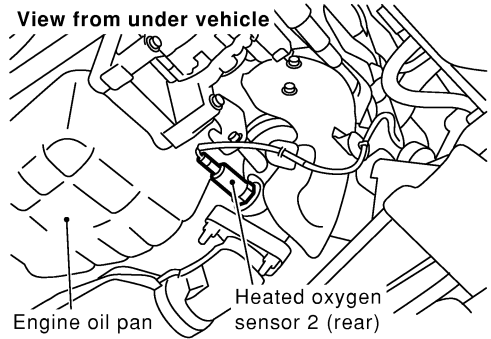
Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to "DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)", EC-957.
No	▶	GO TO 3.

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DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p>		
 <p style="text-align: center;">View from under vehicle</p> <p style="text-align: center;">Engine oil pan Heated oxygen sensor 2 (rear)</p>		
<p>3. Check harness continuity between ECM terminal 86 and HO2S2 (rear) terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 86 or HO2S2 (rear) terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

SEF394Z

4	CHECK GROUND CIRCUIT	
<p>1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-901.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC1302

NIEC1302S01

With CONSULT-II

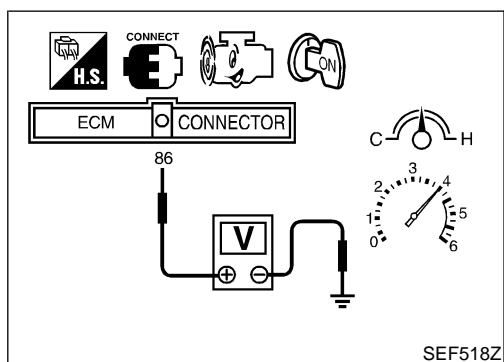
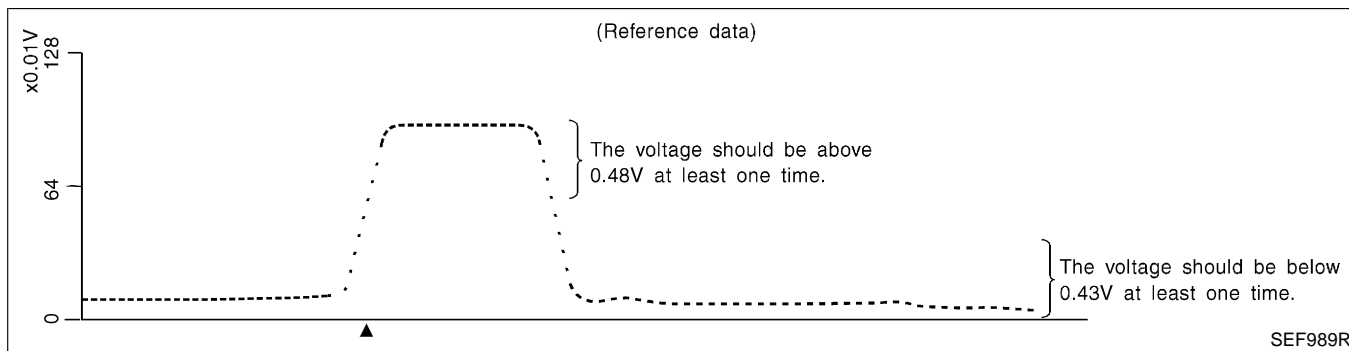
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0138 HEATED OXYGEN SENSOR 2 (REAR)
(MAX. VOLTAGE MONITORING)**

QG18DE (CALIF CA)

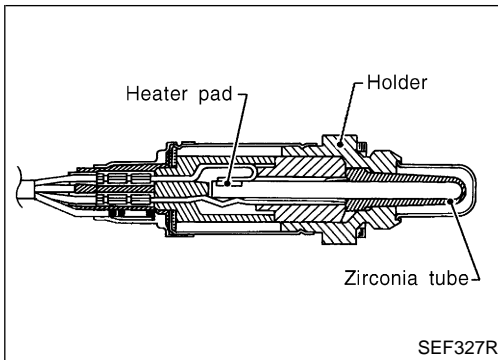
Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)

Component Description



Component Description

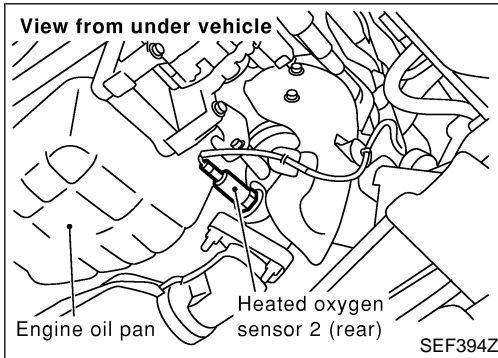
The heated oxygen sensor 2 (rear), after TWC (Manifold three way catalyst), monitors the oxygen level in the exhaust gas. Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

NIEC1303

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LC



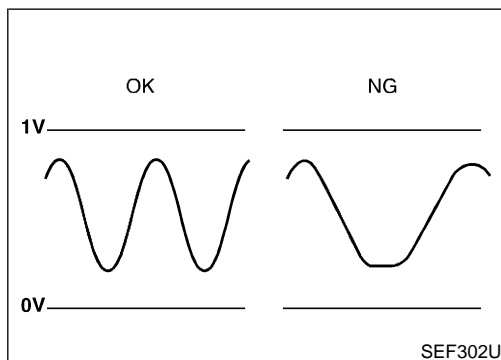
CONSULT-II Reference Value in Data Monitor Mode

NIEC1304

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH

EC
FE
CL
MT



On Board Diagnosis Logic

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

NIEC1305

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RS
BT
HA

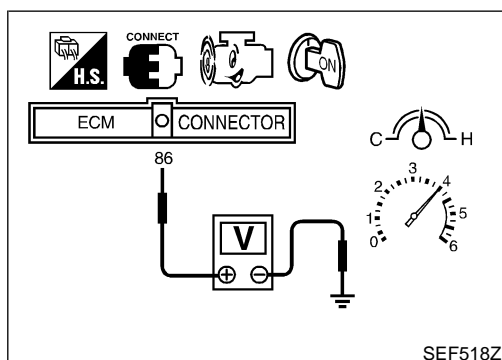
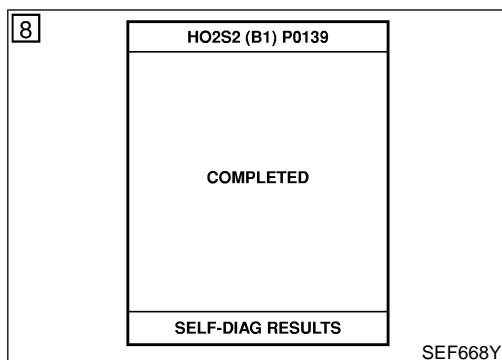
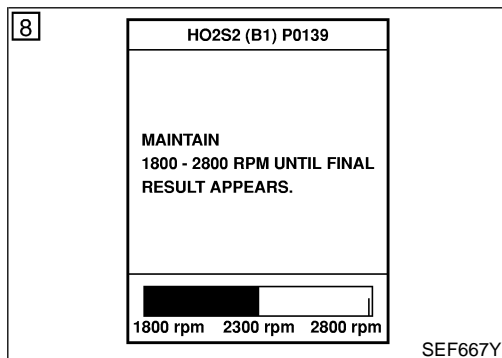
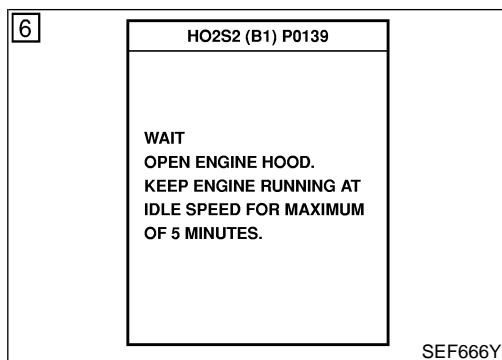
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0139	● It takes more than the specified time for the sensor to respond between rich and lean.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks

SC
EL
IDX

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC1306

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-906.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1307

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should change at more than 0.06V for 1 second during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-906.

EC-904

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

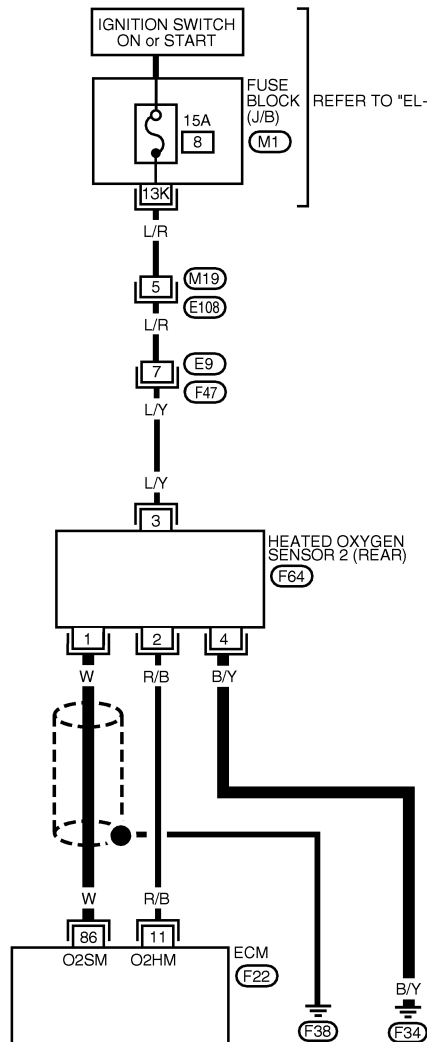
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1308

EC-HO2S2-01



REFER TO "EL-POWER".

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC

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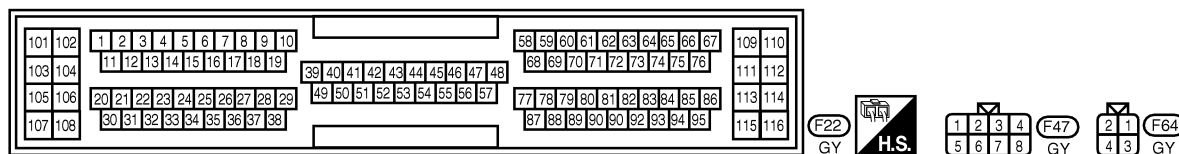
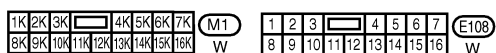
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WEC390

HA

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	W	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SC

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SEF724YA

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

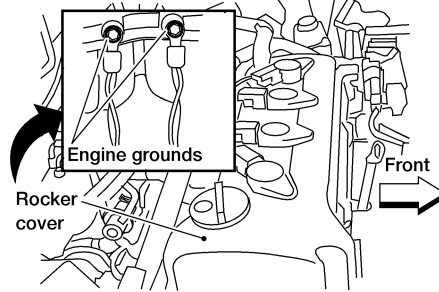
Diagnostic Procedure

NIEC1309

1 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249



GO TO 2.

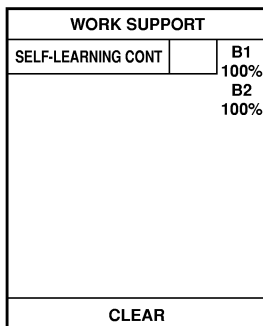
DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

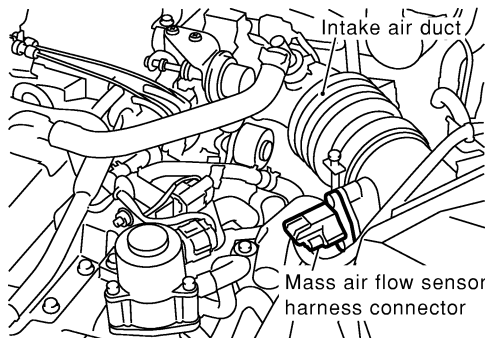


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172 detected? Is it difficult to start engine?

Yes or No

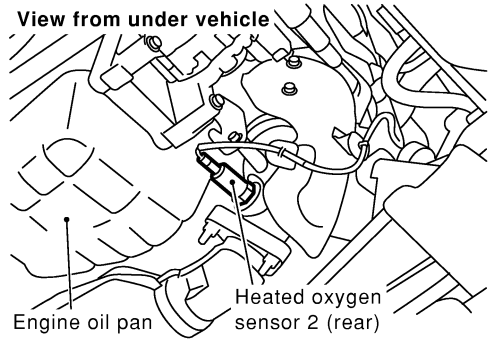
Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to "DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)", EC-957, or "DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)", EC-964.
No	▶	GO TO 3.

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DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p>		
 <p style="text-align: center;">View from under vehicle</p> <p style="text-align: center;">Engine oil pan Heated oxygen sensor 2 (rear)</p>		
<p>3. Check harness continuity between ECM terminal 86 and HO2S2 (rear) terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 86 or HO2S2 (rear) terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

SEF394Z

4	CHECK GROUND CIRCUIT	
<p>1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-909.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection

NIEC1310

HEATED OXYGEN SENSOR 2 (REAR)

NIEC1310S01

④ With CONSULT-II

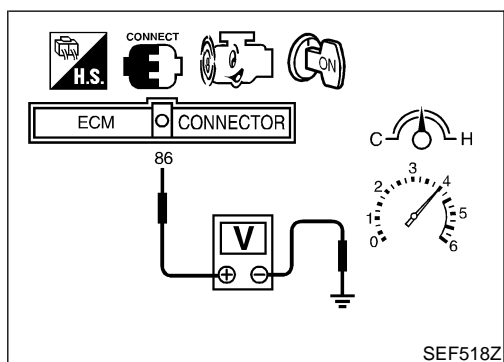
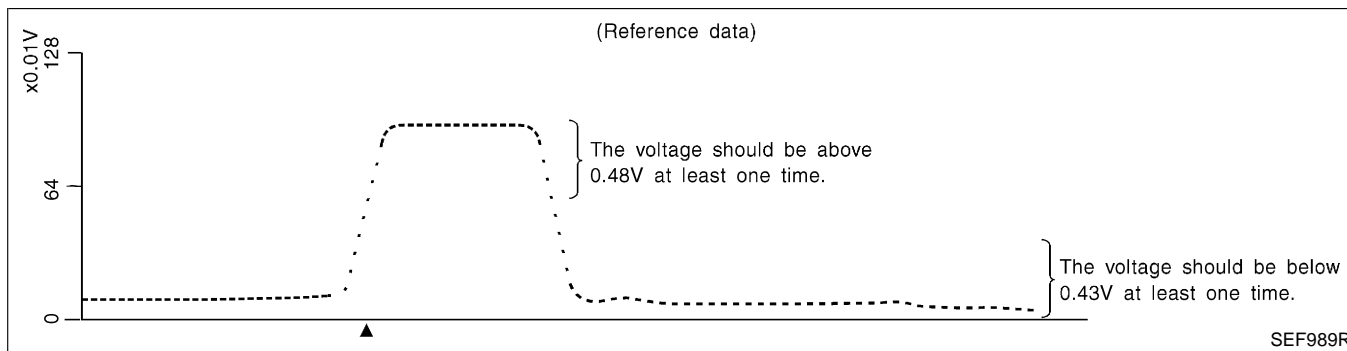
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0139 HEATED OXYGEN SENSOR 2 (REAR)
(RESPONSE MONITORING)**

QG18DE (CALIF CA)

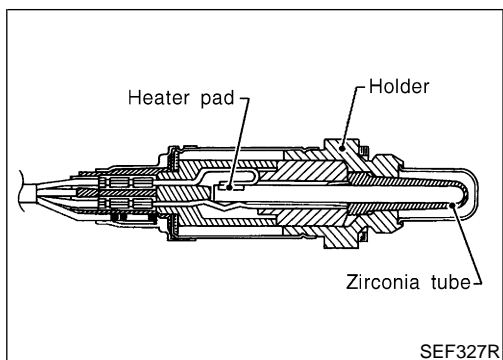
Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

QG18DE (CALIF CA)

Component Description



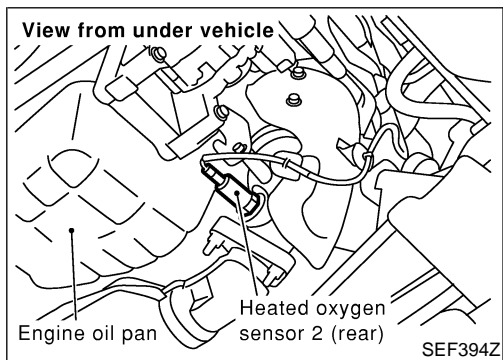
Component Description

The heated oxygen sensor 2 (rear), after TWC (Manifold three way catalyst), monitors the oxygen level in the exhaust gas. NIEC1311

Even if switching characteristics of the air fuel ratio (A/F) sensor 1 are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

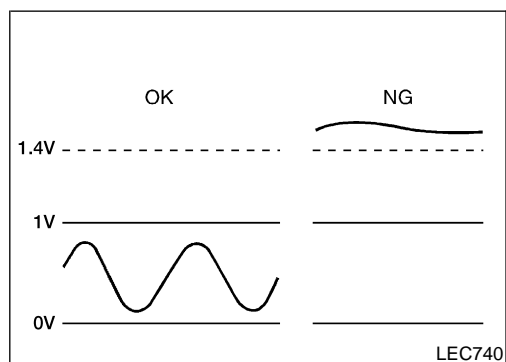


CONSULT-II Reference Value in Data Monitor Mode

NIEC1312

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC1313

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of rear heated oxygen sensor 2, ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0140	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear)

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

QG18DE (CALIF CA)

DTC Confirmation Procedure

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

DTC Confirmation Procedure

NIEC1314

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

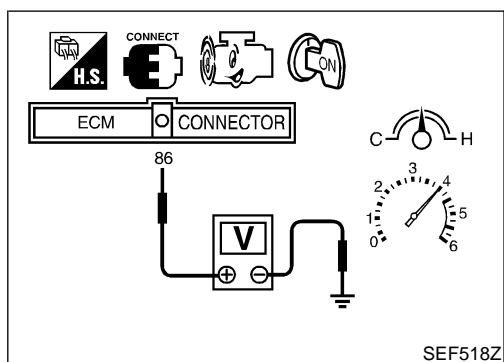
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,000 - 3,000 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-914.



Overall Function Check

NIEC1315

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage after revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 2V during this procedure.
- 5) If NG, go to "Diagnostic Procedure", EC-914.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

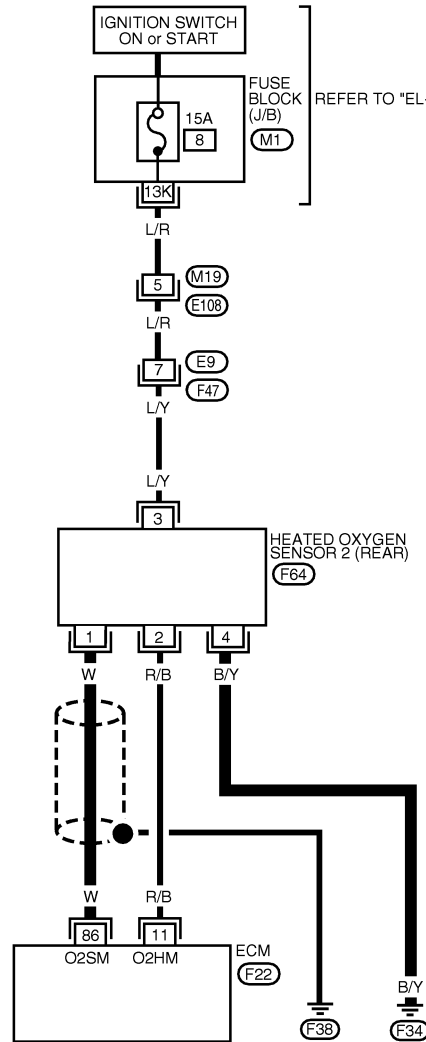
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

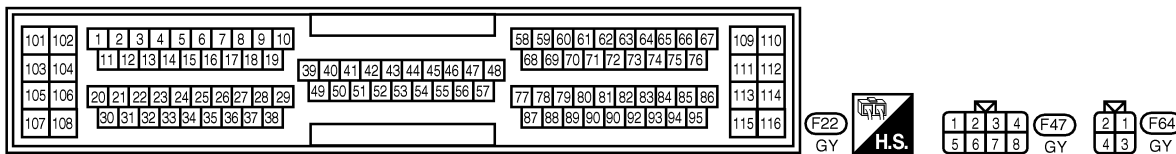
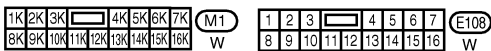
NIEC1316

EC-HO2S2-01



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

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WEC390

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	W	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YA

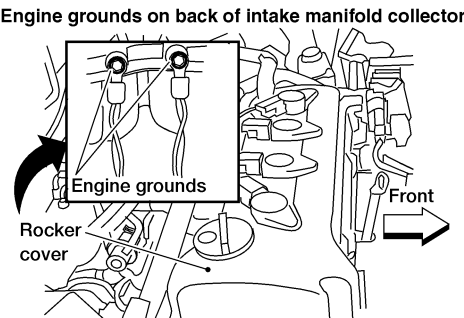
DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

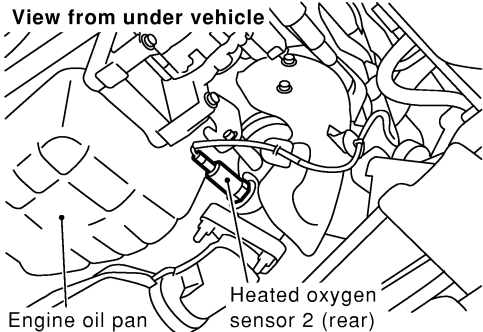
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1317

1	RETIGHTEN GROUND SCREWS	<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div>	WEC249
▶		GO TO 2.	

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect heated oxygen sensor HO2S2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;">  </div>	SEF394Z
		<p>2. Check harness continuity between ECM terminal 86 and HO2S2 (rear) terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal 86 or HO2S2 (rear) terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK ▶		GO TO 3.	
NG ▶		Repair open circuit or short to ground or short to power in harness or connectors.	

3	CHECK GROUND CIRCUIT	<p>1. Check harness continuity between HO2S2 (rear) terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK ▶		GO TO 4.	
NG ▶		Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4	CHECK HARNESS CONNECTOR	
Check heated oxygen sensor 2 (rear) harness connector for water. Water should not exist.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace harness connector.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-915.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
	▶	INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC1318
NIEC1318S01

④ With CONSULT-II

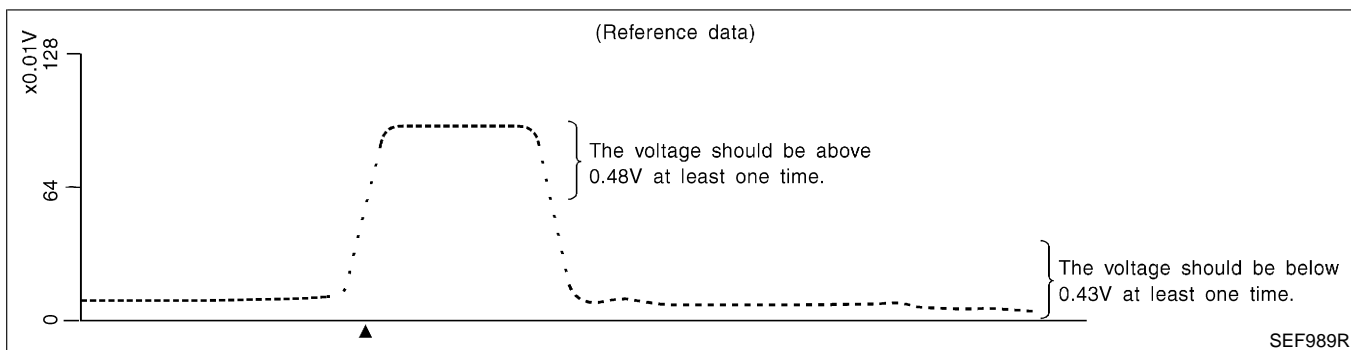
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

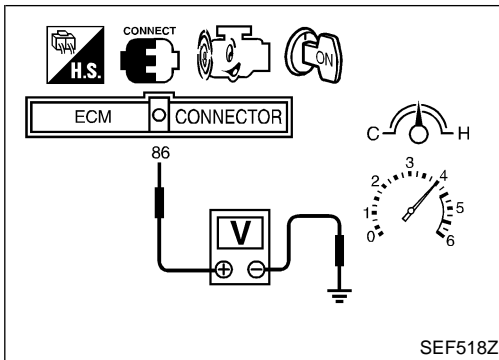
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

QG18DE (CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 86 (HO2S2 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

QG18DE (CALIF CA)

Description

Description

NIEC1319

SYSTEM DESCRIPTION

NIEC1319S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)
Crankshaft position sensor (POS)			

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater (rear) corresponding to the engine speed.

OPERATION

NIEC1319S02

Engine speed rpm	Heated oxygen sensor 2 heater (rear)
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NIEC1320

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 	OFF
	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 	ON

On Board Diagnosis Logic

NIEC1321

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0141	<ul style="list-style-type: none"> ● The current amperage in the heated oxygen sensor 2 heater (rear) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 2 heater (rear).] 	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 2 heater (rear) circuit is open or shorted.) ● Heated oxygen sensor 2 heater (rear)

DTC Confirmation Procedure

NIEC1322

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V at idle.

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	THRTL POS SEN	XXX V

SEF179Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-920.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-920.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

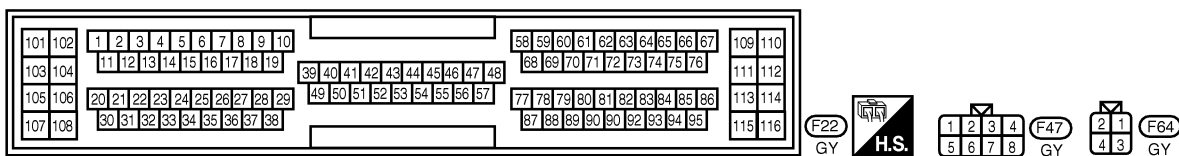
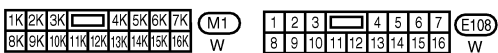
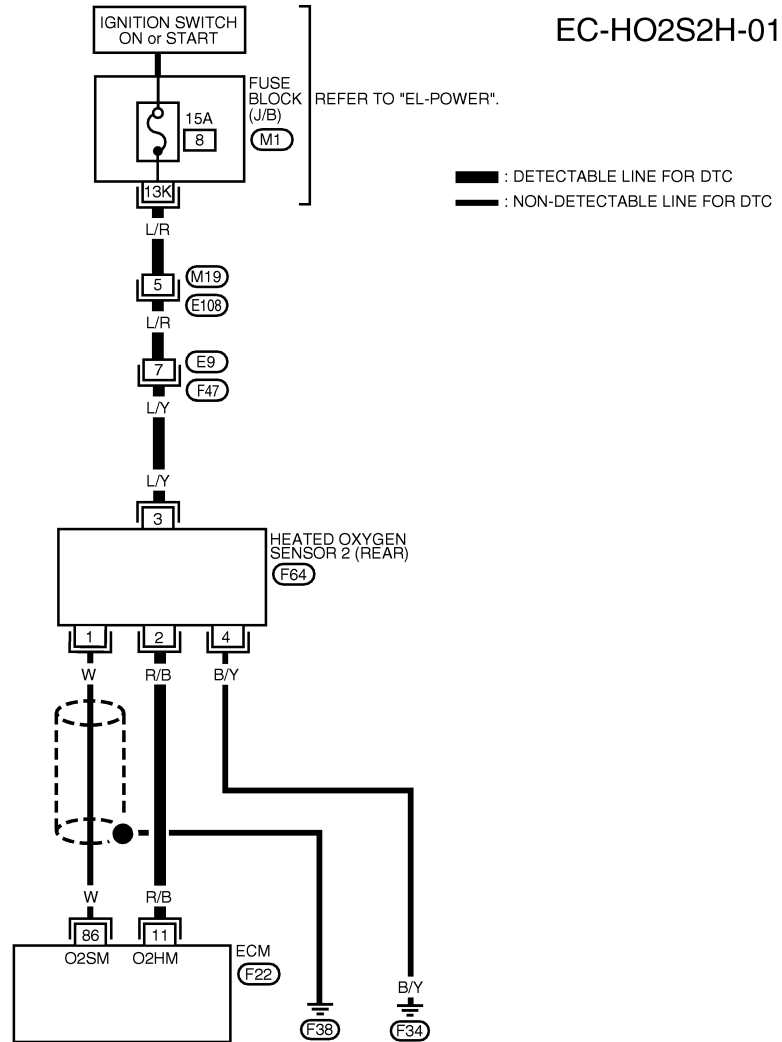
DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1323



WEC391

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
11	R/B	HEATED OXYGEN SENSOR 2 (REAR) HEATER	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

SEF728YA

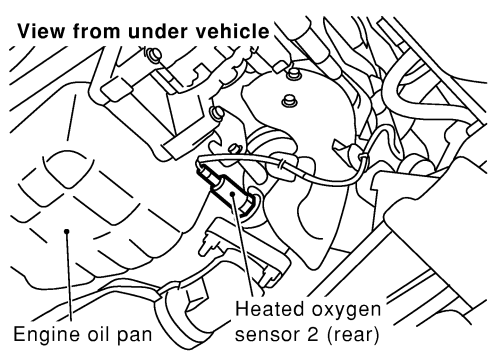
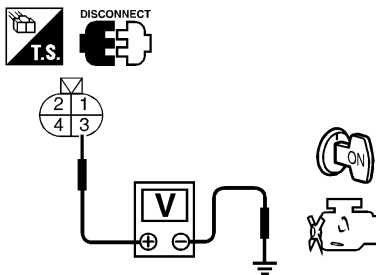
DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1324

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor HO2S2 (rear) harness connector.</p> <div style="text-align: center;">  <p>View from under vehicle</p> <p>Engine oil pan Heated oxygen sensor 2 (rear)</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between rear HO2S2 terminal 3 and ground.</p> <div style="text-align: center;">  <p>DISCONNECT</p> <p>T.S.</p> <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF394Z</p> <p style="text-align: right;">SEF520Z</p> <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors M19, E108 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between heated oxygen sensor 2 (rear) and fuse <p style="text-align: right;">▶ Repair harness or connectors.</p>
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3	CHECK OUTPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between HO2S2 (rear) terminal 2 and ECM terminal 11. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

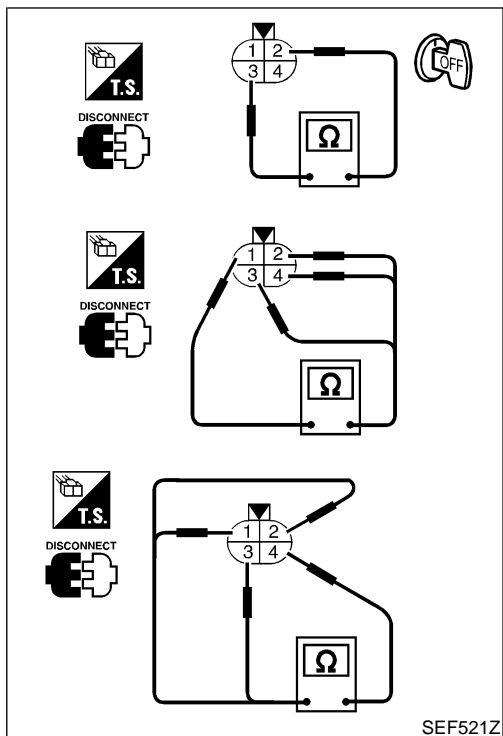
DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)
Refer to "Component Inspection", EC-921.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace heated oxygen sensor 2 (rear).

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

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Component Inspection

HEATED OXYGEN SENSOR 2 HEATER (REAR)

NIEC1325
NIEC1325S01

Check the following.

- Check resistance between terminals 2 and 3.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
- Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

If NG, replace the heated oxygen sensor 2 (rear).

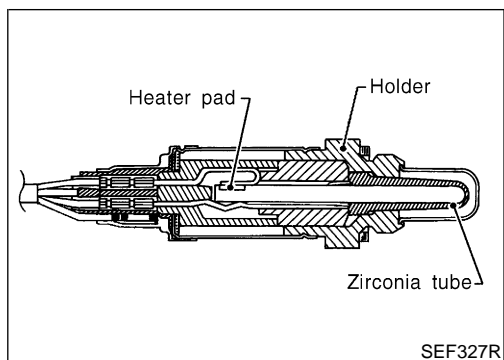
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

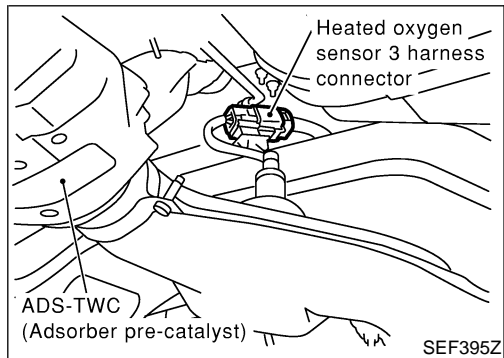
Component Description



Component Description

The heated oxygen sensor 3, after ADS-TWC (Adsorber pre-catalyst), monitors the oxygen level in the exhaust gas. This sensor is used for recovery control of air fuel ratio after the fuel cut operation. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

NIEC1326

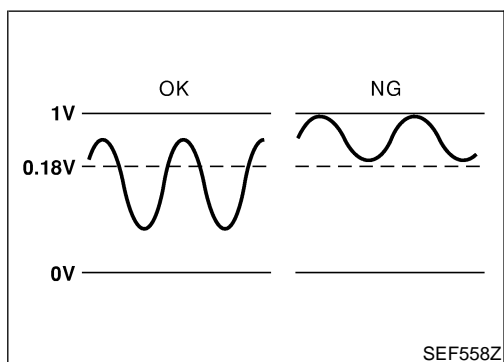


CONSULT-II Reference Value in Data Monitor Mode

NIEC1327

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S3 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V



On Board Diagnosis Logic

The heated oxygen sensor 3 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 3, ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

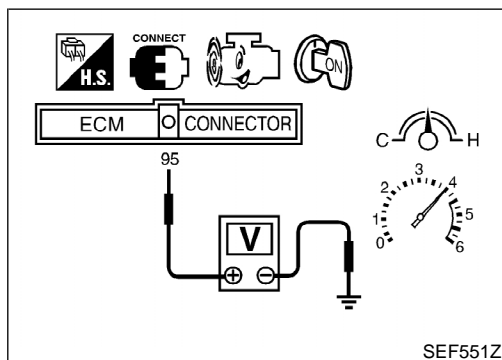
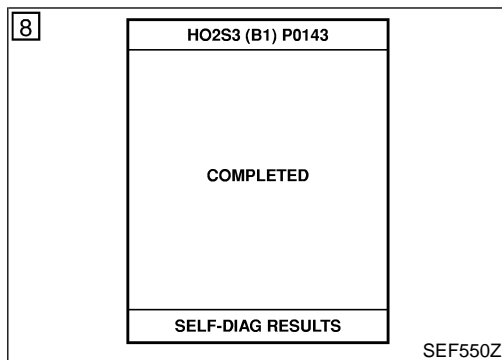
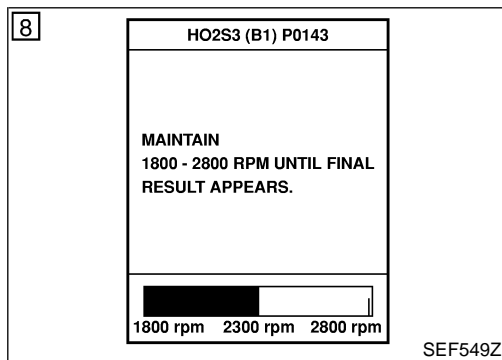
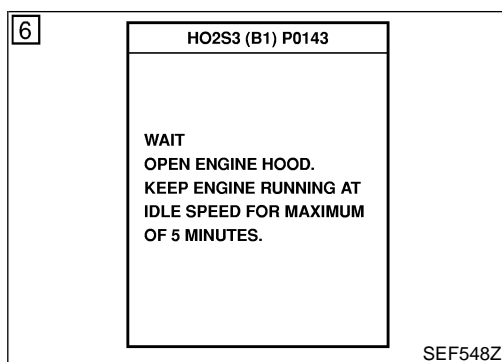
NIEC1328

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0143	<ul style="list-style-type: none"> The minimum voltage from the sensor does not reach the specified voltage. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 3 Fuel pressure Injectors

DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC1329

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S3 (B1) P0143" of "HO2S3" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-925.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1330

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.43V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-925.

EC-923

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DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

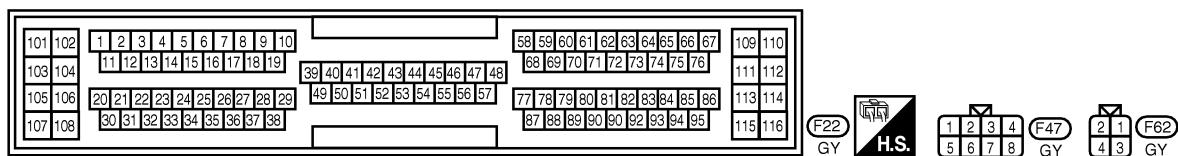
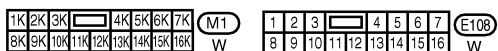
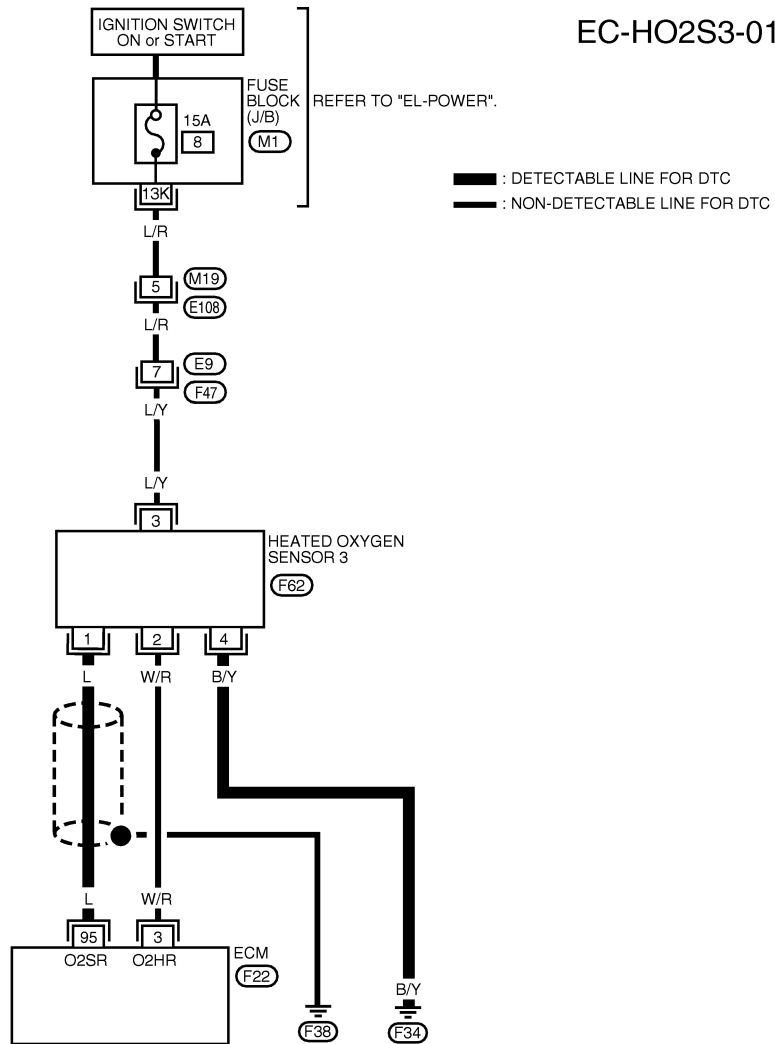
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1331

EC-HO2S3-01



WEC392

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	L	HEATED OXYGEN SENSOR 3	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

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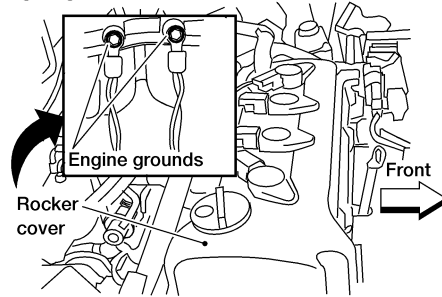
DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1332

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine grounds on back of intake manifold collector</p>  <p style="text-align: right;">WEC249</p>	
▶	GO TO 2.

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DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA
----------	-------------------------------------

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

WORK SUPPORT	
SELF-LEARNING CONT	B1 100%
	B2 100%
CLEAR	

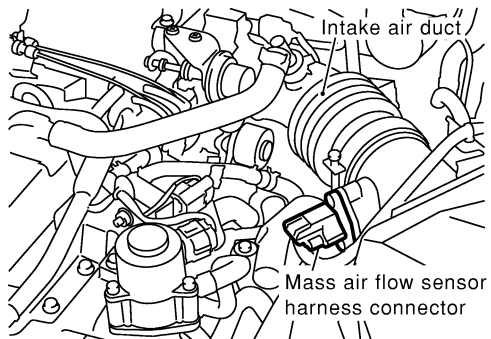
SEF652Y

4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



Intake air duct

Mass air flow sensor harness connector

SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

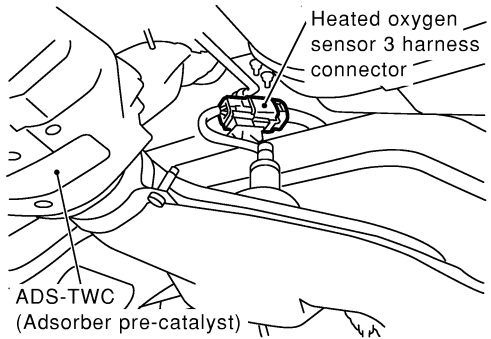
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to "DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)", EC-964.
No	▶	GO TO 3.

DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT								
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 3 harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="font-size: small;">Heated oxygen sensor 3 harness connector</p> <p style="font-size: small;">ADS-TWC (Adsorber pre-catalyst)</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center; font-weight: bold;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p>						
		<p>3. Check harness continuity between ECM terminal 95 and HO2S3 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 95 or HO2S3 terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>SEF395Z</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="border-right: 1px solid black;">GO TO 4.</td> </tr> <tr> <td style="border-right: 1px solid black;">NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>AT</p>
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

4	CHECK GROUND CIRCUIT								
		<p>1. Check harness continuity between HO2S3 terminal 4 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>AX</p> <p>SU</p> <p>BR</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="border-right: 1px solid black;">GO TO 5.</td> </tr> <tr> <td style="border-right: 1px solid black;">NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>ST</p>
OK	▶	GO TO 5.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)								
		<p>Refer to "Component Inspection", EC-928.</p> <p style="text-align: center;">OK or NG</p>	<p>RS</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td style="border-right: 1px solid black;">GO TO 6.</td> </tr> <tr> <td style="border-right: 1px solid black;">NG</td> <td style="text-align: center;">▶</td> <td>Replace corresponding heated oxygen sensor 3.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace corresponding heated oxygen sensor 3.	<p>BT</p> <p>HA</p>
OK	▶	GO TO 6.							
NG	▶	Replace corresponding heated oxygen sensor 3.							

6	CHECK INTERMITTENT INCIDENT					
		<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	<p>SC</p>			
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;"></td> <td style="width: 5%; text-align: center;">▶</td> <td style="border-right: 1px solid black;">INSPECTION END</td> </tr> </table>		▶	INSPECTION END	<p>EL</p> <p>IDX</p>
	▶	INSPECTION END				

DTC P0143 HEATED OXYGEN SENSOR 3 (MIN. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 3

NIEC1333

NIEC1333S01

With CONSULT-II

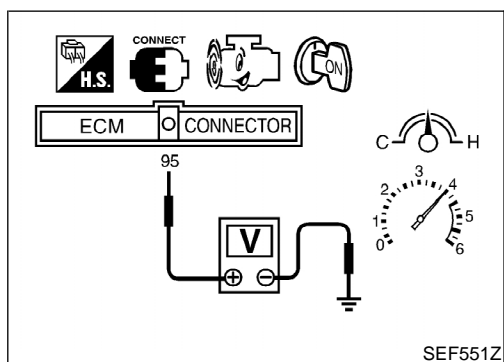
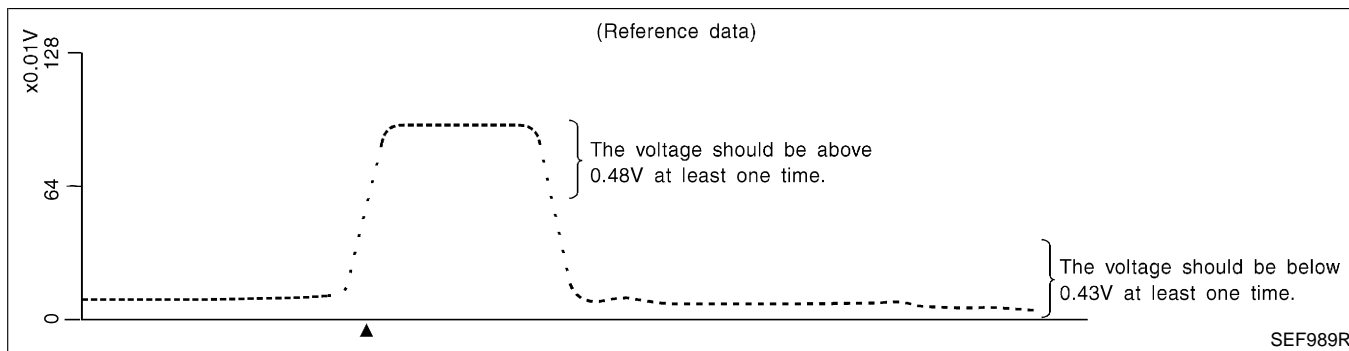
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S3 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0143 HEATED OXYGEN SENSOR 3
(MIN. VOLTAGE MONITORING)**

QG18DE (CALIF CA)

Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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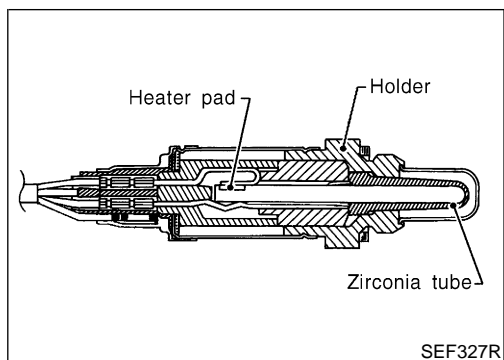
EL

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DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

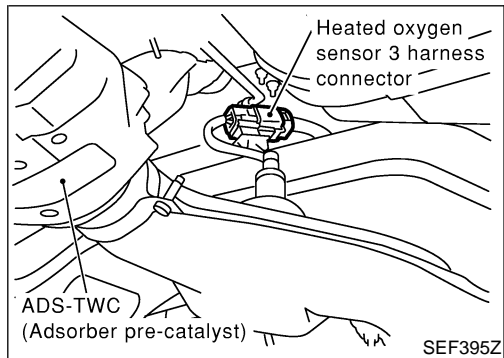
Component Description



Component Description

The heated oxygen sensor 3, after ADS-TWC (Adsorber pre-catalyst) monitors the oxygen level in the exhaust gas. This sensor is used for recovery control of air fuel ratio after the fuel cut operation. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

NIEC1334

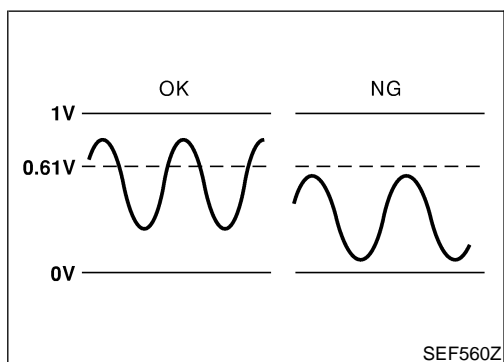


CONSULT-II Reference Value in Data Monitor Mode

NIEC1335

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S3 (B1)	● Engine: After warming up	Reving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V



On Board Diagnosis Logic

The heated oxygen sensor 3 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 3, ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

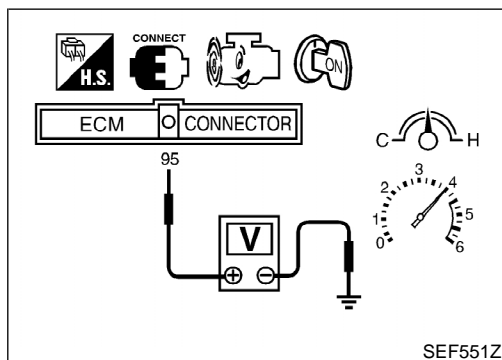
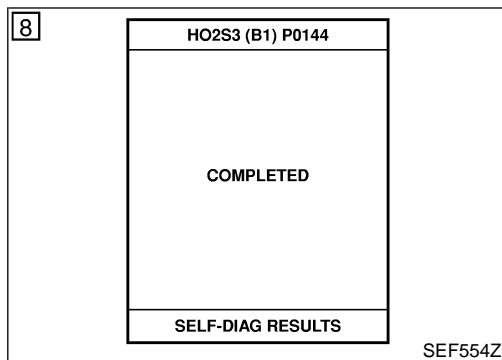
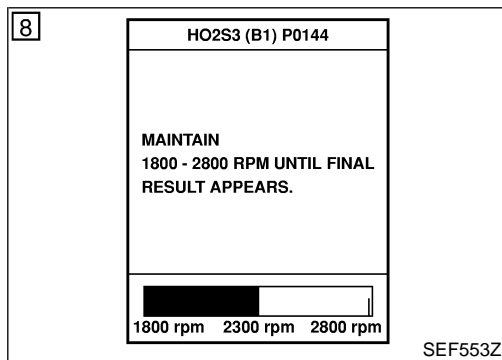
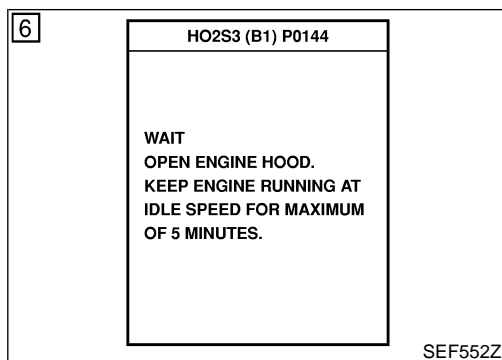
NIEC1336

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0144	● The maximum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 3 ● Fuel pressure ● Injectors ● Intake air leaks

DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC1337

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S3 (B1) P0144" of "HO2S3" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-933.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1338

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be above 0.48V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-933.

EC-931

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DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

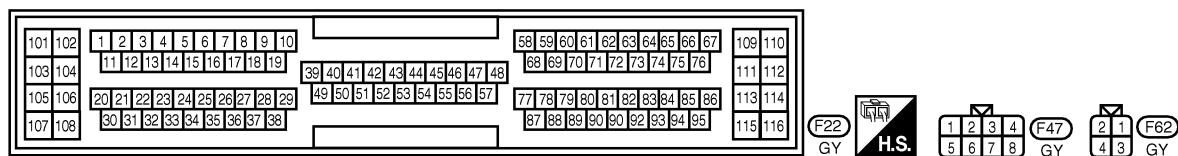
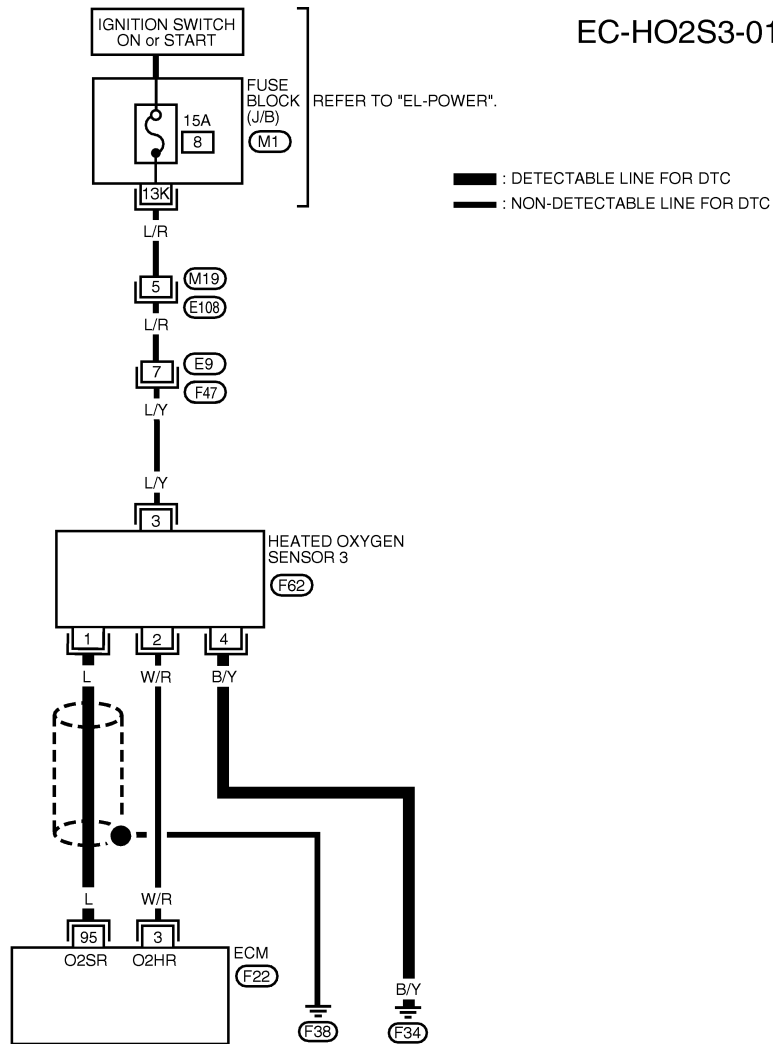
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1339

EC-HO2S3-01



WEC392

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	L	HEATED OXYGEN SENSOR 3	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YB

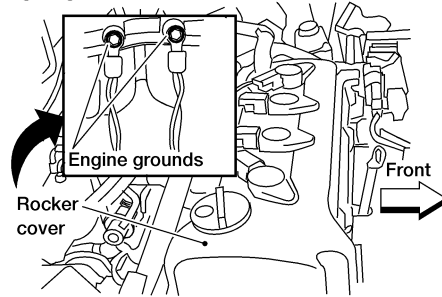
DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1340

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine grounds on back of intake manifold collector</p>  <p style="text-align: right;">WEC249</p>	
▶	GO TO 2.

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DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA
----------	-------------------------------------

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

WORK SUPPORT	
SELF-LEARNING CONT	B1 100%
	B2 100%
CLEAR	

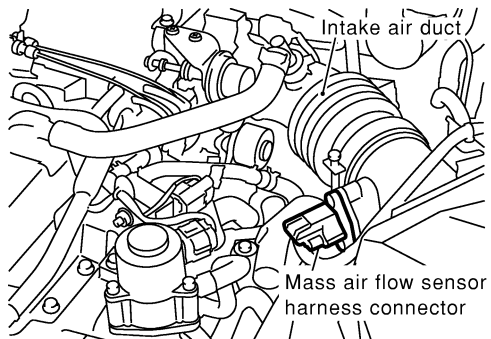
SEF652Y

4. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



Intake air duct

Mass air flow sensor harness connector

SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

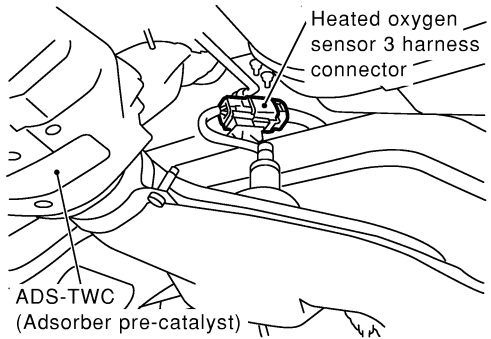
Is the 1st trip DTC P0171 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to "DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)", EC-957.
No	▶	GO TO 3.

DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT								
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 3 harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="font-size: small;">Heated oxygen sensor 3 harness connector</p> <p style="font-size: small;">ADS-TWC (Adsorber pre-catalyst)</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center; font-weight: bold;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>						
		<p>3. Check harness continuity between ECM terminal 95 and HO2S3 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 95 or HO2S3 terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	SEF395Z						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

4	CHECK GROUND CIRCUIT								
		<p>1. Check harness continuity between HO2S3 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
OK	▶	GO TO 5.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)								
		<p>Refer to "Component Inspection", EC-936.</p> <p style="text-align: center;">OK or NG</p>	<p>RS</p> <p>BT</p> <p>HA</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace corresponding heated oxygen sensor 3.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace corresponding heated oxygen sensor 3.	
OK	▶	GO TO 6.							
NG	▶	Replace corresponding heated oxygen sensor 3.							

6	CHECK INTERMITTENT INCIDENT					
		<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	<p>SC</p> <p>EL</p> <p>IDX</p>			
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>		▶	INSPECTION END	
	▶	INSPECTION END				

DTC P0144 HEATED OXYGEN SENSOR 3 (MAX. VOLTAGE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 3

NIEC1341

NIEC1341S01

With CONSULT-II

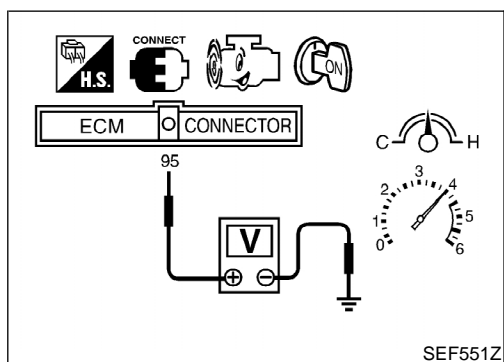
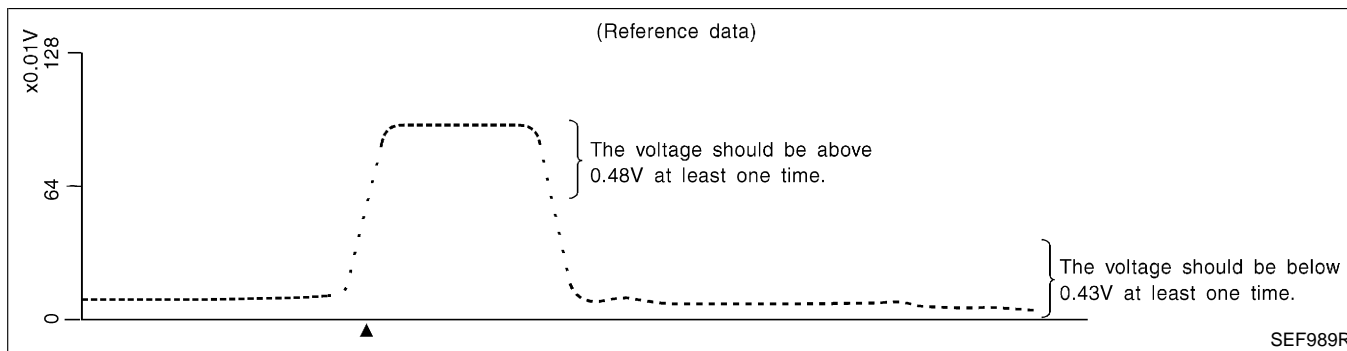
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes..
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S3 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0144 HEATED OXYGEN SENSOR 3
(MAX. VOLTAGE MONITORING)**

QG18DE (CALIF CA)

Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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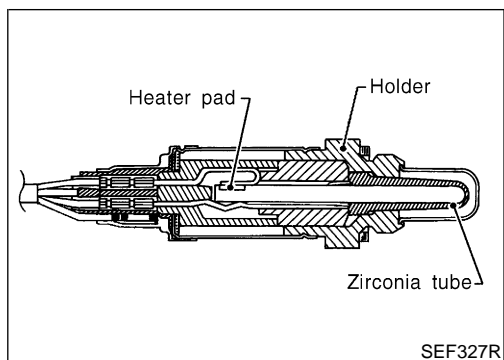
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DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

QG18DE (CALIF CA)

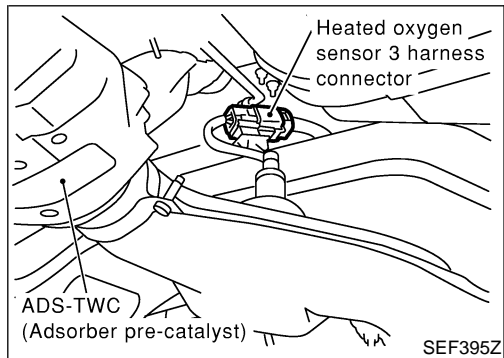
Component Description



Component Description

The heated oxygen sensor 3, after ADS-TWC (Adsorber pre-catalyst), monitors the oxygen level in the exhaust gas. This sensor is used for recovery control of air fuel ratio after the fuel cut operation.

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

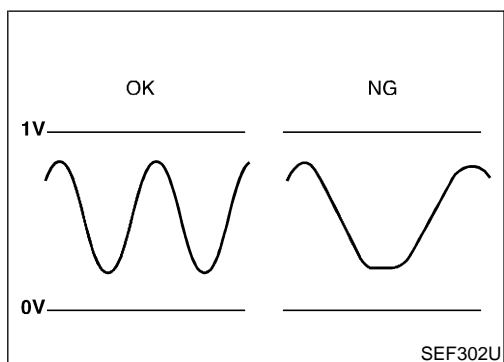


CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC1343

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S3 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V



On Board Diagnosis Logic

The heated oxygen sensor 3 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 3, ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

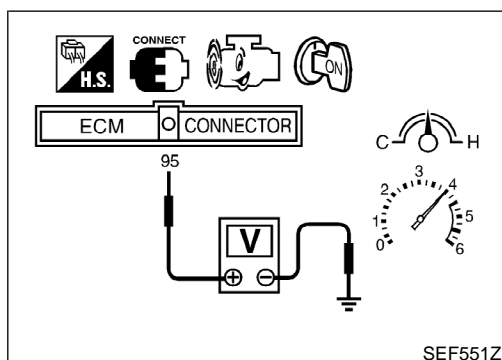
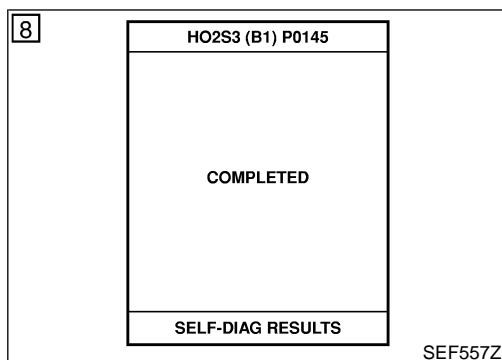
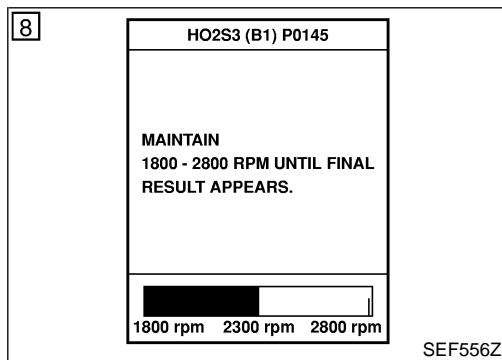
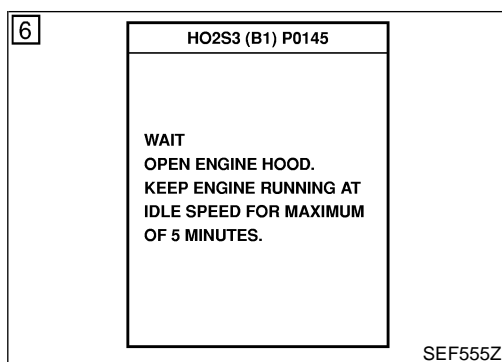
NIEC1344

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0145	<ul style="list-style-type: none"> It takes more than the specified time for the sensor to respond between rich and lean. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 3 Fuel pressure Injectors Intake air leaks

DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC1345

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S3 (B1) P0145" of "HO2S3" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-941.

If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC1346

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should change at more than 0.06V for 1 second during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-941.

EC-939

GI

MA

EM

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EC

FE

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DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

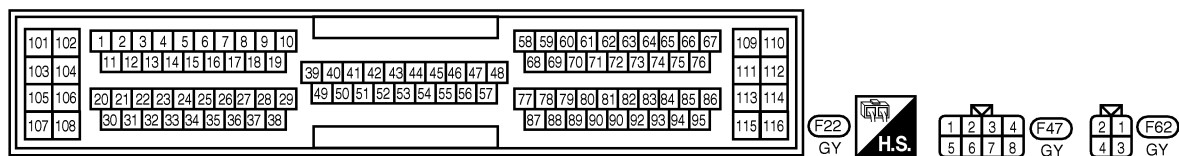
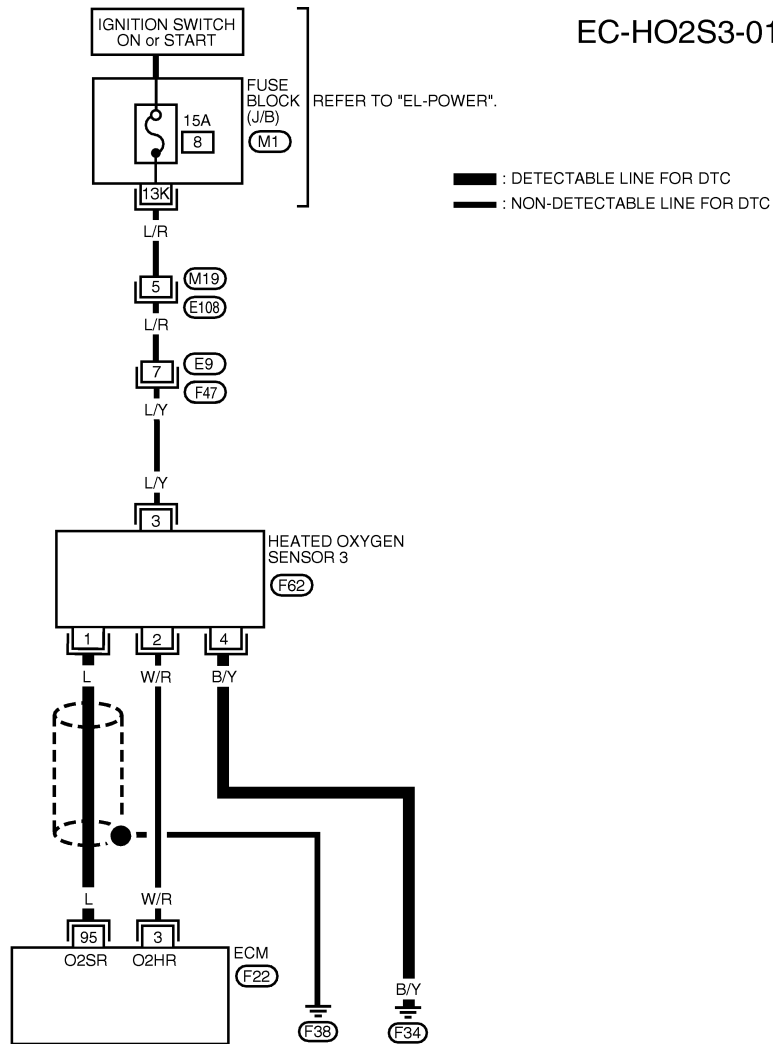
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1347

EC-HO2S3-01



WEC392

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	L	HEATED OXYGEN SENSOR 3	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YB

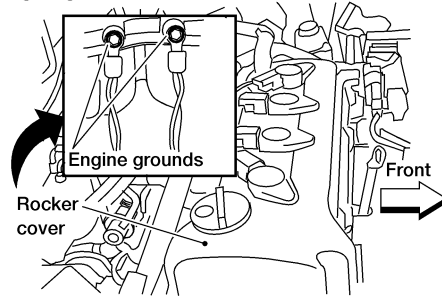
DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1348

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p> <div><p>Engine grounds on back of intake manifold collector</p><p>The diagram shows a top-down view of the engine's intake manifold collector. Two screws are highlighted with a box and labeled 'Engine grounds'. A curved arrow points to the 'Rocker cover' area, and a straight arrow points towards the 'Front' of the engine.</p></div>	
<p>▶ GO TO 2.</p>	

WEC249

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MA

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DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

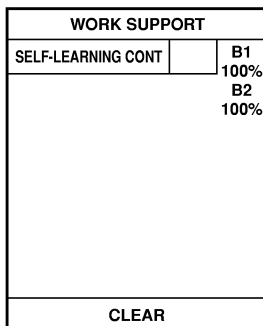
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

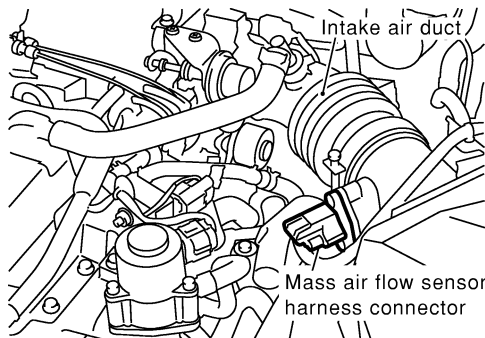


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171, P0172 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

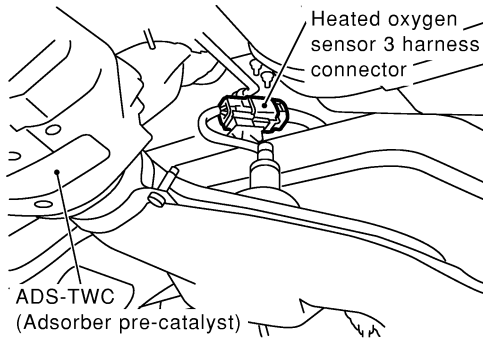
Is the 1st trip DTC P0171, P0172 detected? Is it difficult to start engine?

Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-957, EC-964.
No	▶	GO TO 3.

DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT								
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 3 harness connector and ECM harness connector.</p> <div style="text-align: center;">  <p style="font-size: small;">Heated oxygen sensor 3 harness connector</p> <p style="font-size: small;">ADS-TWC (Adsorber pre-catalyst)</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center; font-weight: bold;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p>						
		<p>3. Check harness continuity between ECM terminal 95 and HO2S3 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 95 HO2S3 terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>SEF395Z</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>AT</p>
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

4	CHECK GROUND CIRCUIT								
		<p>1. Check harness continuity between HO2S3 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>AX</p> <p>SU</p> <p>BR</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>ST</p>
OK	▶	GO TO 5.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

5	CHECK HEATED OXYGEN SENSOR 3 (REAR)								
		<p>Refer to "Component Inspection", EC-944.</p> <p style="text-align: center;">OK or NG</p>	<p>RS</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace corresponding heated oxygen sensor 3.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace corresponding heated oxygen sensor 3.	<p>BT</p> <p>HA</p>
OK	▶	GO TO 6.							
NG	▶	Replace corresponding heated oxygen sensor 3.							

6	CHECK INTERMITTENT INCIDENT					
		<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	<p>SC</p>			
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>		▶	INSPECTION END	<p>EL</p> <p>IDX</p>
	▶	INSPECTION END				

DTC P0145 HEATED OXYGEN SENSOR 3 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 3

NIEC1349

NIEC1349S01

With CONSULT-II

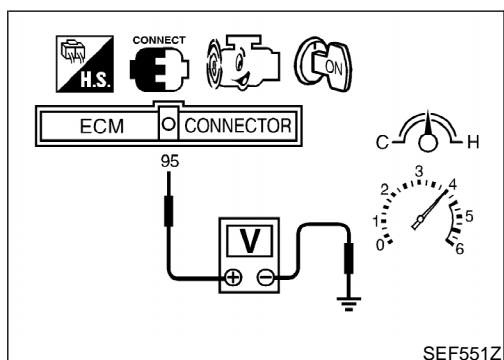
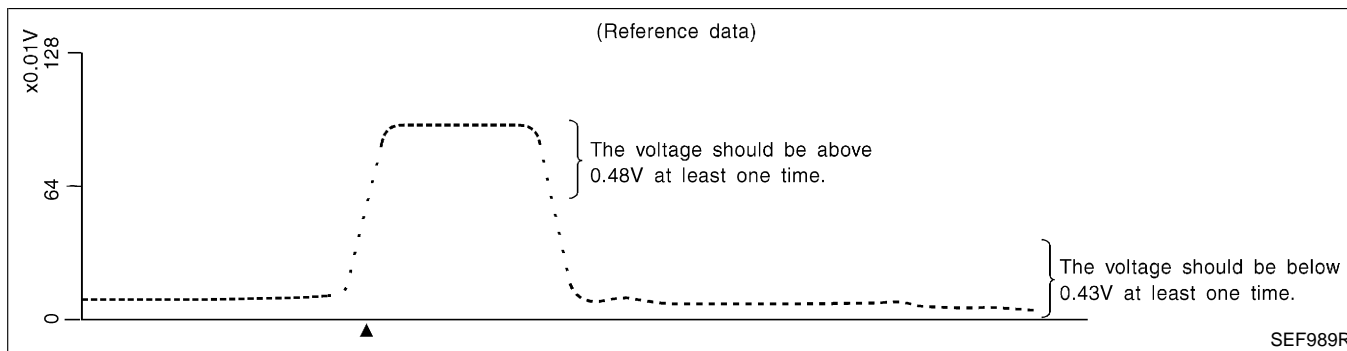
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S3 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 terminal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor

**DTC P0145 HEATED OXYGEN SENSOR 3
(RESPONSE MONITORING)**

QG18DE (CALIF CA)

Component Inspection (Cont'd)

Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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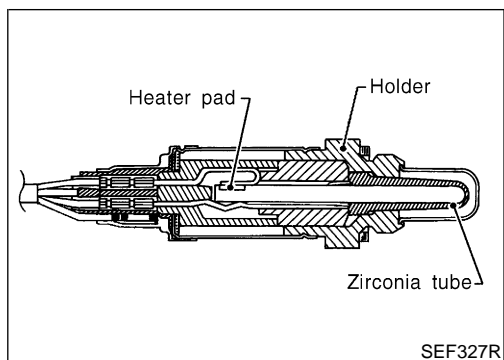
EL

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DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Component Description



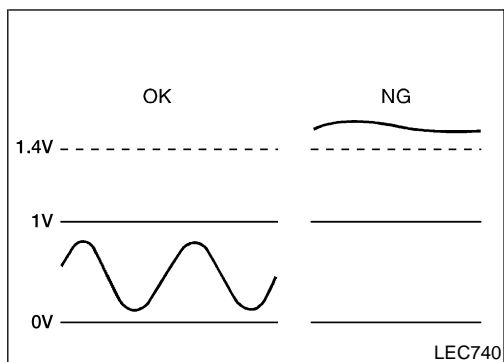
Component Description

The heated oxygen sensor 3, after ADS-TWC (Adsorber pre-catalyst), monitors the oxygen level in the exhaust gas. This sensor is used for recovery control of air fuel ratio after the fuel cut operation. This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S3 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm 	0 - 0.3V ↔ Approx. 0.6 - 1.0V



On Board Diagnosis Logic

The heated oxygen sensor 3 has a much longer switching time between rich and lean than the air fuel ratio (A/F) sensor 1. The oxygen storage capacity before the TWC (Manifold three way catalyst) causes the longer switching time. To judge the malfunctions of heated oxygen sensor 3, ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0146	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

DTC Confirmation Procedure

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and drive vehicle at a speed of more than 70 km/h

DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

QG18DE (CALIF CA)

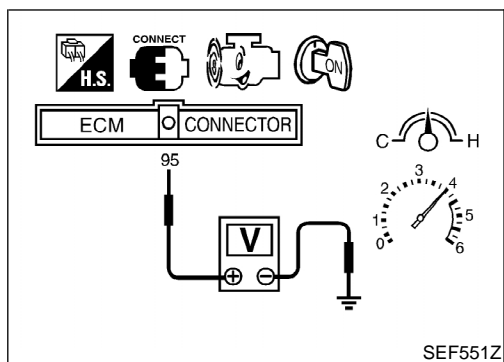
DTC Confirmation Procedure (Cont'd)

(43 MPH) for 2 consecutive minutes.

- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,000 - 3,000 rpm
VHCL SPEED SE	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-949.



Overall Function Check

Use this procedure to check the overall function of the rear heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage after revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 2V during this procedure.
- 5) If NG, go to "Diagnostic Procedure", EC-949.

DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

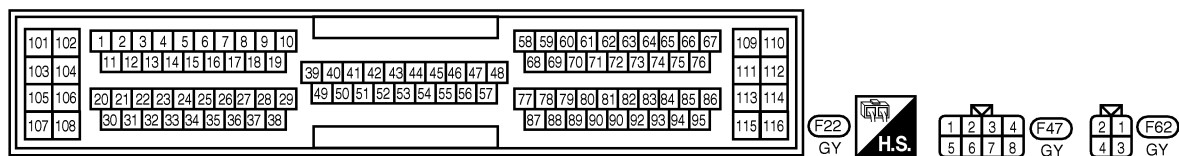
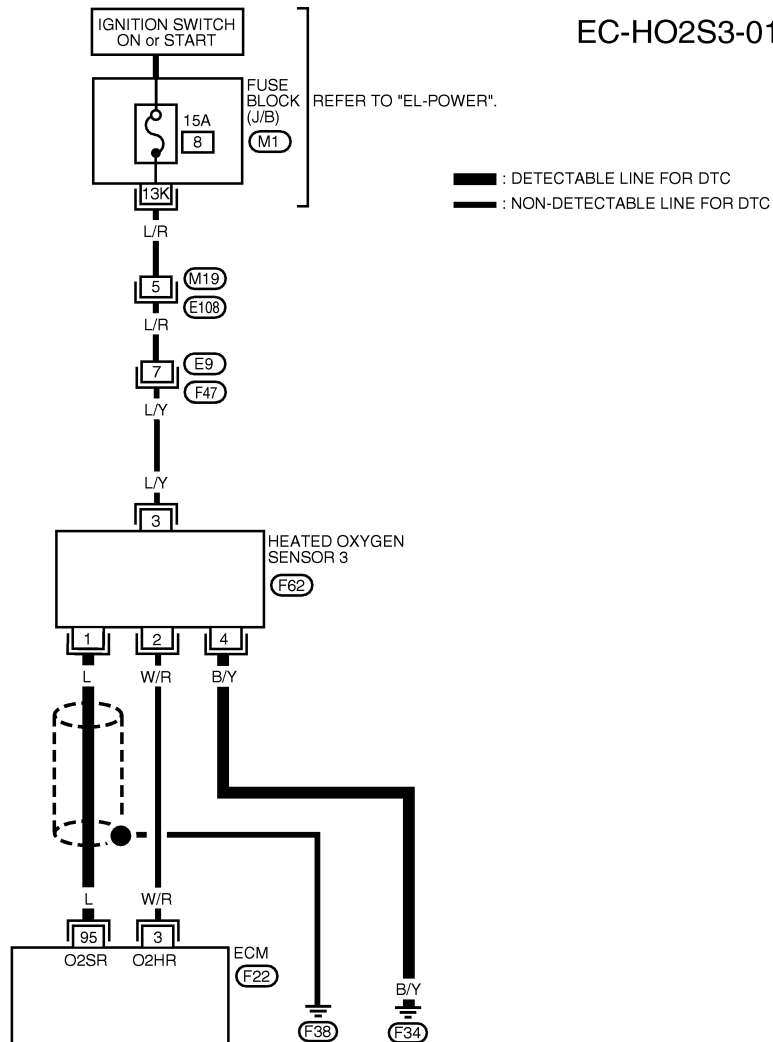
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1355

EC-HO2S3-01



WEC392

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
95	L	HEATED OXYGEN SENSOR 3	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF724YB

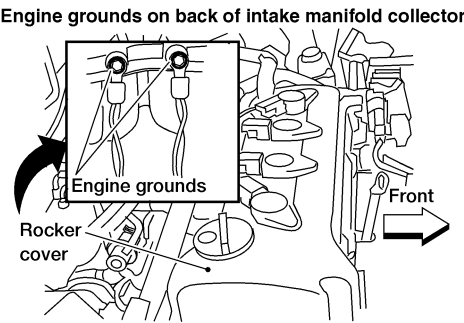
DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

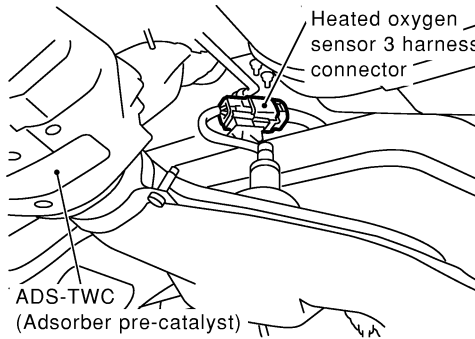
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1356

1	RETIGHTEN GROUND SCREWS	<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">WEC249</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p>
▶ GO TO 2.			

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect heated oxygen sensor 3 harness connector and ECM harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF395Z</p> <p>2. Check harness continuity between ECM terminal 95 and HO2S3 terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal 95 or HO2S3 terminal 1 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p>
OK ▶ GO TO 3.			
NG ▶ Repair open circuit or short to ground or short to power in harness or connectors.			

3	CHECK GROUND CIRCUIT	<p>1. Check harness continuity between HO2S3 terminal 4 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK ▶ GO TO 4.			
NG ▶ Repair open circuit or short to ground or short to power in harness or connectors.			

DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK HARNESS CONNECTOR	
Check heated oxygen sensor 3 harness connector for water. Water should not exist.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace harness connector.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-950.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace corresponding heated oxygen sensor 3.

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
A/F SEN1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S3 (B1)	XXX V

SEF519Z

Component Inspection HEATED OXYGEN SENSOR 3

NIEC1357

NIEC1357S01

Ⓜ With CONSULT-II

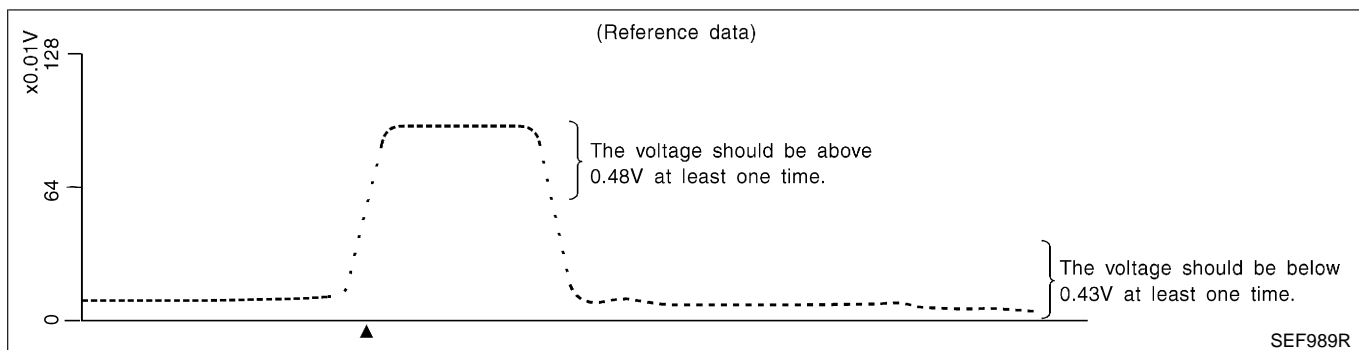
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S3 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S3 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S3 (B1)" should be above 0.48V at least once when the "FUEL INJECTION" is +25%.

"HO2S3 (B1)" should be below 0.43V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

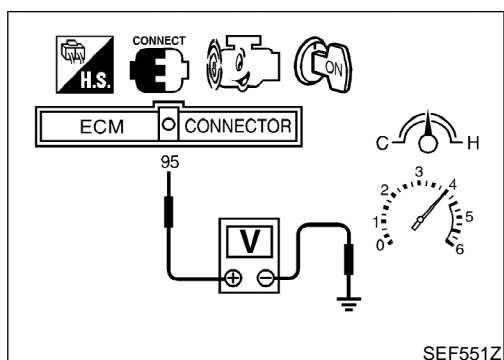
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



DTC P0146 HEATED OXYGEN SENSOR 3 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 95 (HO2S3 signal) and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.48V at least once.
If the voltage is above 0.48V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in D position with "OD" OFF.
The voltage should be below 0.43V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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DTC P0147 HEATED OXYGEN SENSOR 3 HEATER

QG18DE (CALIF CA)

Description

Description

NIEC1358

SYSTEM DESCRIPTION

NIEC1358S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed	Heated oxygen sensor 3 heater control	Heated oxygen sensor 3 heater
Crankshaft position sensor (POS)			

The ECM performs ON/OFF control of the heated oxygen sensor 3 heater corresponding to the engine speed.

OPERATION

NIEC1358S02

Engine speed rpm	Heated oxygen sensor 3 heater
Above 3,600	OFF
Below 3,600	ON

On Board Diagnosis Logic

NIEC1359

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0147	<ul style="list-style-type: none"> ● The current amperage in the heated oxygen sensor 3 heater circuit is out of the normal range. (An improper voltage drop signal is sent to ECM through the heated oxygen sensor 3 heater.) 	<ul style="list-style-type: none"> ● Harness or connectors (The heated oxygen sensor 3 heater circuit is open or shorted.) ● Heated oxygen sensor 3 heater

DTC Confirmation Procedure

NIEC1360

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is in between 10.5V and 16V at idle.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF179Y

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-955.

Ⓜ With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.

DTC P0147 HEATED OXYGEN SENSOR 3 HEATER

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 5 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-955.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

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DTC P0147 HEATED OXYGEN SENSOR 3 HEATER

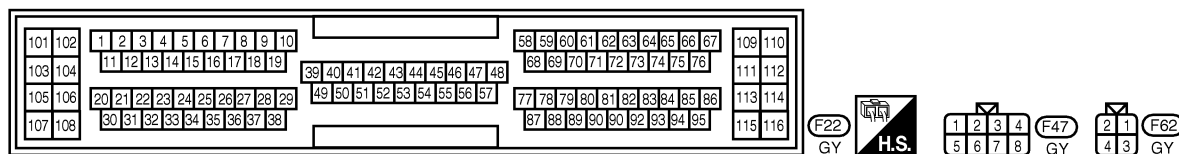
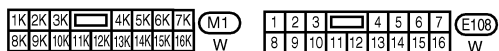
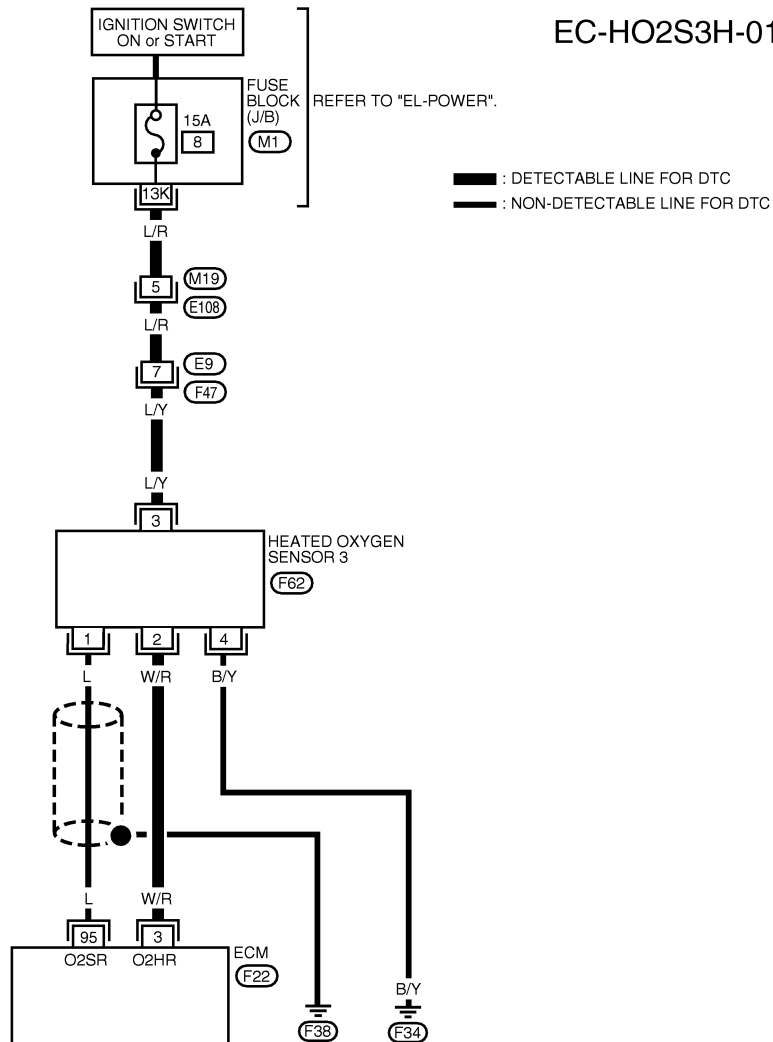
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1361

EC-HO2S3H-01



WEC393

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	W/R	HEATED OXYGEN SENSOR 3 HEATER	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
3	W/R	HEATED OXYGEN SENSOR 3 HEATER	ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

SEF728YB

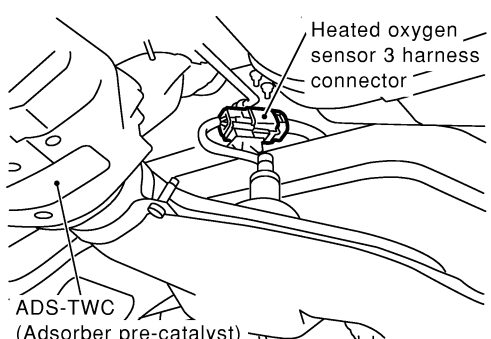
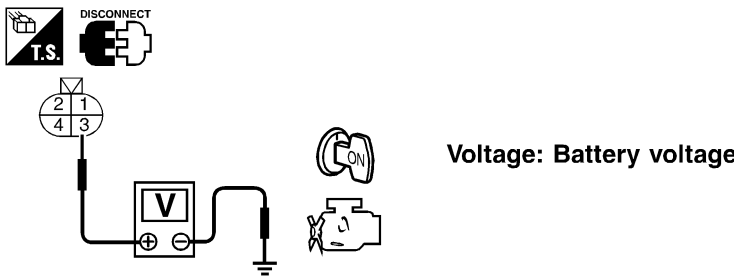
DTC P0147 HEATED OXYGEN SENSOR 3 HEATER

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1362

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 3 harness connector.</p>  <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between rear HO2S3 terminal 3 and ground.</p>  <p style="text-align: right;">SEF395Z</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
		OK or NG	<p>SEF520Z</p>
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors M19, E108 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between heated oxygen sensor 3 and fuse 	
		▶	Repair harness or connectors.

3	CHECK OUTPUT SIGNAL CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between HO2S3 terminal 2 and ECM terminal 3. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>	
		OK or NG	
	OK	▶	GO TO 4.
	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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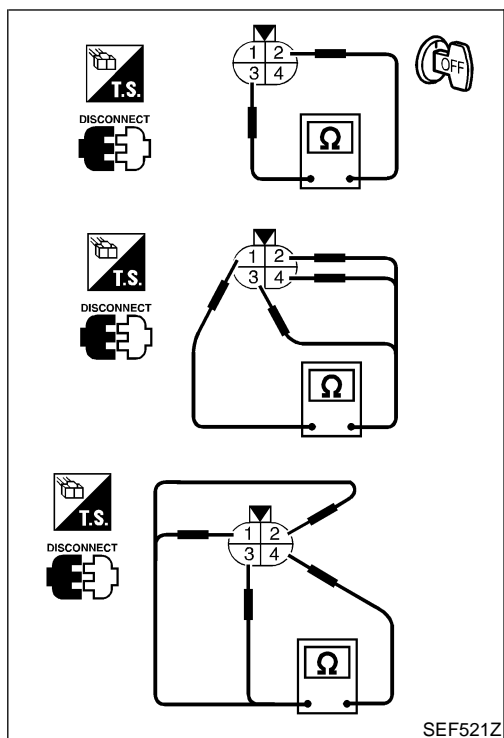
DTC P0147 HEATED OXYGEN SENSOR 3 HEATER

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 3 HEATER
Check HO2S3 heater, refer to "Component Inspection", EC-956.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace corresponding heated oxygen sensor 3.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END



Component Inspection

HEATED OXYGEN SENSOR 3 HEATER

NIEC1363

NIEC1363S01

Check the following.

- Check resistance between terminals 2 and 3.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
- Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

If NG, replace the heated oxygen sensor 3.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new heated oxygen sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)

On Board Diagnosis Logic

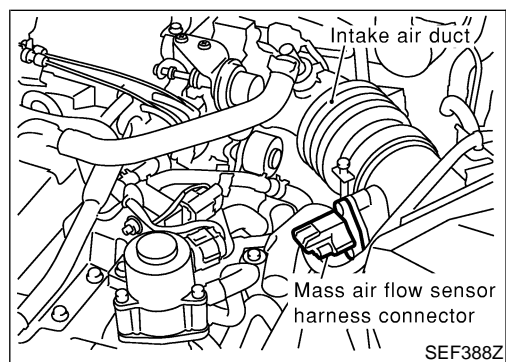
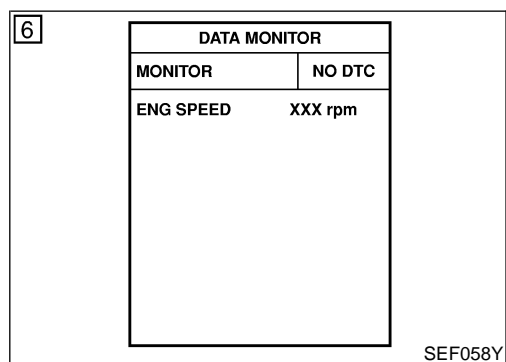
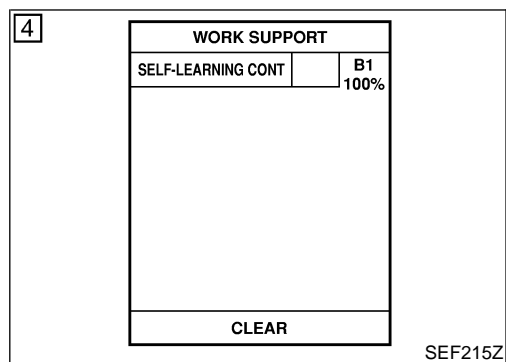
On Board Diagnosis Logic

NIEC1364

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0171	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) 	<ul style="list-style-type: none"> Intake air leaks Air fuel ratio (A/F) sensor 1 Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor



DTC Confirmation Procedure

NIEC1365

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

④ With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-960.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-960. If engine does not start, visually check for exhaust and intake air leak.

④ With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-960.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-960. If engine does not start, visually check for exhaust and intake air leak.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1366

EC-FUEL-01

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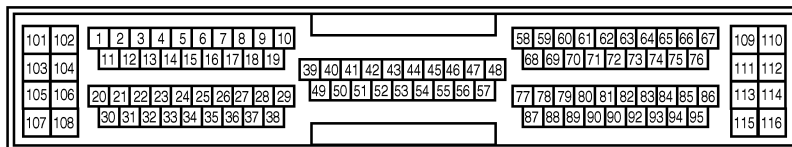
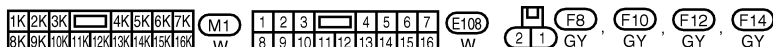
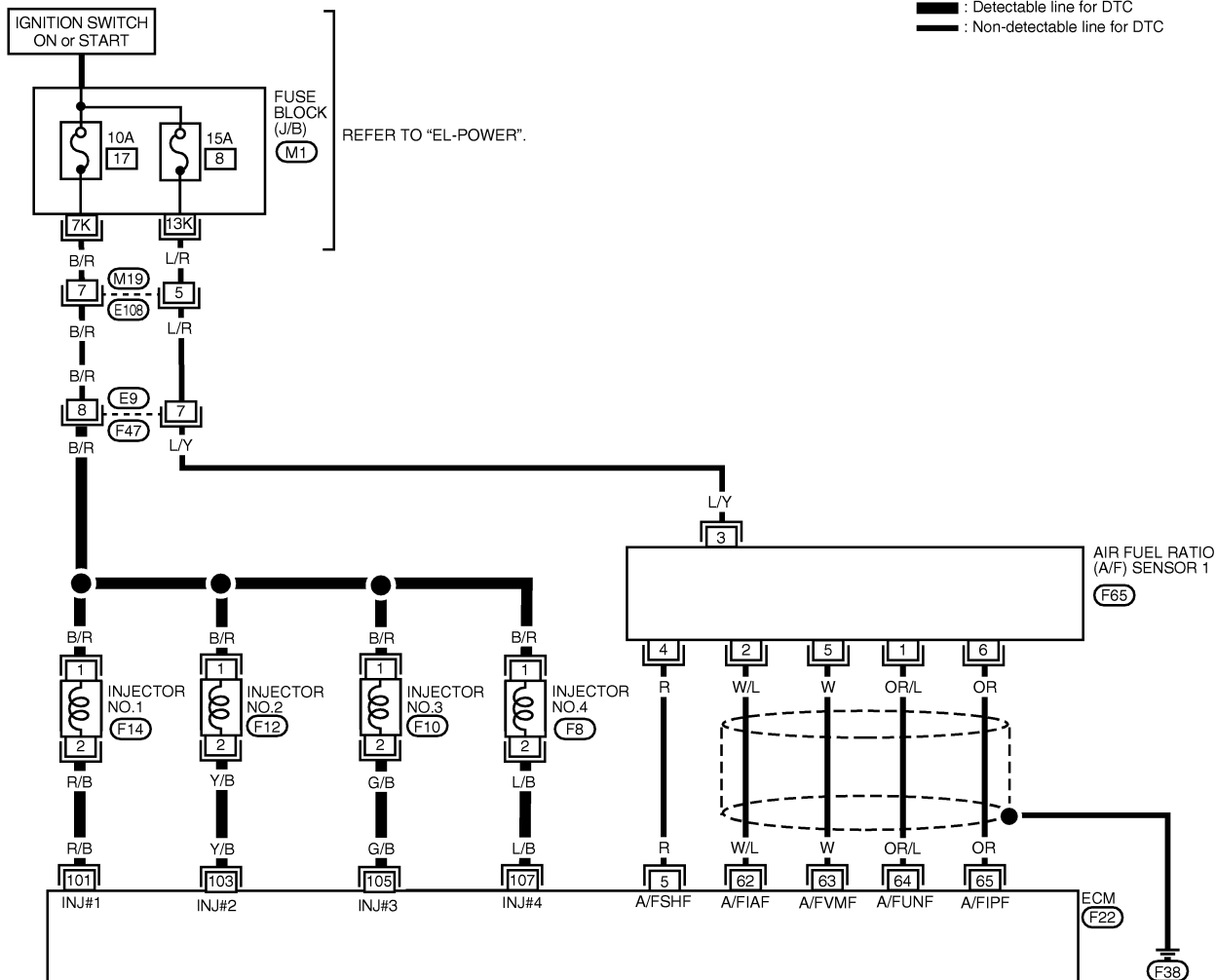
HA

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— : Detectable line for DTC
 - - - : Non-detectable line for DTC



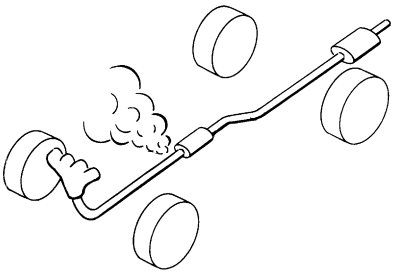
DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

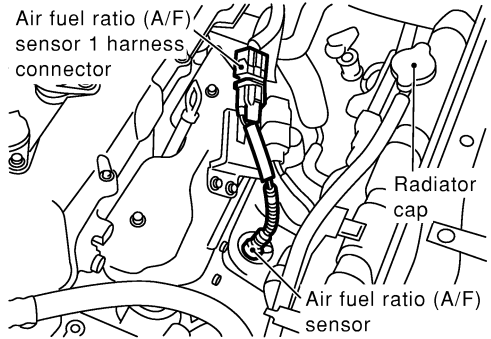
NIEC1367

1	CHECK EXHAUST AIR LEAK
1. Start engine and run it at idle. 2. Listen for an exhaust air leak before TWC (Manifold three way catalyst).	
 A line drawing of an exhaust manifold with four pipes extending from it. A hand is shown pointing to a cloud of smoke or steam coming from one of the pipes, indicating an air leak.	
SEF099P	
OK or NG	
OK	▶ GO TO 2.
NG	▶ Repair or replace.

2	CHECK FOR INTAKE AIR LEAK
Listen for an intake air leak after the mass air flow sensor.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect A/F sensor 1 harness connector and ECM harness connector.</p> <div style="text-align: center;">  </div> <p>3. Check harness continuity between ECM terminals and A/F sensor 1 terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">A/F sensor 1</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">65</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">SEF393Z</p> <p style="text-align: right; margin-right: 20px;">MTBL0538</p> <p style="color: blue; margin-left: 20px;">Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 and ground, or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p style="color: blue; margin-left: 20px;">Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	ECM terminal	A/F sensor 1	62	2	63	5	64	1	65	6	GI MA EM LC EC FE CL MT AT AX SU BR
ECM terminal	A/F sensor 1												
62	2												
63	5												
64	1												
65	6												
OK	▶	GO TO 4.											
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.											

4	CHECK FUEL PRESSURE	<p>1. Release fuel pressure to zero. Refer to EC-743.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="color: blue; margin-left: 20px;">At idling: 350 kPa (3.57 kg/cm², 51 psi)</p> <p style="text-align: center;">OK or NG</p>	ST RS BT HA
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

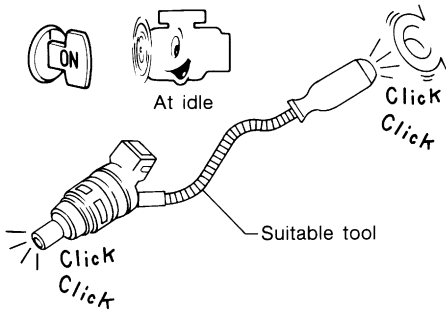
5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to EC-1333. ● Fuel lines. Refer to MA-19, "Checking Fuel Lines". ● Fuel filter for clogging <p style="text-align: center;">OK or NG</p>	SC EL IDX
OK	▶	Replace fuel pressure regulator.	
NG	▶	Repair or replace.	

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

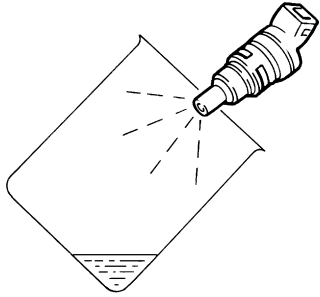
6	CHECK MASS AIR FLOW SENSOR	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Install all removed parts. 2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec 		
<p>Ⓜ With GST</p> <ol style="list-style-type: none"> 1. Install all removed parts. 2. Check mass air flow sensor signal in MODE 1 with GST. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec 		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-846.

7	CHECK FUNCTION OF INJECTORS																	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 																		
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																		
POWER BALANCE																		
MONITOR																		
ENG SPEED	XXX rpm																	
MAS A/F SE-B1	XXX V																	
IACV-AAC/V	XXX step																	
SEF190Y																		
<ol style="list-style-type: none"> 3. Make sure that each circuit produces a momentary engine speed drop. 																		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Listen to each injector operating sound. 																		
																		
MEC703B																		
Clicking noise should be heard.																		
OK or NG																		
OK	▶	GO TO 8.																
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-1324.																

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

8	REMOVE INJECTOR	<ol style="list-style-type: none"> 1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle. 2. Turn ignition switch "OFF". 3. Remove injector with fuel tube assembly. Refer to EC-744. Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected. 	GI MA EM
▶		GO TO 9.	

9	CHECK INJECTOR	<ol style="list-style-type: none"> 1. Disconnect all ignition wires. 2. Place pans or saucers under each injector. 3. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors. <div style="text-align: center; margin: 20px 0;">  <p style="font-size: small;">SEF595Q</p> </div> <p style="text-align: center; margin-top: 10px;">Fuel should be sprayed evenly for each cylinder.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	LC EC FE CL MT AT AX
OK ▶		GO TO 10.	
NG ▶		Replace injectors from which fuel does not spray out. Always replace O-ring with new one.	

10	CHECK INTERMITTENT INCIDENT	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	BR
▶		INSPECTION END	ST RS BT HA SC EL IDX

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)

On Board Diagnosis Logic

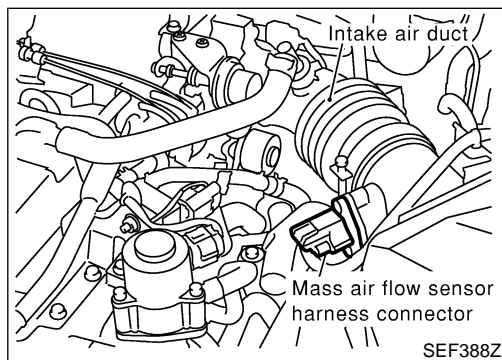
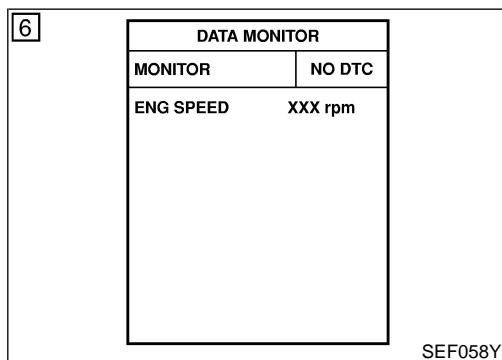
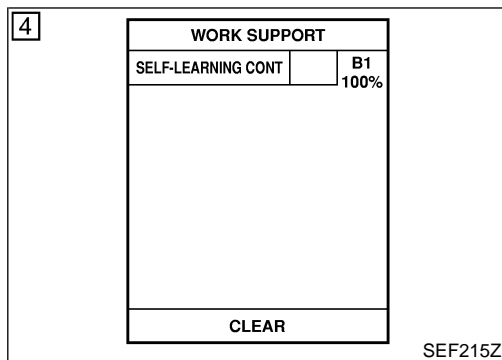
On Board Diagnosis Logic

NIEC1368

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the air fuel ratio (A/F) sensor 1. The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios. In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Air fuel ratio (A/F) sensor 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0172	<ul style="list-style-type: none"> ● Fuel injection system does not operate properly. ● The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) 	<ul style="list-style-type: none"> ● Air fuel ratio (A/F) sensor 1 ● Injectors ● Exhaust gas leaks ● Incorrect fuel pressure ● Mass air flow sensor



DTC Confirmation Procedure

NIEC1369

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- 4) Clear the self-learning control coefficient by touching "CLEAR" or "START".
- 5) Select "DATA MONITOR" mode with CONSULT-II.
- 6) Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-967.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- 8) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-967. If engine does not start, remove ignition plugs and check for fouling, etc.

Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- 4) Stop engine and reconnect mass air flow sensor harness connector.
- 5) Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- 6) Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-967. GI
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction. MA
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-967. If engine does not start, remove ignition plugs and check for fouling, etc. EM

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DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)

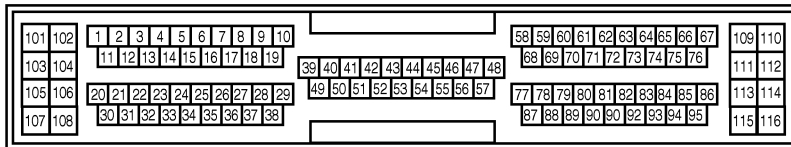
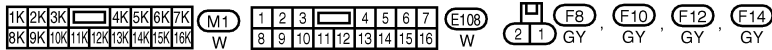
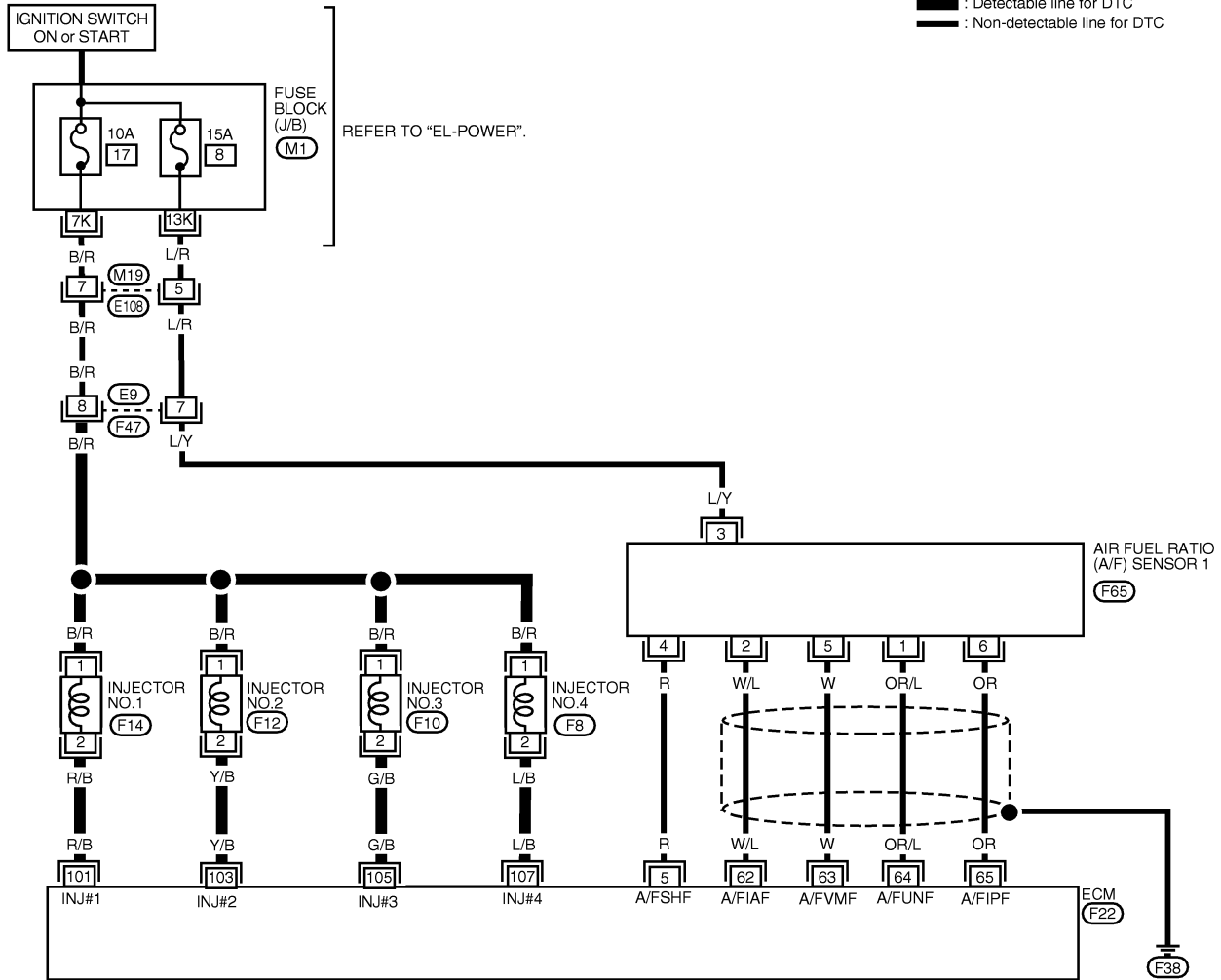
Wiring Diagram

Wiring Diagram

NIEC1370

EC-FUEL-01

: Detectable line for DTC
 : Non-detectable line for DTC



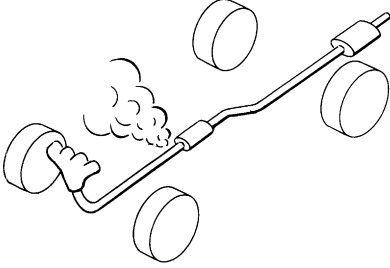
DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

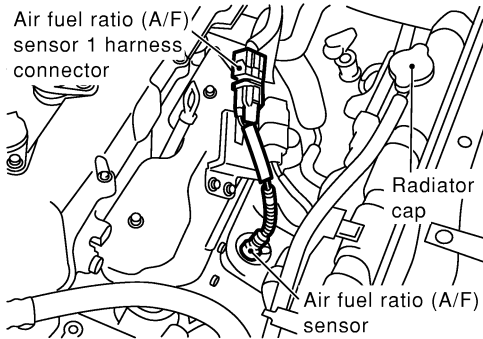
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1371

1	CHECK FOR EXHAUST AIR LEAK	<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before TWC (Manifold three way catalyst).</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF099P</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL
OK	▶	GO TO 2.	
NG	▶	Repair or replace.	

2	CHECK AIR FUEL RATIO (A/F) SENSOR 1 CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect A/F sensor 1 harness connector and ECM harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF393Z</p> <p>3. Check harness continuity between ECM terminals and A/F sensor 1 terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">A/F sensor 1</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">65</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0538</p> <p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 and ground, or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	ECM terminal	A/F sensor 1	62	2	63	5	64	1	65	6	MT AT AX SU BR ST RS BT HA SC EL IDX
ECM terminal	A/F sensor 1												
62	2												
63	5												
64	1												
65	6												
OK	▶	GO TO 3.											
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.											



DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-743.</p> <p>2. Install fuel pressure gauge and check fuel pressure. At idling: Approximately 350 kPa (3.57 kg/cm², 51 psi)</p> <p style="text-align: right;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-1333.) <p style="text-align: right;">OK or NG</p>		
OK	▶	Replace fuel pressure regulator.
NG	▶	Repair or replace.

5	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p> <p style="text-align: right;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-846.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

6 CHECK FUNCTION OF INJECTORS

Ⓜ With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

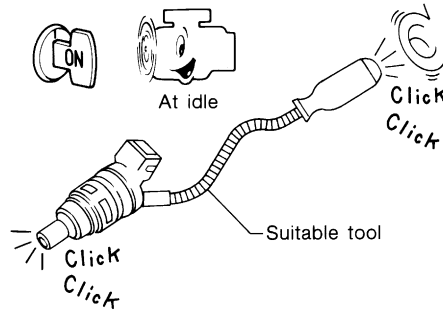
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

ⓧ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 7.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-1324.

7 REMOVE INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector assembly. Refer to EC-744.
Keep fuel hose and all injectors connected to injector gallery.

▶ GO TO 8.

8 CHECK INJECTOR

1. Disconnect all injector harness connectors.
2. Disconnect all ignition coil harness connectors.
3. Prepare pans or saucers under each injectors.
4. Crank engine for about 3 seconds.
Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip)	▶	GO TO 9.
NG (Drips)	▶	Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

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DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

QG18DE (CALIF CA)

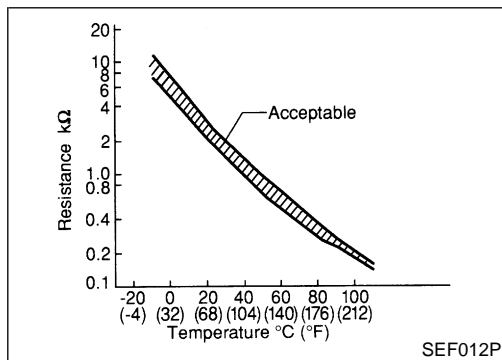
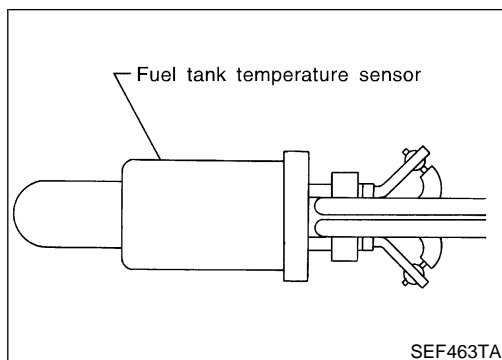
Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1372

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

GI
MA
EM
LC

<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

EC

FE

*: These data are reference values and are measured between ECM terminal 82 (Fuel tank temperature sensor) and ground.

CL

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may lead the ECM's transistor damage. Use ground other than ECM, such as body ground.

MT

AT

AX

SU

BR

On Board Diagnosis Logic

NIEC1373

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0180	<ul style="list-style-type: none"> An excessively high or low voltage is sent to ECM. Rationally incorrect voltage is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Fuel tank temperature sensor

ST

RS

BT

HA

3

DATA MONITOR	
MONITOR	DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
INT/A TEMP/S	XXX °C

SEF475Y

DTC Confirmation Procedure

NIEC1374

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

SC

EL

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-974.

IDX

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

If the result is OK, go to following step.

- 4) Check "COOLAN TEMP/S" signal.
If the signal is less than 50°C (122°F), the result will be OK.
If the signal is above 50°C (122°F), go to the following step.
- 5) Cool engine down until "COOLAN TEMP/S" signal is less than 50°C (122°F).
- 6) Wait at least 10 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-974.



With GST

Follow the procedure "With CONSULT-II" above.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (CALIF CA)

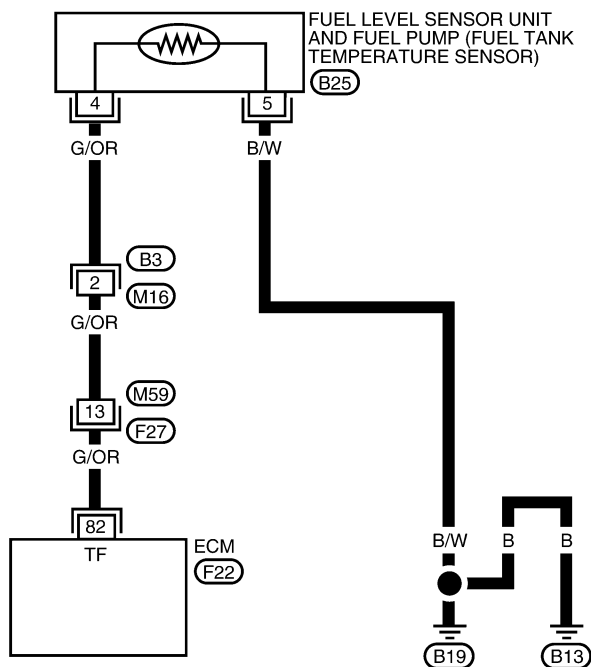
Wiring Diagram

Wiring Diagram

NIEC1375

EC-FTTS-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



1	2	3	4	5	6	7	8	9	(B3)		
10	11	12	13	14	15	16	17	18	19	20	W

5	4	3	2	1	(B25)	GY
---	---	---	---	---	-------	----

101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38	87	88	89	90	91	92	93	94	95	115	116											



1	2	3	4	5	6	7	(F27)		
8	9	10	11	12	13	14	15	16	BR

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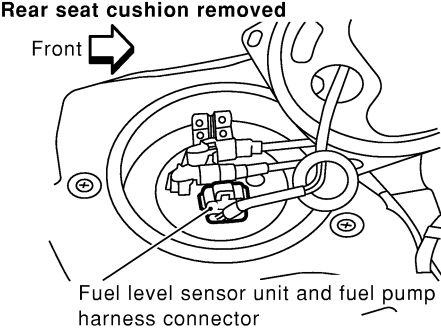
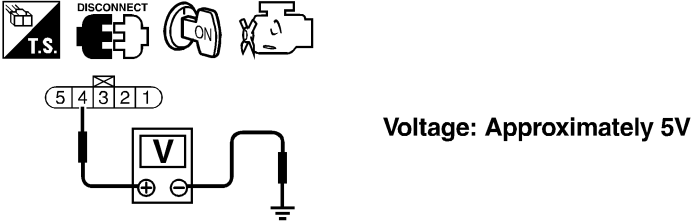
DTC P0180 FUEL TANK TEMPERATURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1376

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect fuel level sensor unit and fuel pump harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OK or NG</p>	SEF396Z
		SEF586X	
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M59, F27 ● Harness connectors B3, M16 ● Harness for open or short between ECM and fuel level sensor unit and fuel pump <p style="text-align: center;">▶ Repair harness or connector.</p>	
----------	-----------------------------------	---	--

3	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between fuel level sensor unit and fuel pump terminal 3 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶	GO TO 4.
	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

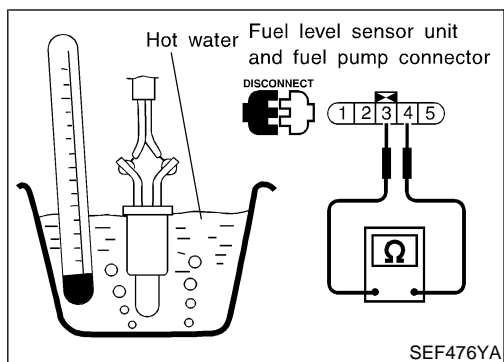
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK FUEL TANK TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-975.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel level sensor unit and fuel pump.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
	▶	INSPECTION END

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Component Inspection

FUEL TANK TEMPERATURE SENSOR

NIEC1377

NIEC1377S01

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel level sensor unit and fuel pump.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

System Description

System Description

NIEC1378

COOLING FAN CONTROL

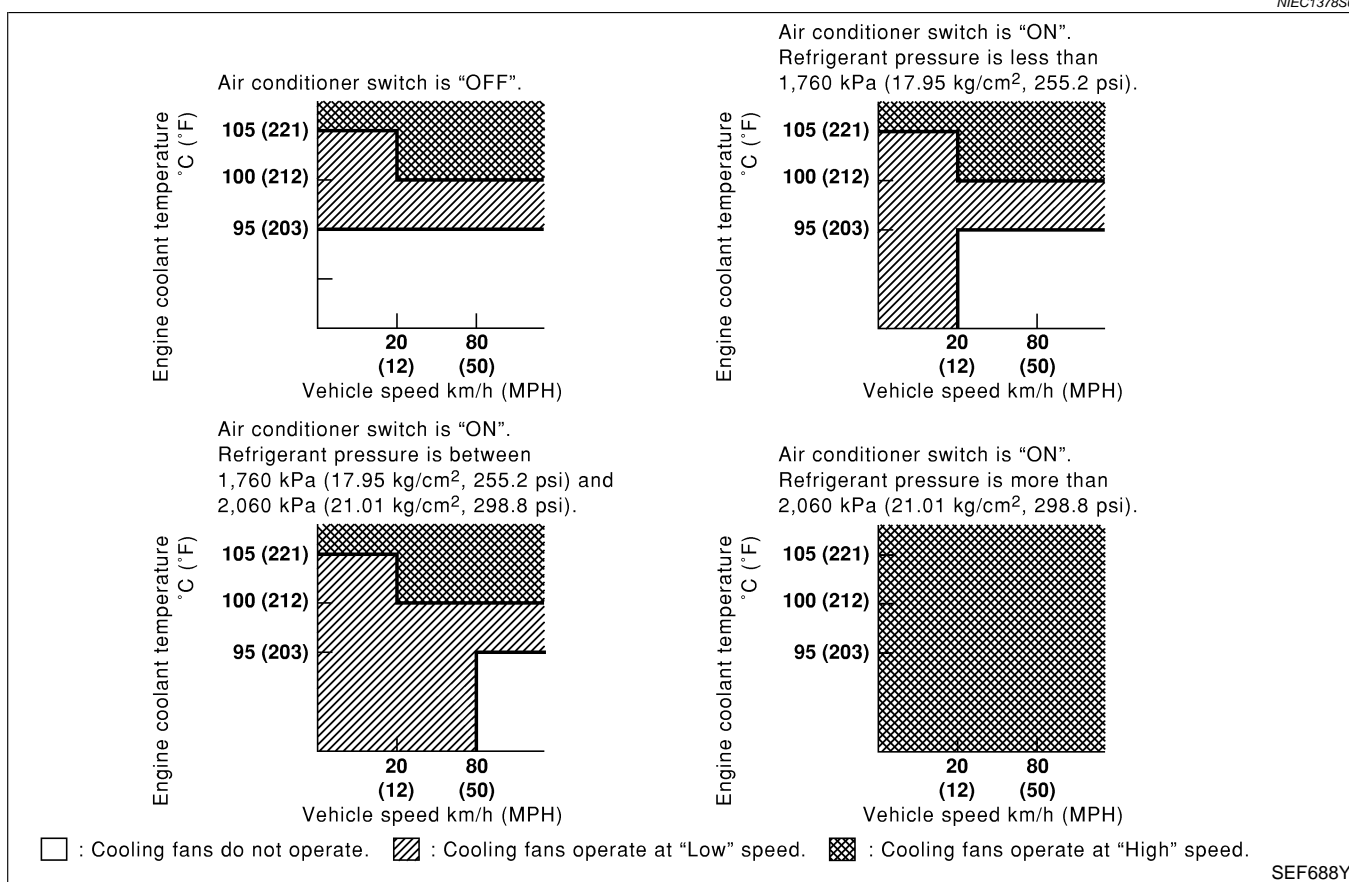
NIEC1378S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC1378S02



SEF688Y

CONSULT-II Reference Value in Data Monitor Mode

NIEC1379

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF OFF
	Air conditioner switch: ON (Compressor operates)	ON

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less
	Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)	OFF
	Engine coolant temperature is 105°C (221°F) or more	LOW
		HIGH

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On Board Diagnosis Logic

NIEC1380

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy. When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip. Malfunction is detected when engine coolant temperature is excessively high under normal engine speed.

Possible Cause

NIEC1381

- Harness or connectors (The cooling fan circuit is open or shorted)
- Cooling fan
- Thermostat
- Improper ignition timing
- Engine coolant temperature sensor
- Blocked radiator
- Blocked front end (Improper fitting of nose mask)
- Crushed vehicle frontal area (Vehicle frontal is collided but not repaired)
- Blocked air passage by improper installation of front fog lamp or fog lamps.
- Improper mixture ratio of coolant
- Damaged bumper

For more information, refer to “Main 12 Causes of Overheating”, EC-994.

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-17, “Changing Engine Coolant”. Also, replace the engine oil. Refer to MA-20, “Changing Engine Oil”.

- 1) **Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-15, “Anti-Freeze Coolant Mixture Ratio”.**
- 2) **After refilling coolant, run engine to ensure that no water-flow noise is emitted.**

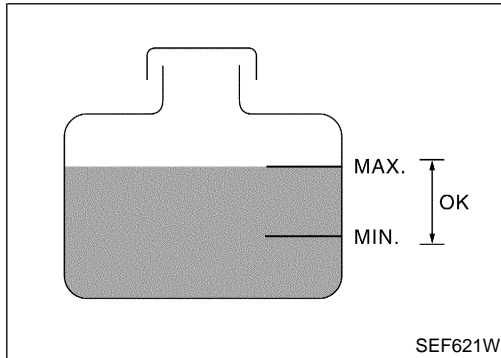
Overall Function Check

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed. NIEC1382

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.



WITH CONSULT-II

1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NIEC1382S01

Allow engine to cool before checking coolant level and mixture ratio.

- If the coolant level in the reservoir and/or radiator is below the proper range, go to “Diagnostic Procedure”, EC-983.
- If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, “Changing Engine Coolant”.

a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, “Anti-Freeze Coolant Mixture Ratio”.

b) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

c) After checking or replacing coolant, go to step 3 below.

2) Ask the customer if engine coolant has been added. If it has been added, go to “Diagnostic Procedure”, EC-983. After repair, go to the next step.

3) Start engine and let it idle.

4) Make sure that A/C switch is “OFF” and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-19** “TROUBLE DIAGNOSES”. After repair, go to the next step.

5) Perform “ENG COOLANT TEMP” in “ACTIVE TEST” mode with CONSULT-II at idle.

a) Set “ENG COOLANT TEMP” to 95°C (203°F) and make sure that cooling fan operates at low speed. If NG, go to “Diagnostic Procedure”, EC-983.

b) Set “ENG COOLANT TEMP” to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to “Diagnostic Procedure”, EC-983. After repair, go to the next step.

6) Check for blocked coolant passage.

a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.

If NG, go to “Diagnostic Procedure”, EC-983. After repair, go to the next step.

Be extremely careful not to touch any moving or adjacent parts.

7) Check for blocked radiator air passage.

a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.

b) Check the front end for clogging caused by insects or debris.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step. GI
- 8) Check function of ECT sensor.
Refer to step 7 of "Diagnostic Procedure", EC-983.
If NG, replace ECT sensor and go to the next step. MA
- 9) Check ignition timing. Refer to "Basic Inspection", EC-798.
Make sure that ignition timing is $9^{\circ}\pm 2^{\circ}$ at idle.
If NG, follow the procedure under "Basic Inspection". EM

WITH GST

- 1) Check the coolant level and mixture ratio (using coolant tester) ^{NIEC1382S02} in the reservoir tank and radiator. LC
Allow engine to cool before checking coolant level and mixture ratio.
 - If the coolant level in the reservoir and/or radiator is below the proper range, and go to "Diagnostic Procedure", EC-983. EC
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, "Changing Engine Coolant". FE
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, "Anti-Freeze Coolant Mixture Ratio". CL
- b) After refilling coolant, run engine to ensure that no water-flow noise is emitted. MT
- c) After checking or replacing coolant, go to step 3 below. AT
- 2) Ask the customer if engine coolant has been added. If it has been added, go to "Diagnostic Procedure", EC-983. After repair, go to the next step. AX
- 3) Start engine and let it idle. SU
- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-19**, "TROUBLE DIAGNOSES". After repair, go to the next step. BR
- 5) Turn ignition switch "OFF" ST
- 6) Disconnect engine coolant temperature sensor harness connector. RS
- 7) Connect 150Ω resistor to engine coolant temperature sensor. BT
- 8) Start engine and make sure that cooling fan operates.
Be careful not to overheat engine.
If NG, go to "Diagnostic Procedure", EC-983. After repair, go to the next step. HA
- 9) Check for blocked coolant passage. SC
 - a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.
If NG, go to "Diagnostic Procedure", EC-983. After repair, go to the next step.
Be extremely careful not to touch any moving or adjacent parts. EL
- 10) Check for blocked radiator air passage. IDX
 - a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
 - b) Check the front end for clogging caused by insects or debris.
 - c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step.

EC-979

**DTC P0217 COOLANT OVERTEMPERATURE
ENRICHMENT PROTECTION**

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- 11) Check function of ECT sensor.
Refer to step 6 of "Diagnostic Procedure", EC-983.
If NG, replace ECT sensor and go to the next step.
- 12) Check ignition timing. Refer to "Basic Inspection", EC-798.
Make sure that ignition timing is $9^{\circ}\pm 2^{\circ}$ at idle.
If NG, follow the procedure under "Basic Inspection".

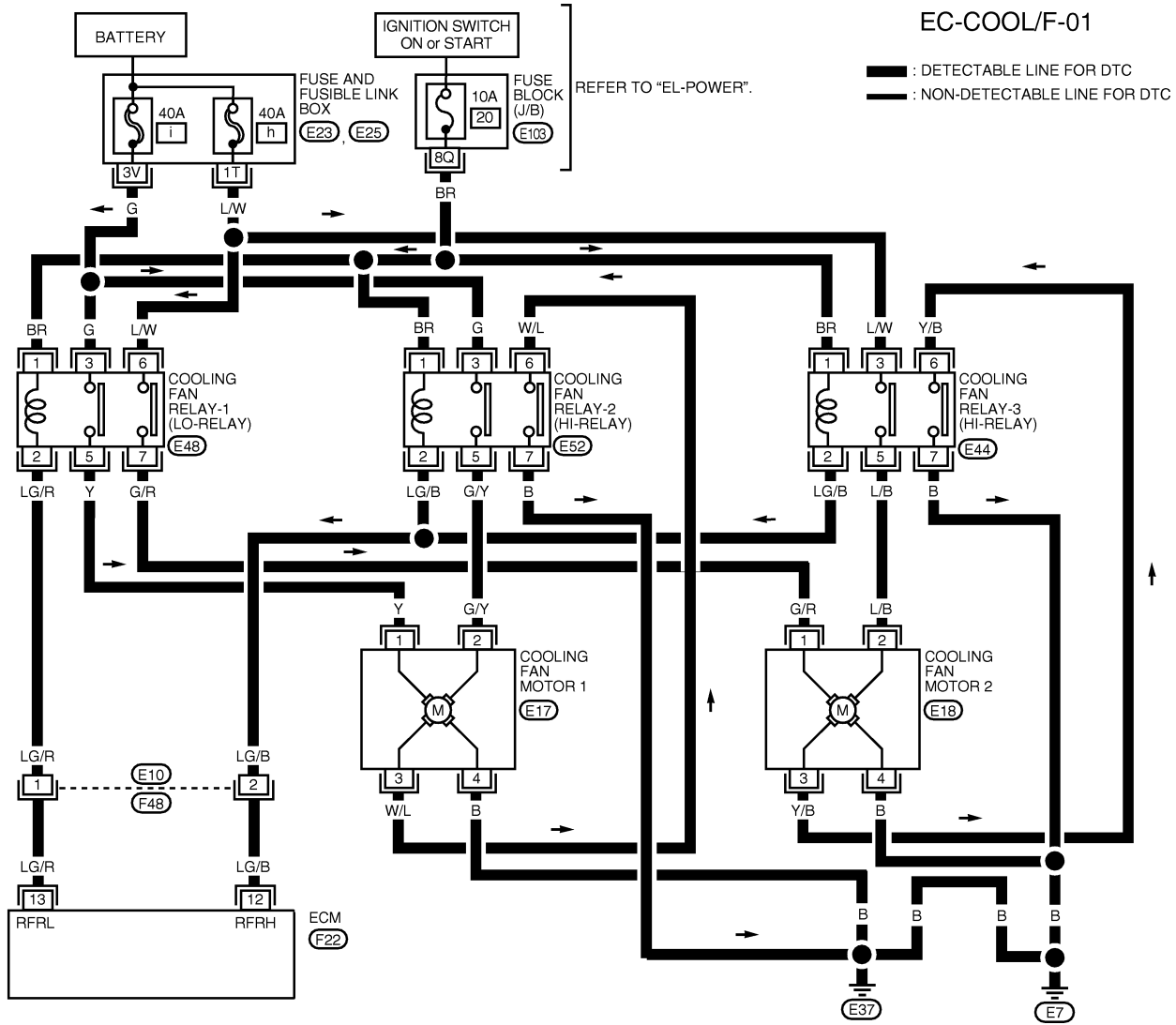
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

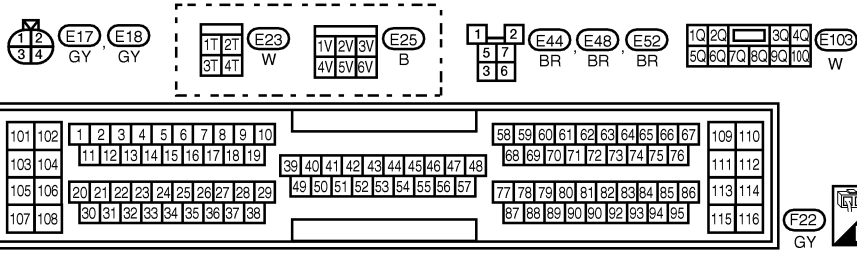
Wiring Diagram — Early Production

Wiring Diagram — Early Production

=NIEC1383



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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SC
EL
IDX

SEF571Y

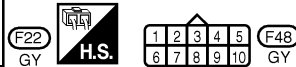
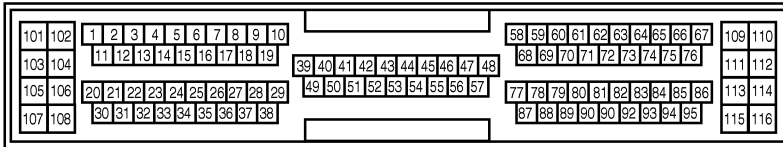
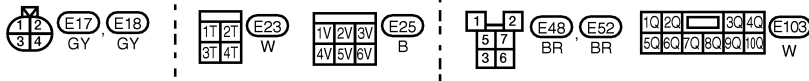
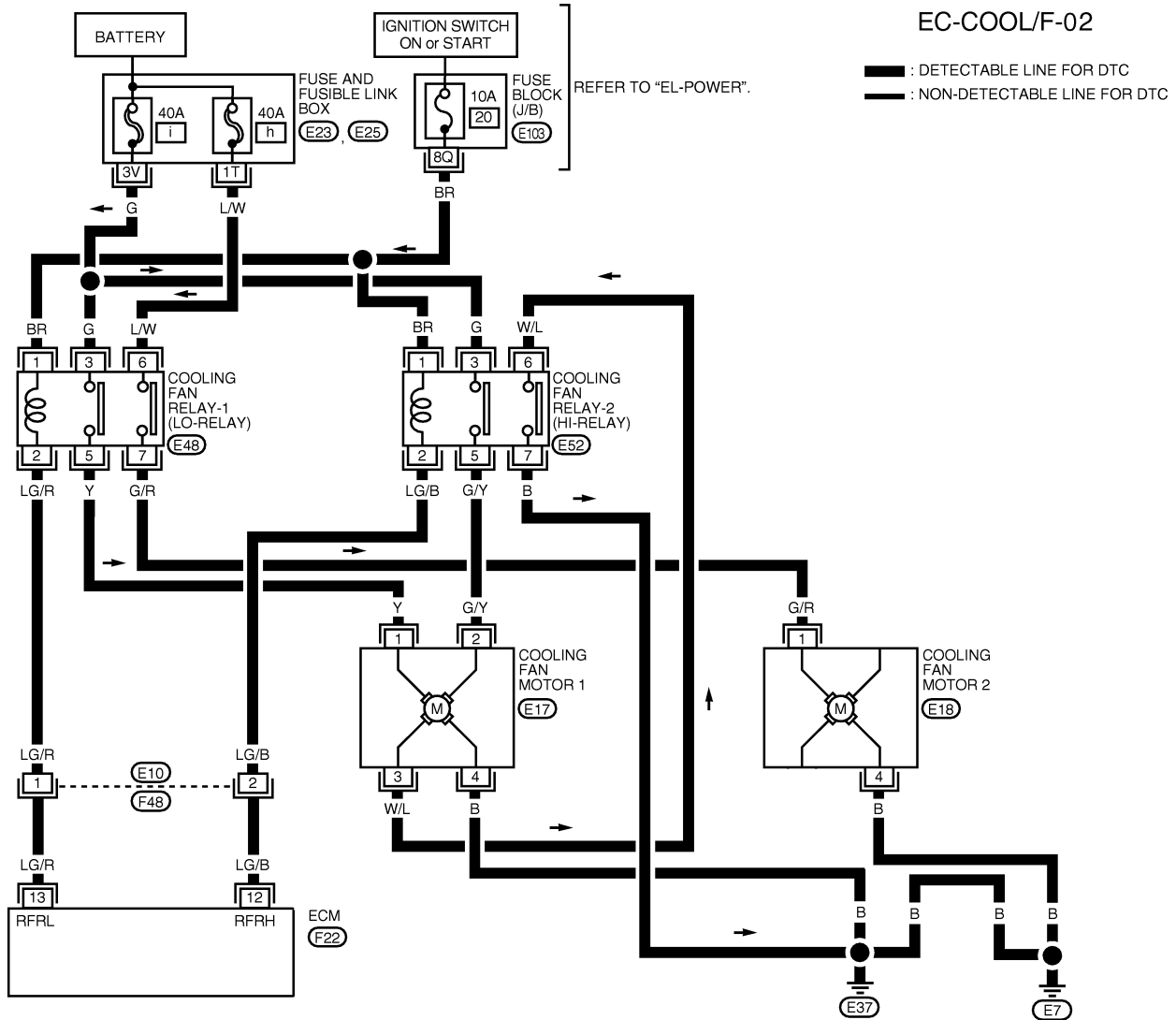
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Wiring Diagram — Late Production

Wiring Diagram — Late Production

NIEC1734



WEC129A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SEF571Y

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1384

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

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2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p>With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3 (early production).</p> <div style="text-align: center;"> </div> <p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> <tr> <th style="text-align: center;">COOLING FAN</th> <th style="text-align: center;">OFF</th> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <th style="text-align: center;">COOLAN TEMP/S</th> <th style="text-align: center;">XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	OFF																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-989.)																								

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																							
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Turn ignition switch "ON". 4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C														
ACTIVE TEST																								
COOLING FAN	OFF																							
MONITOR																								
COOLAN TEMP/S	XXX °C																							
SEF646X																								
<p>5. Make sure that cooling fans-1 and -2 (early production) operate at high speed.</p> <p style="text-align: center;">OK or NG</p>																								
OK	▶	GO TO 6.																						
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-992.)																						

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

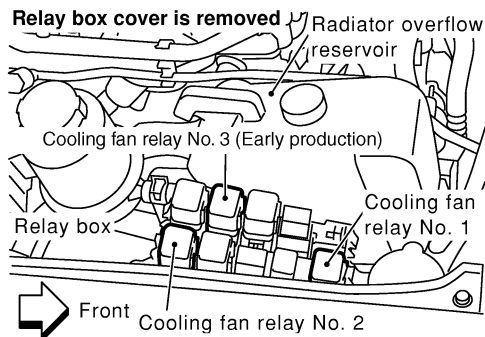
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

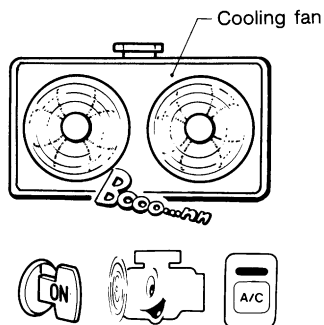
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3 (early production).



2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.

LEC130A



SEC163BA

OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-989.)

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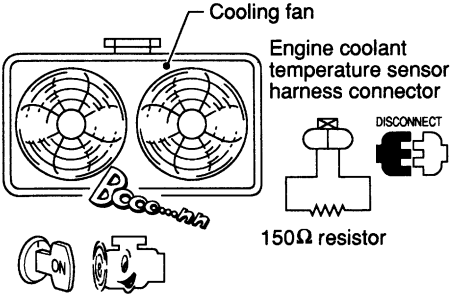
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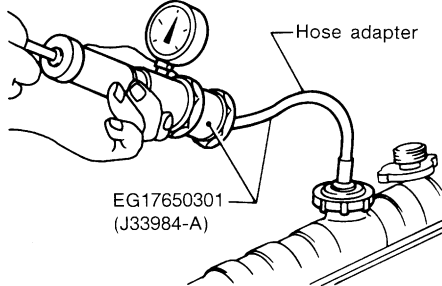
IDX

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

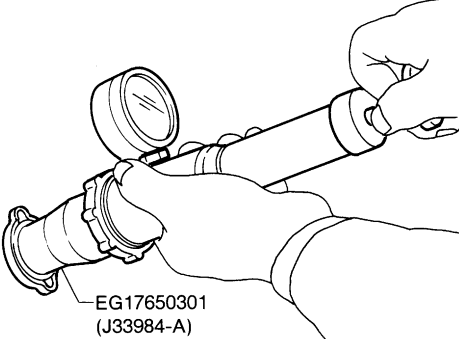
5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Turn air conditioner switch and blower fan switch "OFF". 4. Disconnect engine coolant temperature sensor harness connector. 5. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 6. Restart engine and make sure that cooling fans-1 and -2 (early production) operate at high speed. 	
 <p style="text-align: right;">MEC475B</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-992.)

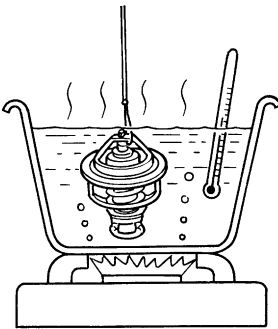
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p style="color: red;">CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
 <p style="text-align: right;">SLC754A</p>	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
<p>Check the following for leak.</p> <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump (Refer to LC-12, "Water Pump".) 	
▶	Repair or replace.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

8	CHECK RADIATOR CAP		
Apply pressure to cap with a tester and check radiator cap relief pressure.			
			
<p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p>			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace radiator cap.	

9	CHECK THERMOSTAT		
<ol style="list-style-type: none"> 1. Remove thermostat. 2. Check valve seating condition at normal room temperatures. It should seat tightly. 3. Check valve opening temperature and valve lift. 			
			
<p>Valve opening temperature: 76.5°C (170°F) [standard]</p> <p>Valve lift: More than 9 mm/90°C (0.35 in/194°F)</p>			
4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-13 , "Thermostat".			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Replace thermostat	

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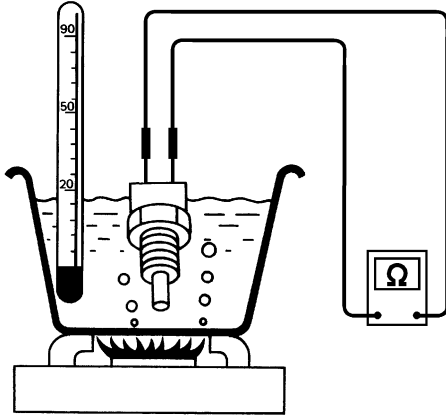
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

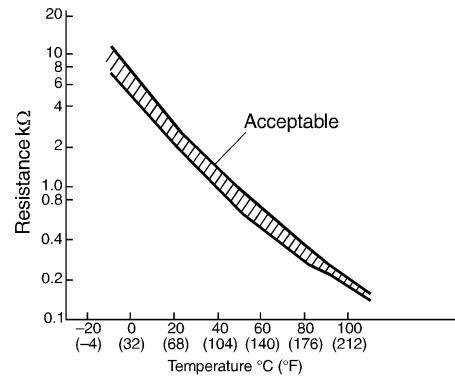
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK ► GO TO 11.

NG ► Replace engine coolant temperature sensor.

11 CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to "Main 12 Causes of Overheating", EC-994.

► **INSPECTION END**

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC1384S01

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;"> </div> <p style="color: blue; margin-left: 20px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>		
OK		▶ GO TO 3.
NG		▶ GO TO 2.

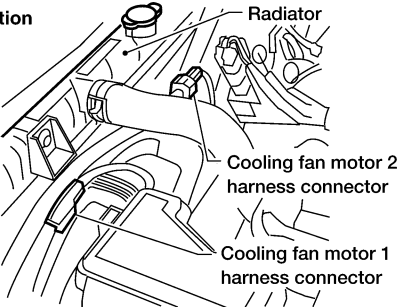
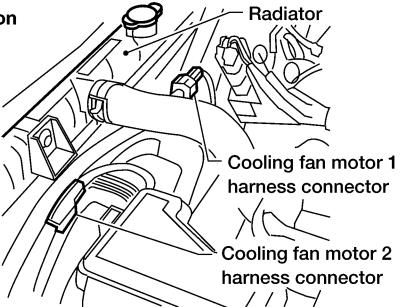
2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible links ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

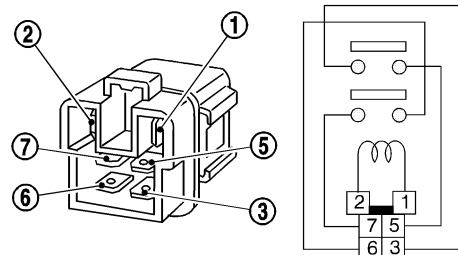
3	CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p>		
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>Early production</p>  </div> <div style="text-align: center;"> <p>Late production</p>  </div> </div> <p style="text-align: right; margin-right: 50px;">WEC131A</p>		
<p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-981 or "Wiring Diagram — Late Production", EC-982.</p> <p style="margin-left: 20px;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-981 or "Wiring Diagram — Late Production", EC-982.</p> <p style="margin-left: 20px;">Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

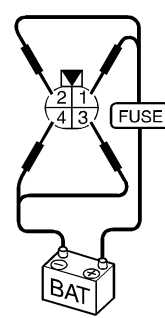

4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram — Early Production", EC-981 or "Wiring Diagram — Late Production", EC-982.</p> <p style="margin-left: 20px;">Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relay-1 and ECM 		
OK or NG		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN RELAY-1								
Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.									
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity								
12V direct current supply between terminals 1 and 2	Yes								
No current supply	No								
		SEF591X							
OK or NG									
OK		▶ GO TO 7.							
NG		▶ Replace cooling fan relay.							

7	CHECK COOLING FAN MOTORS-1 AND -2																			
Supply battery voltage between the following terminals and check operation.																				
		 <p style="font-size: small;">Cooling fan motor -1 or -2 harness connector</p>																		
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2 (Early production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Cooling fan motor -2 (Late production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2 (Early production)	Low	1	4	High	1, 2	3, 4	Cooling fan motor -2 (Late production)	Low	1	4
	Speed	Terminals																		
		(+)	(-)																	
Cooling fan motor -1 or -2 (Early production)	Low	1	4																	
	High	1, 2	3, 4																	
Cooling fan motor -2 (Late production)	Low	1	4																	
		LEC132A																		
OK or NG																				
OK		▶ GO TO 8.																		
NG		▶ Replace cooling fan motors.																		

8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.			
		▶ INSPECTION END	

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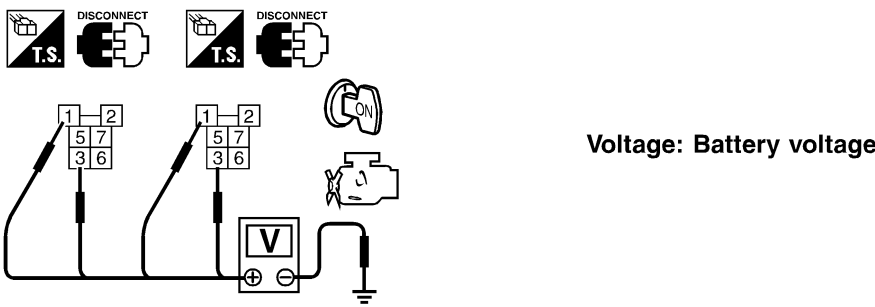
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC1384S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3 (early production). 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 (early production) terminals 1, 3 and ground with CONSULT-II or tester.</p>	
	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

SEF593X

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fuse ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fusible link 	
▶	Repair harness or connectors.

3	CHECK COOLING FAN GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-981 or "Wiring Diagram — Late Production", EC-982. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power. 5. For early production models, check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-981. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

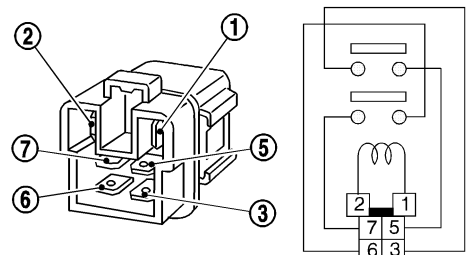
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

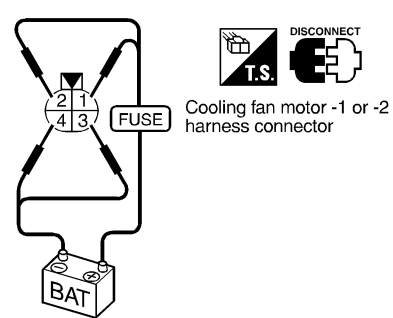
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 (early production) terminal 2. Refer to "Wiring Diagram — Early Production", EC-981 or "Wiring Diagram — Late Production", EC-982.</p> <p style="color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relays-2 and -3 (early production) and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK COOLING FAN RELAYS-2 AND -3 (EARLY PRODUCTION)	
<p>Check continuity between cooling fan relay-2, -3 (early production) terminals 3 and 5, 6 and 7 under the following conditions.</p>		
		
SEF591X		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.

7	CHECK COOLING FAN MOTORS-1 AND -2	
<p>Supply battery voltage between the following terminals and check operation.</p>		
		
LEC132A		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	INSPECTION END

Main 12 Causes of Overheating

NIEC1385

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-10 , "System Check".
ON*2	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-10 , "System Check".
ON*2	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-13 , "Thermostat" and LC-15 , "Radiator".
ON*1	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for DTC P0217 (EC-976).
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight edge, feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-34 , "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-55 , "Inspection".

*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to **LC-19**, "Overheating Cause Analysis".

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC1386

When a misfire occurs, engine speed will fluctuate. If the engine speed fluctuates enough to cause the crankshaft position sensor (POS) signal to vary, the ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (POS)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. On the first trip that a misfire condition occurs that can damage the TWC (Manifold three way catalyst) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the crankshaft position sensor (POS) signal every 200 engine revolutions for a change.

When the misfire condition decreases to a level that will not damage the TWC (Manifold three way catalyst), the MIL will turn off.

If another misfire condition occurs that can damage the TWC (Manifold three way catalyst) on a second trip, the MIL will blink.

When the misfire condition decreases to a level that will not damage the TWC (Manifold three way catalyst), the MIL will remain on.

If another misfire condition occurs that can damage the TWC (Manifold three way catalyst), the MIL will begin to blink again.

2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not damage the TWC (Manifold three way catalyst) (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the crankshaft position sensor (POS) signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0300	<ul style="list-style-type: none"> Multiple cylinders misfire. 	<ul style="list-style-type: none"> Improper spark plug Insufficient compression Incorrect fuel pressure EGR volume control valve The injector circuit is open or shorted Injectors Intake air leak The ignition secondary circuit is open or shorted Lack of fuel Drive plate Air fuel ratio (A/F) sensor 1
P0301	<ul style="list-style-type: none"> No. 1 cylinder misfires. 	
P0302	<ul style="list-style-type: none"> No. 2 cylinder misfires. 	
P0303	<ul style="list-style-type: none"> No. 3 cylinder misfires. 	
P0304	<ul style="list-style-type: none"> No. 4 cylinder misfires. 	

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1387

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
Hold the accelerator pedal as steady as possible.

NOTE:

Refer to the freeze frame data for the test driving conditions.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-996.

 **With GST**

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NIEC1388

1	CHECK FOR INTAKE AIR LEAK	
1. Start engine and run it at idle speed. 2. Listen for the sound of the intake air leak.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Discover air leak location and repair.

2	CHECK FOR EXHAUST SYSTEM CLOGGING	
Stop engine and visually check exhaust tube, TWC (Manifold three way catalyst) and muffler for dents.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace it.

3	CHECK EGR FUNCTION	
Perform DTC Confirmation Procedure for DTC P1402 EGR FUNCTION (OPEN). Refer to EC-1246.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair EGR system.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4 PERFORM POWER BALANCE TEST

☑ With CONSULT-II

1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.

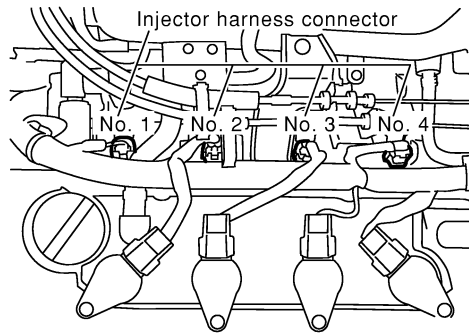
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

2. Is there any cylinder which does not produce a momentary engine speed drop?

☒ Without CONSULT-II

When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?



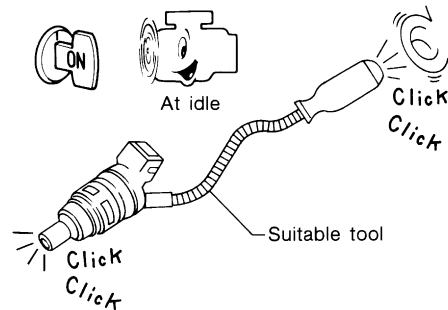
SEF398Z

Yes or No

- | | | |
|-----|---|----------|
| Yes | ▶ | GO TO 5. |
| No | ▶ | GO TO 8. |

5 CHECK INJECTOR

Does each injector make an operating sound at idle?



MEC703B

Yes or No

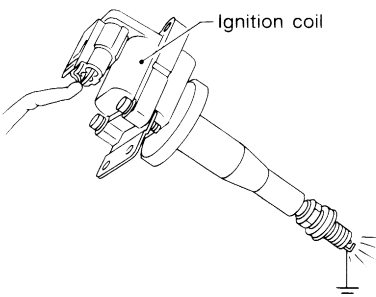
- | | | |
|-----|---|---|
| Yes | ▶ | GO TO 6. |
| No | ▶ | Check injector(s) and circuit(s). Refer to EC-1324. |

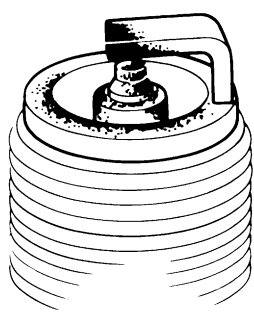
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DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

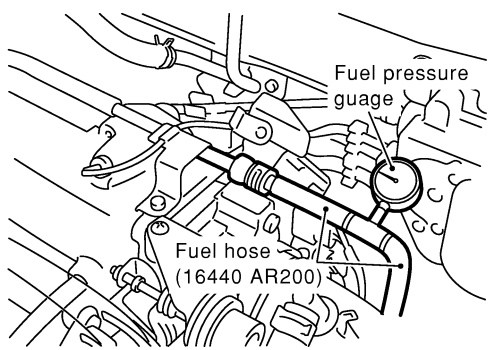
6	CHECK IGNITION SPARK		
<p>1. Turn Ignition switch "OFF". 2. Remove ignition coil from the engine. 3. Place end of spark plug against a suitable ground and crank engine. 4. Check for spark properly.</p>			
			
SEF575Q			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	GO TO 7.	

7	CHECK SPARK PLUGS		
Check the spark plugs for fouling, etc.			
			
SEF156I			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	Repair or replace ignition coil.	

8	CHECK COMPRESSION PRESSURE		
Refer to EM-88 , "Measurement of Compression Pressure".			
<ul style="list-style-type: none"> ● Check compression pressure. <ul style="list-style-type: none"> Standard: 1,324 kPa (13.5 kg/cm², 192 psi)/300 rpm Minimum: 1,128 kPa (11.5 kg/cm², 164 psi)/300 rpm Difference between each cylinder: 98 kPa (1.0 kg/cm², 14 psi)/300 rpm 			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Check pistons, piston rings, valves, valve seats and cylinder head gaskets.	

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

9	CHECK FUEL PRESSURE		
<p>1. Install any parts removed. 2. Release fuel pressure to zero. Refer to "Fuel Pressure Release", EC-743. 3. Install fuel pressure gauge and check fuel pressure.</p>			
			
<p>At idle: Approx. 350 kPa (3.57 kg/cm², 51 psi)</p>			
OK or NG			
OK		▶	GO TO 11.
NG		▶	GO TO 10.

10	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to "Fuel Pump", EC-1333. ● Fuel lines. Refer to MA-19, "Checking Fuel Lines". ● Fuel filter for clogging 			
OK or NG			
NG		▶	Replace fuel pressure regulator.
OK		▶	Repair or replace.

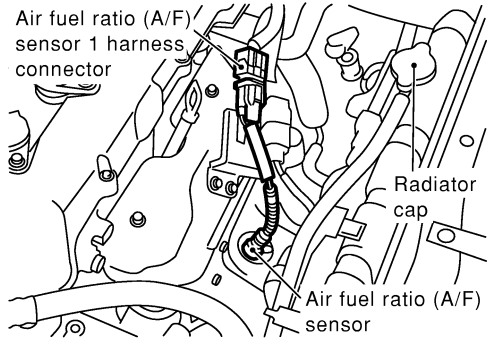
11	CHECK IGNITION TIMING		
<p>Perform "Basic Inspection", EC-798.</p>			
OK or NG			
OK		▶	GO TO 12.
NG		▶	Adjust ignition timing.

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DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE



QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

12	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT										
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p>											
											
<p>3. Check harness continuity between the following terminals. Refer to "Wiring Diagram", EC-1193.</p>											
<table border="1" style="margin: auto;"> <thead> <tr> <th>ECM terminal</th> <th>A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">65</td> <td style="text-align: center;">6</td> </tr> </tbody> </table>		ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6
ECM terminal	A/F sensor 1 terminal										
62	2										
63	5										
64	1										
65	6										
SEF393Z											
<p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>5. Also check harness for short to power.</p>											
OK or NG											
OK	▶ GO TO 13.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

MTBL0542

13	CHECK A/F SENSOR 1 HEATER
<p>Refer to "Component Inspection", EC-1227.</p>	
OK or NG	
OK	▶ GO TO 14.
NG	▶ Replace A/F sensor 1.

14	CHECK MASS AIR FLOW SENSOR
<p> With CONSULT-II Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>	
<p> With GST Check mass air flow sensor signal in MODE 1 with GST. at idling: 1.4 - 4.0 g-m/sec at 2,500 rpm: 5.0 - 10.0 g-m/sec</p>	
OK or NG	
OK	▶ GO TO 16.
NG	▶ GO TO 15.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

15	CHECK CONNECTORS	
Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to "DTC P0100 MASS AIR FLOW SENSOR (MAFS)", EC-846.		
OK or NG		
NG	▶	Repair or replace it.

GI

MA

16	CHECK SYMPTOM MATRIX CHART	
Check items on the rough idle symptom in "Symptom Matrix Chart", EC-815.		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Repair or replace.

EM

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EC

17	ERASE THE 1ST TRIP DTC	
Some tests may cause a 1st trip DTC to be set. Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to "HOW TO ERASE EMISSION RELATED DIAGNOSTIC INFORMATION", EC-769.		
OK or NG		
	▶	GO TO 18.

FE

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18	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
OK or NG		
	▶	INSPECTION END

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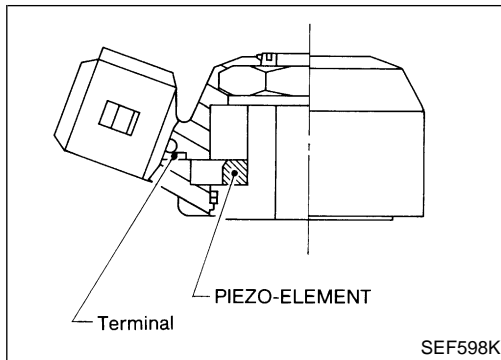
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Component Description



Component Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM. ^{NIEC1389}

Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction. The knock sensor has one trip detection logic.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1390

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

 **With CONSULT-II**

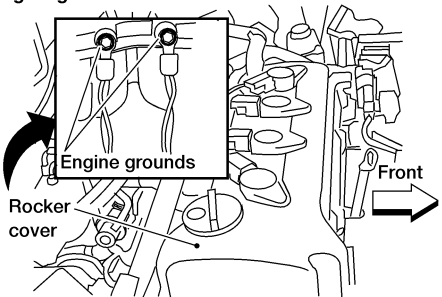
- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 5 seconds at idle speed.
- 3) If DTC is detected, go to "Diagnostic Procedure", EC-1004.

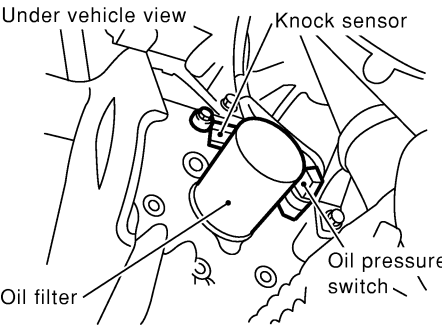
 **With GST**

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

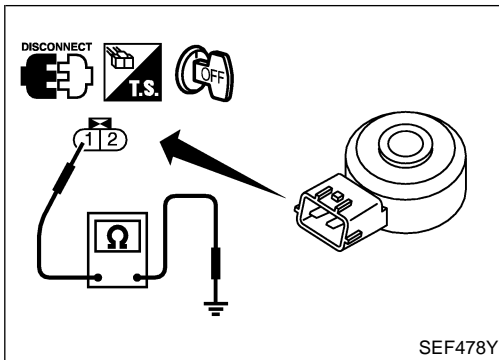
NIEC1392

1	RETIGHTEN GROUND SCREWS
<p>Loosen and retighten engine ground screws.</p> <div style="text-align: center;"> <p>Engine grounds on back of intake manifold collector</p>  </div>	
WEC249	
▶	GO TO 2.

2	CHECK INPUT SIGNAL CIRCUIT-1
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and knock sensor harness connector.</p> <div style="text-align: center;"> <p>Under vehicle view</p>  </div>	
SEF729Y	
<p>3. Check harness continuity between knock sensor terminal 1 and ECM terminal 81. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK KNOCK SENSOR
<p>Knock sensor Refer to "Component Inspection", EC-1005.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Replace knock sensor.

4	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	
▶	INSPECTION END



Component Inspection

KNOCK SENSOR

NIEC1393

NIEC1393S01

- Use an ohmmeter which can measure more than 10 M Ω .
1. Disconnect knock sensor harness connector.
 2. Check resistance between terminal 1 and ground.

Resistance: 500 - 620 k Ω [at 20°C (68°F)]

CAUTION:

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.

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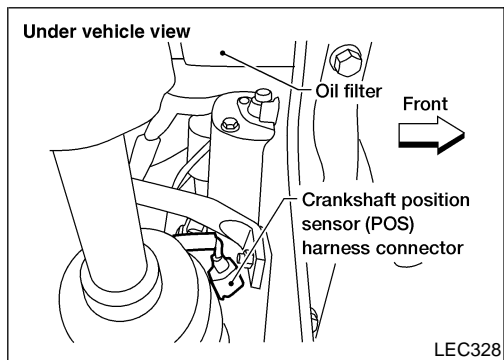
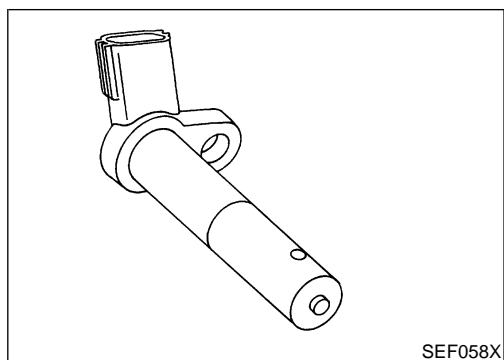
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IDX

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (CALIF CA)

Component Description



Component Description

The crankshaft position sensor (POS) is located on the cylinder block rear housing facing the gear teeth (cogs) of the signal plate at the end of crankshaft. It detects the fluctuation of the engine revolution. NIEC1394

The sensor consists of a permanent magnet and hall IC. When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

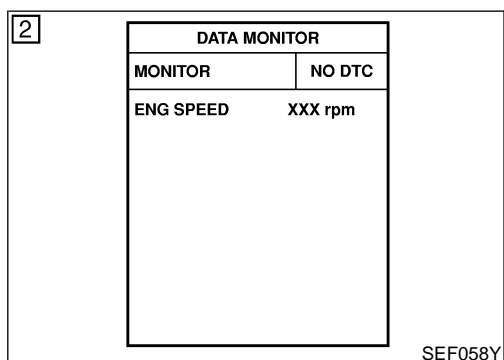
Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

On Board Diagnosis Logic

NIEC1395

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0335	<ul style="list-style-type: none"> The crankshaft position sensor (POS) signal is not sent to ECM during the first few seconds of engine cranking. The proper pulse signal from the crankshaft position sensor (POS) is not sent to ECM while the engine is running. The crankshaft position sensor (POS) signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors (The crankshaft position sensor (POS) circuit is open.) Crankshaft position sensor (POS)



DTC Confirmation Procedure

NIEC1396

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 10 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1008.

With GST

Follow the procedure "With CONSULT-II" above.

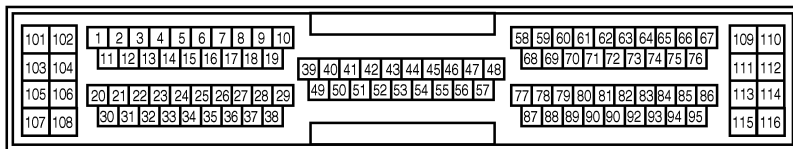
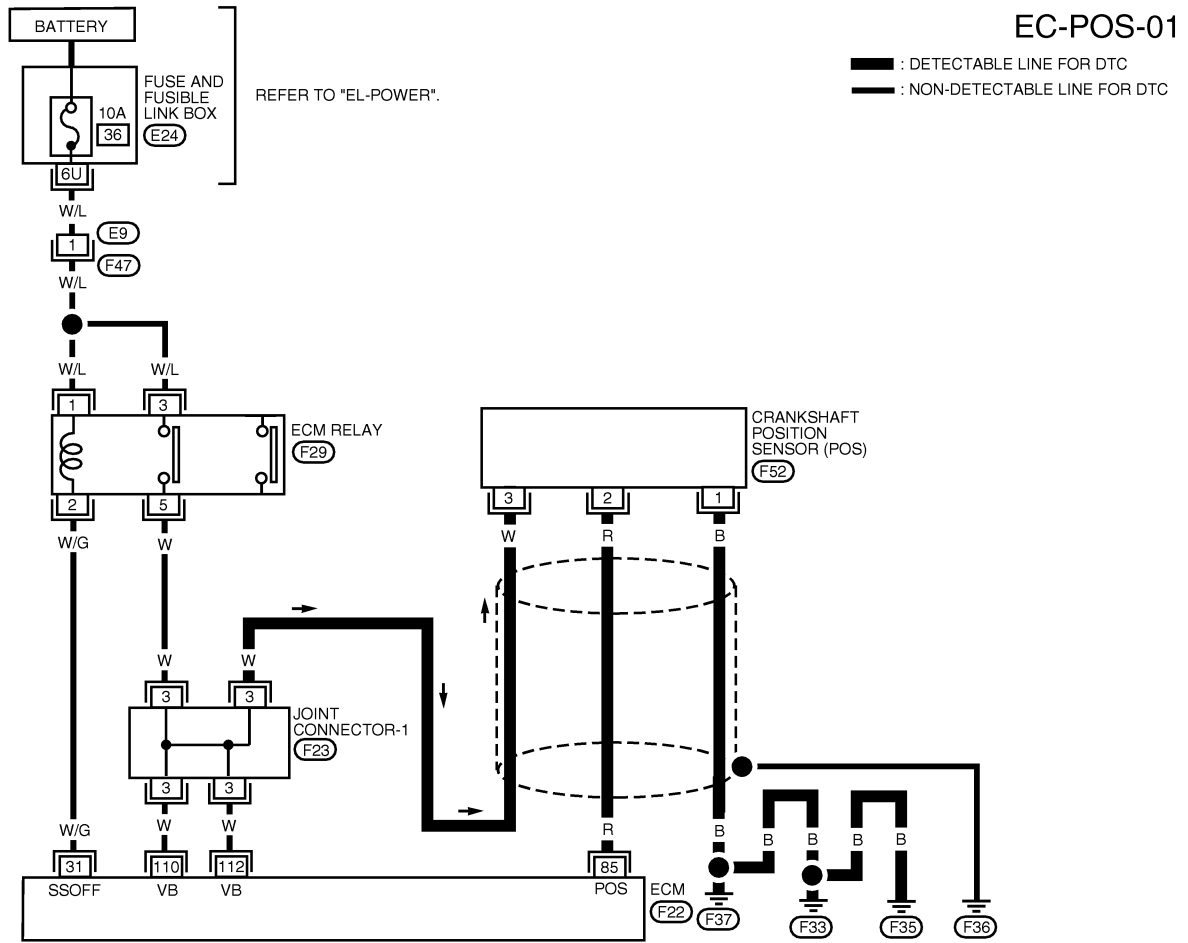
DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (CALIF CA)

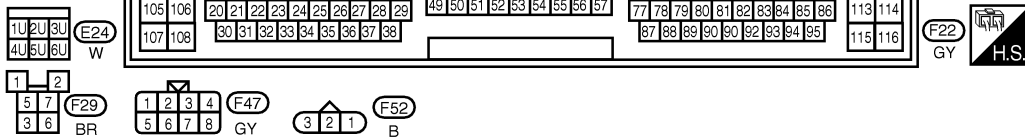
Wiring Diagram

Wiring Diagram

NIEC1397



REFER TO THE FOLLOWING.
 (F23) - JOINT CONNECTOR



WEC396

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
85	R	CRANKSHAFT POSITION SENSOR (POS)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 3.0V - 4.0V
			ENGINE RUNNING AT 2,000 RPM	APPROX. 3.0V - 4.0V

SEF605Z

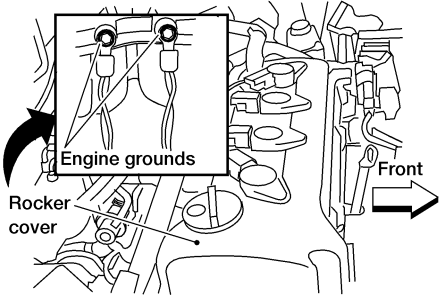
DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

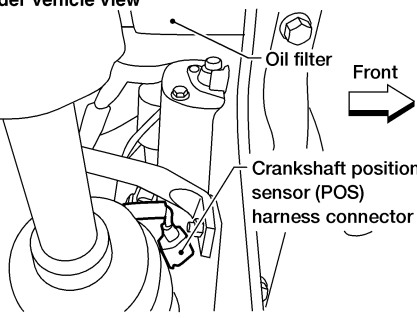
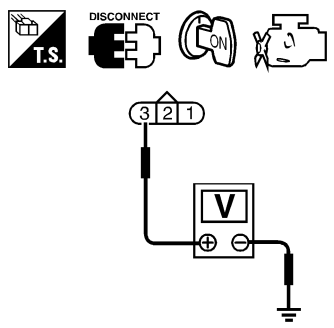
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1398

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center; margin: 10px 0;"> <p>Engine grounds on back of intake manifold collector</p>  </div> <p style="text-align: right; margin-top: 10px;">WEC249</p>	
<p>▶ GO TO 2.</p>	

2	CHECK POWER SUPPLY
<p>1. Disconnect crankshaft position sensor (POS) harness connector.</p> <div style="text-align: center; margin: 10px 0;"> <p>Under vehicle view</p>  </div> <p style="text-align: right; margin-top: 10px;">LEC328</p>	
<p>2. Check voltage between crankshaft position sensor (POS) harness connector terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-top: 10px;">SEF479Y</p>	
<p>3. Also check harness for short to ground and short to power.</p> <p style="margin: 0;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open and short between ECM and crankshaft position sensor (POS) ● Harness for open or short between ECM relay and crankshaft position sensor (POS) 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA

4	CHECK INPUT SIGNAL CIRCUIT
1. Check continuity between ECM terminal 85 and CKPS (POS) terminal 2. Refer to Wiring Diagram. Continuity should exist.	
2. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

EM
LC
EC

5	CHECK GROUND CIRCUIT
1. Reconnect ECM harness connector. 2. Check harness continuity between CKPS (POS) terminal 1 and engine ground. Refer to the wiring diagram. Continuity should exist.	
3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

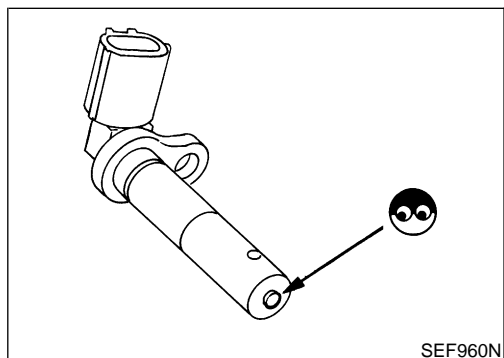
CL
MT
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6	CHECK CRANKSHAFT POSITION SENSOR (POS)
Refer to "Component Inspection", EC-1009. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 7.
NG	▶ Replace crankshaft position sensor (POS).

SU
BR
ST

7	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838. <p style="text-align: center;">INSPECTION END</p>	

RS
BT



Component Inspection CRANKSHAFT POSITION SENSOR (POS)

NIEC1399

NIEC1399S01

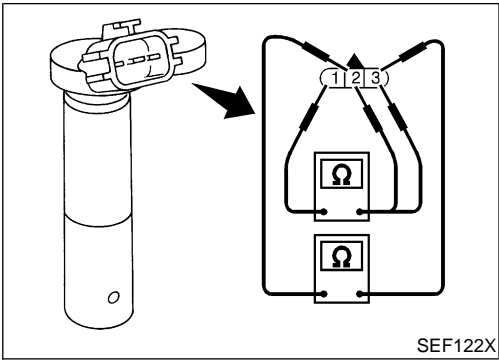
1. Disconnect crankshaft position sensor (POS) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.

HA
SC
EL
IDX

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (POS)

QG18DE (CALIF CA)

Component Inspection (Cont'd)



5. Check resistance as shown in the figure.

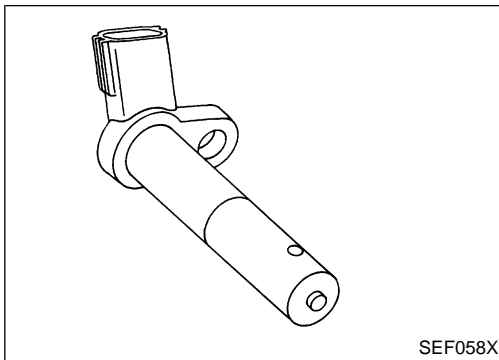
Terminal No. (Polarity)	Resistance Ω [at 25°C (77°F)]
3 (+) - 1 (-)	Except 0 or ∞
2 (+) - 1 (-)	
3 (+) - 2 (-)	

If NG, replace crankshaft position sensor (POS).

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)

Component Description



Component Description

The camshaft position sensor senses the protrusion provided with exhaust valve cam sprocket to identify a particular cylinder. The crankshaft position sensor senses the piston position. When the crankshaft position sensor system becomes inoperative, the camshaft position sensor provides various controls of engine parts instead, utilizing timing of cylinder identification signals. The sensor consists of a permanent magnet, core and coil. When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change. The changing gap causes the magnetic field near the sensor to change. Due to the changing magnetic field, the voltage from the sensor changes.

NIEC1400

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EM

LC

EC

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On Board Diagnosis Logic

NIEC1401

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0340	<ul style="list-style-type: none"> The cylinder No. signal is not entered to ECM for the first few seconds during engine cranking. The cylinder No. signal is not enter to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	<ul style="list-style-type: none"> Harness or connectors (The camshaft position sensor (PHASE) circuit is open or shorted.) Camshaft position sensor (PHASE) Starter motor (Refer to SC section.) Starting system circuit (Refer to SC section.)

AT

AX

SU

BR

DTC Confirmation Procedure

NIEC1402

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

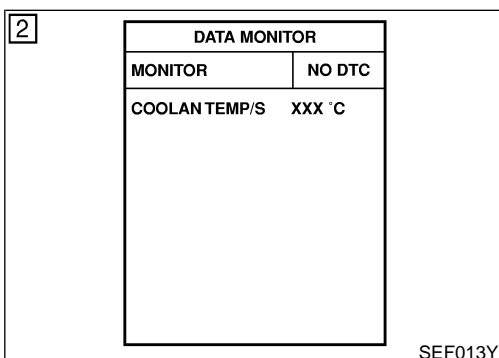
Before performing the following procedure, confirm that battery voltage is more than 10.5V.

ST

RS

BT

HA



With CONSULT-II

- Turn ignition switch "ON".
- Select "DATA MONITOR" mode with CONSULT-II.
- Crank engine for at least 2 seconds and run it at idle speed for at least 5 seconds.
- If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1013.

SC

EL

IDX

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)

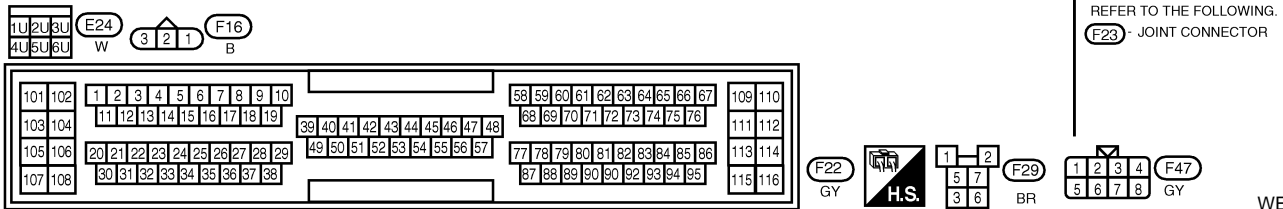
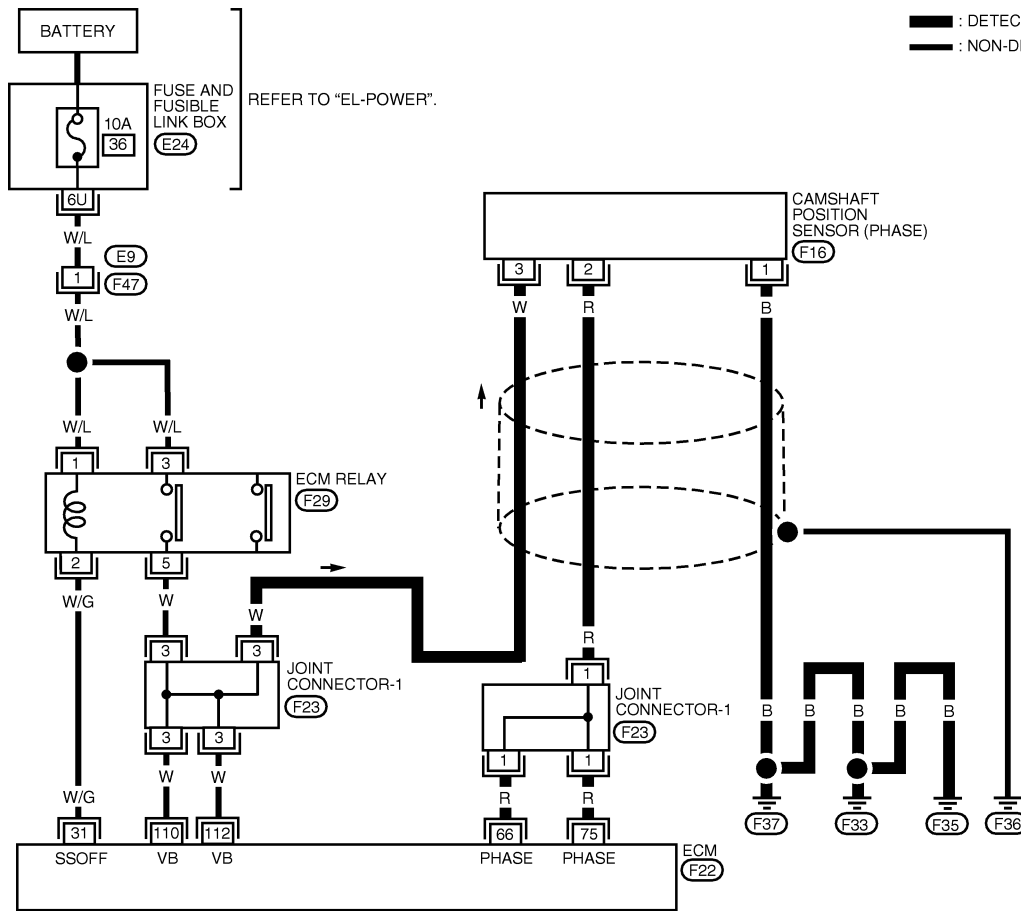
Wiring Diagram

Wiring Diagram

=NIEC1403

EC-PHASE-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



WEC395

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
66, 75	R	CAMSHAFT POSITION SENSOR (PHASE)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 3.0V - 4.0V (V)
			ENGINE RUNNING AT 2,000 RPM	APPROX. 3.0V - 4.0V (V)

SEF606Z

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)

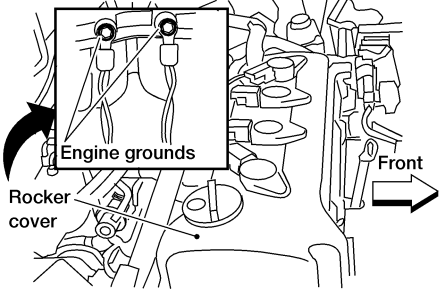
Diagnostic Procedure

Diagnostic Procedure

NIEC1404

1	CHECK STARTING SYSTEM	
Does the engine turn over? (Does the starter motor operate?)		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Check starting system. (Refer to SC-10 , "STARTING SYSTEM".)

GI
MA
EM

2	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine grounds on back of intake manifold collector</p> 		
WEC249		
▶		GO TO 3.

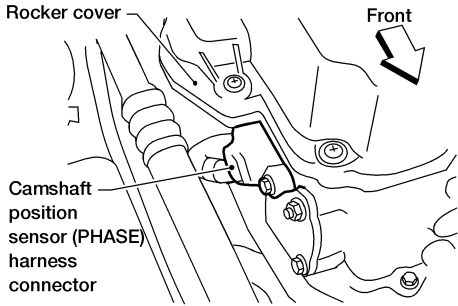
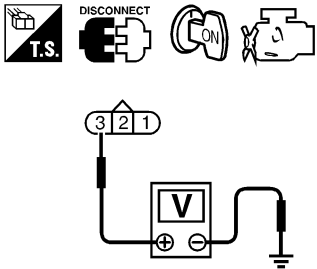
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DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK POWER SUPPLY	<p>1. Disconnect camshaft position sensor (PHASE) harness connector.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between distributor terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p style="color: blue; margin-top: 10px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	<p style="text-align: right;">WEC253</p> <p style="text-align: right;">SEF481Y</p>
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between camshaft position sensor (PHASE) and ECM relay ● Harness for open or short between camshaft position sensor (PHASE) and ECM 	
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

5	CHECK INPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between camshaft position sensor (PHASE) terminal 2 and ECM terminals 66, 75. Refer to Wiring Diagram.</p> <p style="color: blue; margin-left: 20px;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

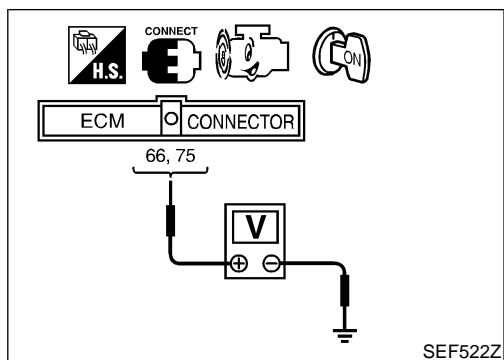
6	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between camshaft position sensor and ECM 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.
7	CHECK GROUND CIRCUIT	
1. Turn ignition switch "OFF". 2. Check harness continuity between camshaft position sensor terminal 1 and engine ground. Refer to the wiring diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
8	CHECK CAMSHAFT POSITION SENSOR	
Refer to "Component Inspection", EC-1016.		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace camshaft position sensor.
9	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

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DTC P0340 CAMSHAFT POSITION SENSOR (CMPS) (PHASE)

QG18DE (CALIF CA)

Component Inspection



Component Inspection

CAMSHAFT POSITION SENSOR (PHASE)

=NIEC1405

NIEC1405S01

1. Start engine and warm it up to normal operating temperature.
2. Check voltage between ECM terminals 66, 75 and engine ground.

Condition	Idle	2,000 rpm
Voltage	Approximately 2.0 - 3.0V	Approximately 2.0 - 3.0V
Pulse signal	<p>SEF977W</p>	<p>SEF978W</p>

If NG, replace camshaft position sensor.

Description
SYSTEM DESCRIPTION

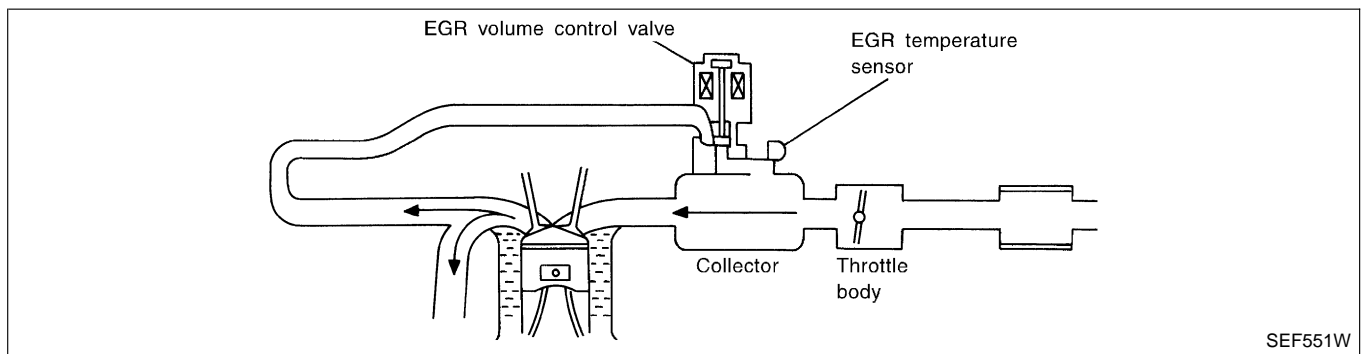
NIEC1406

NIEC1406S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	EGR volume control	EGR volume control valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM	Gear position, shifting signal		

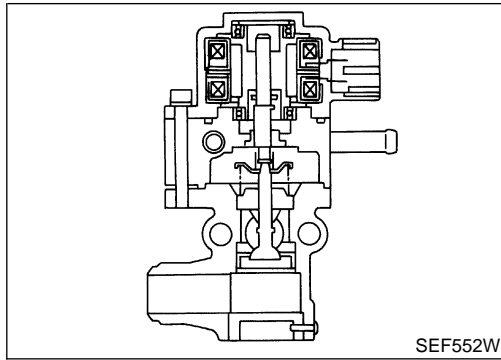
This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W

Description (Cont'd)



COMPONENT DESCRIPTION

EGR volume control valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC1406S02

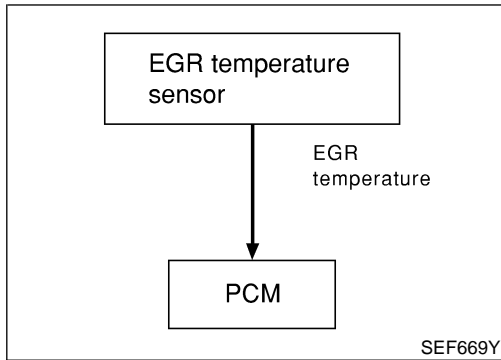
NIEC1406S0201

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC1407

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 step



On Board Diagnosis Logic

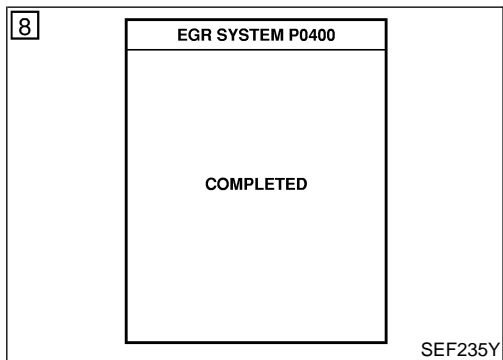
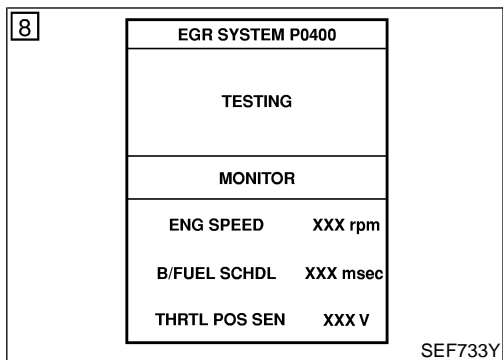
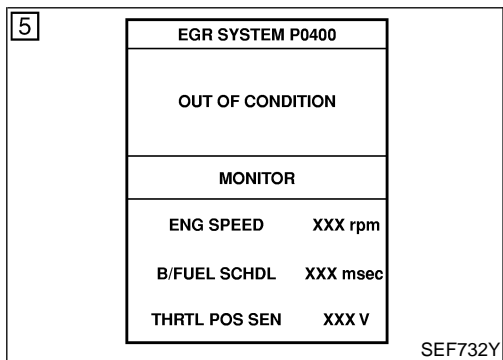
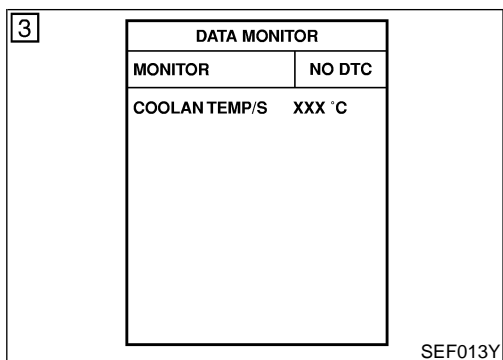
If the absence of EGR flow is detected by EGR temperature sensor under the condition that calls for EGR, a low-flow malfunction is diagnosed. Malfunction is detected when no EGR flow is detected under condition that calls for EGR.

NIEC1408

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve stuck closed
- Dead (Weak) battery
- EGR passage clogged
- EGR temperature sensor and circuit
- Exhaust gas leaks

NIEC1409



DTC Confirmation Procedure

NIEC1410

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 5 seconds before conducting the next test.
- P0400 will not be displayed at “SELF-DIAG RESULTS” mode with CONSULT-II even though DTC work support test result is NG.

TESTING CONDITION:

- Before performing the following procedure, confirm battery voltage is more than 10V at idle, then stop engine immediately.
- For best results, perform the test at a temperature of 5°C (41°F) or higher.

WITH CONSULT-II

NIEC1410S01

- 1) Turn ignition switch “OFF” and wait at least 10 seconds.
- 2) Turn ignition switch “ON”
- 3) Check “COOLAN TEMP/S” in “DATA MONITOR” mode with CONSULT-II.

Confirm COOLAN TEMP/S value is within the range listed below.

COOLAN TEMP/S: Less than 40°C (104°F)

If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the engine coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

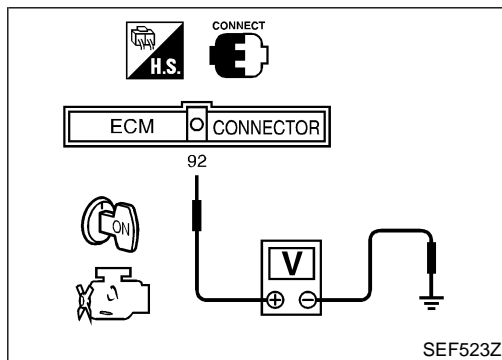
- 4) Start engine and let it idle monitoring “COOLAN TEMP/S” value. When the “COOLAN TEMP/S” value reaches 70°C (158°F), immediately go to the next step.
- 5) Select “EGR SYSTEM P0400” of “EGR SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 6) Touch “START”.
- 7) Accelerate vehicle to a speed of 40 km/h (25 MPH) once and then stop vehicle with engine running.
If “COMPLETED” appears on CONSULT-II screen, go to step 9.
If “COMPLETED” does not appear on CONSULT-II screen, go to the following step.
- 8) Check the output voltage of “THRTL POS SEN” (at closed throttle position) and note it.
- 9) When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions until “TESTING” changes to “COMPLETED”. (It will take approximately 30 seconds or more.)

ENG SPEED	1,200 - 3,600 rpm
Vehicle speed	More than 10 km/h (6 MPH)
B/FUEL SCHDL	4.5 - 8.0 msec
Selector lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

- 10) Make sure that “OK” is displayed after touching “SELF-DIAG

RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1022.



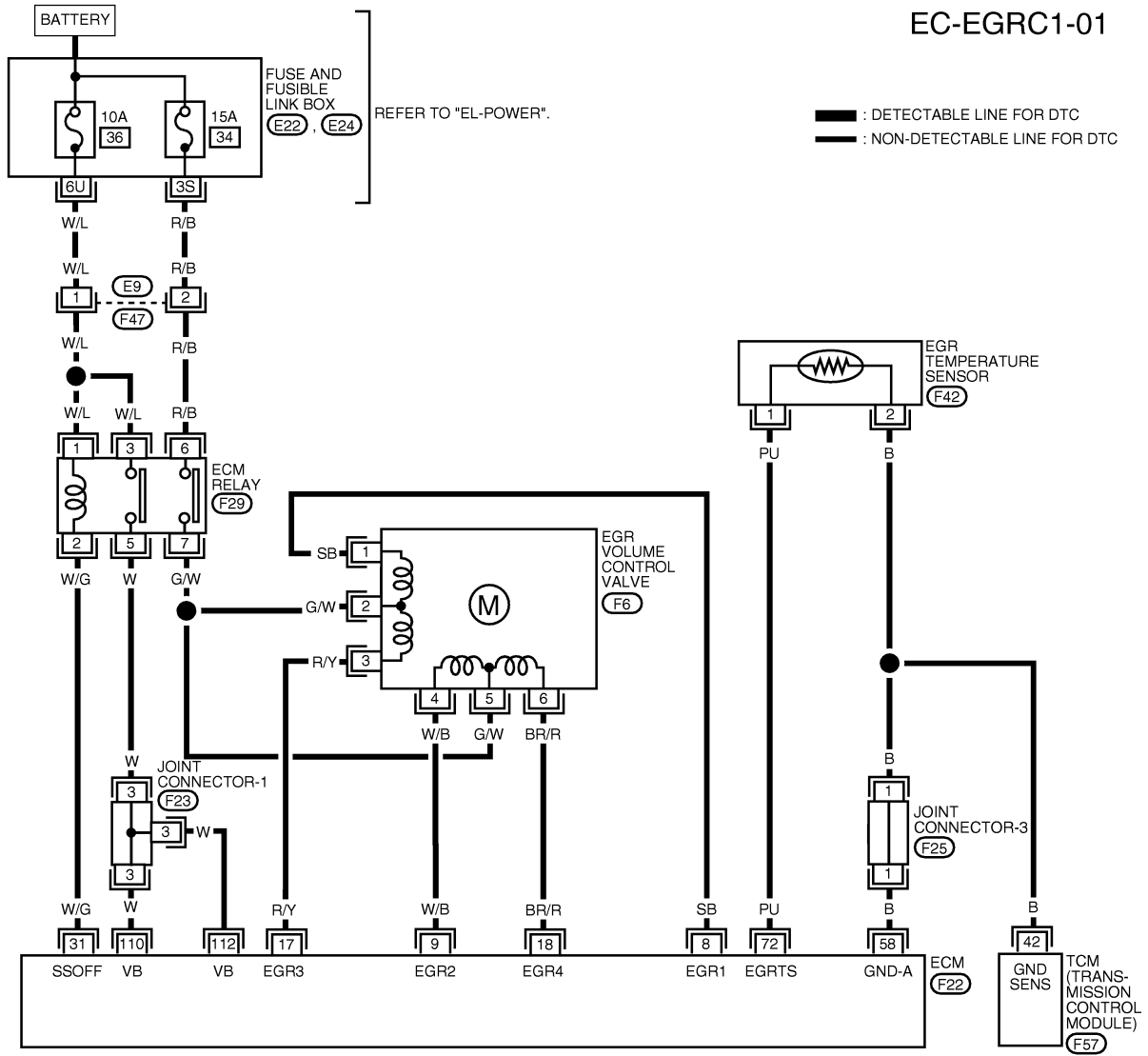
WITH GST

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 2) Turn ignition switch "ON".
 - 3) Check engine coolant temperature in MODE 1 with GST.
Engine coolant temperature: Less than 40°C (104°F)
 If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
 - 4) Start engine and let it idle monitoring the value of "COOLAN TEMP/S". When the engine coolant temperature reaches 70°C (158°F), immediately go to the next step.
 - 5) Maintain the following conditions for at least 1 minute.
Engine speed: 1,200 - 3,600 rpm
Vehicle speed: More than 10 km/h (6 MPH)
Selector lever: Suitable position
 - 6) Stop vehicle.
 - 7) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
 - 8) Repeat step 3 to 5.
 - 9) Select "MODE 3" with GST.
 - 10) If DTC is detected, go to "Diagnostic Procedure", EC-1022.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

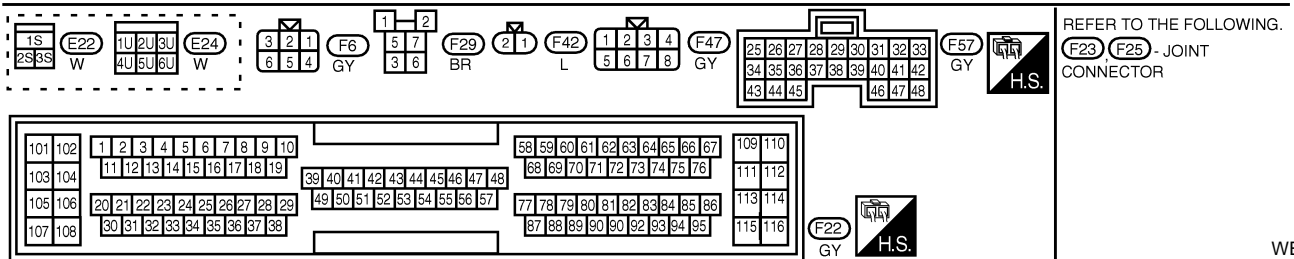
Wiring Diagram

NIEC1411

EC-EGRC1-01



— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 F23, F25 - JOINT CONNECTOR

WEC397

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

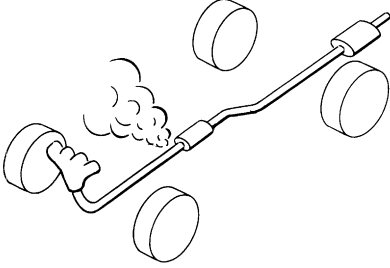
CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

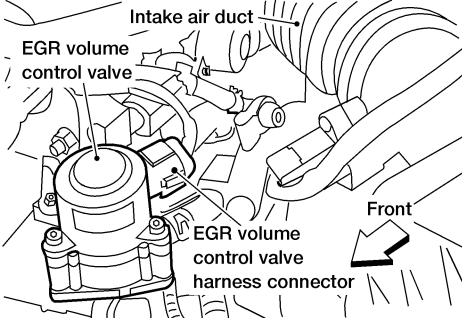
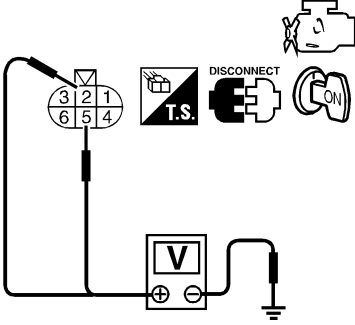
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	BR/R			

SEF575YA

Diagnostic Procedure

NIEC1412

1	CHECK EXHAUST SYSTEM		
<p>1. Start engine. 2. Check exhaust pipes and muffler for leaks.</p>			
			
SEF099P			
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Repair or replace exhaust system.	

2	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT		
<p>1. Disconnect EGR volume control valve harness connector.</p>			
			
LEC333			
<p>2. Turn ignition switch "ON". 3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p>			
			
Voltage: Battery voltage			
SEF327X			
OK or NG			
OK	▶	GO TO 4.	
NG	▶	GO TO 3.	

DTC P0400 EGR FUNCTION (CLOSE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and EGR volume control valve.	
▶	Repair harness or connectors.

GI

MA

4	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.											
<table border="1"><thead><tr><th>ECM terminal</th><th>EGR volume control valve</th></tr></thead><tbody><tr><td>8</td><td>1</td></tr><tr><td>9</td><td>4</td></tr><tr><td>17</td><td>3</td></tr><tr><td>18</td><td>6</td></tr></tbody></table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve										
8	1										
9	4										
17	3										
18	6										
MTBL0543											
Continuity should exist.											
4. Also check harness for short to ground and short to power.											
OK or NG											
OK	▶ GO TO 5.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

EM

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MT

5	CHECK EGR PASSAGE
Check EGR passage for clogging and cracks.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair or replace EGR passage.

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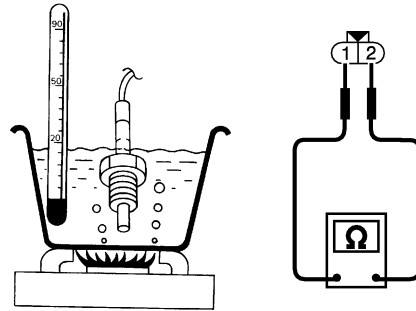
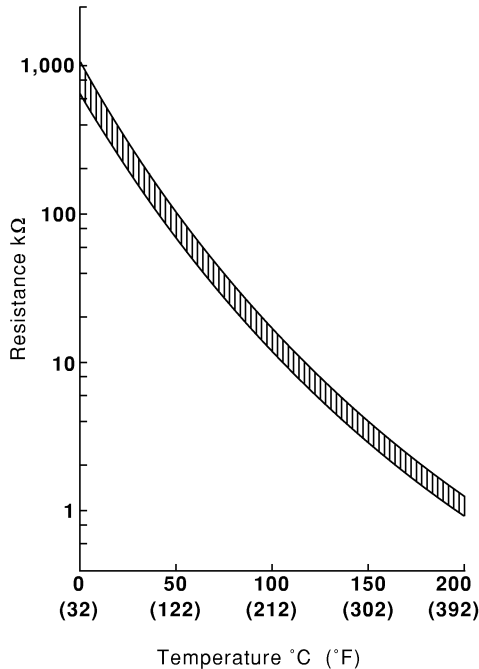
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6 CHECK EGR TEMPERATURE SENSOR AND CIRCUIT

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

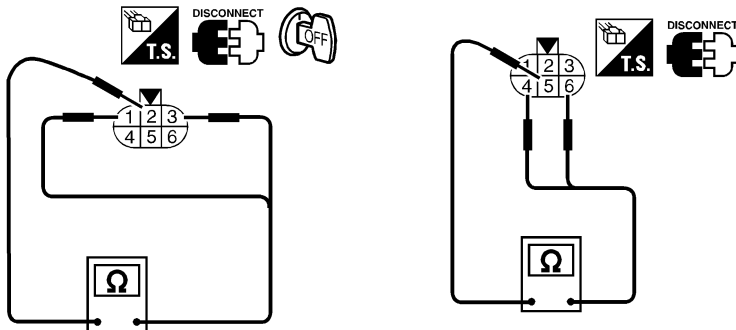
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR temperature sensor. |

7 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

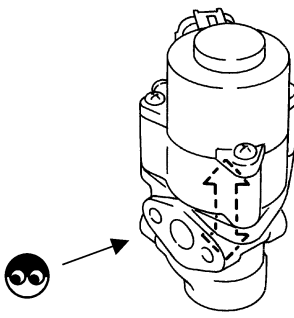


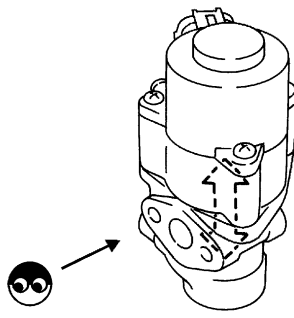
Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 8. |
| OK (Without CONSULT-II) | ▶ | GO TO 9. |
| NG | ▶ | Replace EGR volume control valve. |

8	CHECK EGR VOLUME CONTROL VALVE-II																									
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> 			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
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EGR VOL CONT/V	20 step																									
MONITOR																										
ENG SPEED	XXX rpm																									
EGR TEMP SEN	XXX V																									
SEF491Y																										
OK or NG																										
OK	▶	GO TO 10.																								
NG	▶	Replace EGR volume control valve.																								

9	CHECK EGR VOLUME CONTROL VALVE-II	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
		
SEF560W		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace EGR volume control valve.

10	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

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DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Description

Description SYSTEM DESCRIPTION

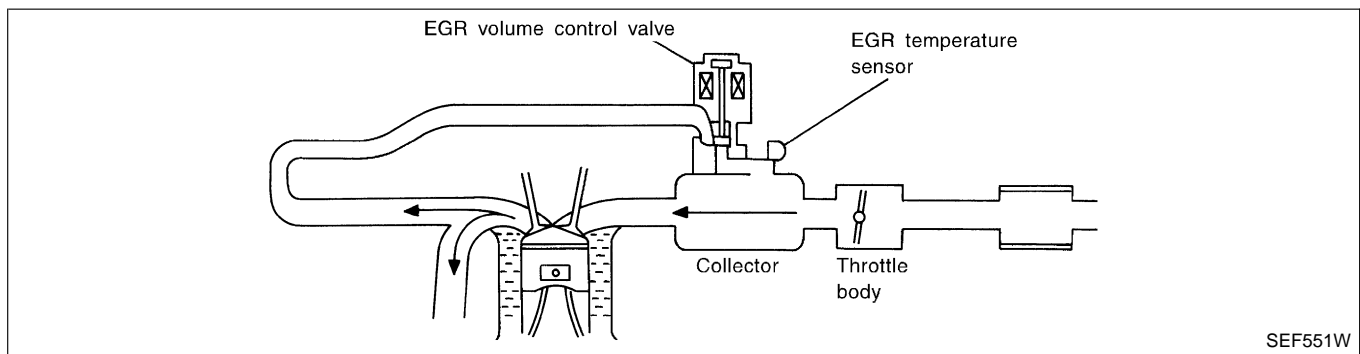
NIEC1413

NIEC1413S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and cylinder position	EGR volume control	EGR volume control valve
Crankshaft position sensor (POS)	Engine speed		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

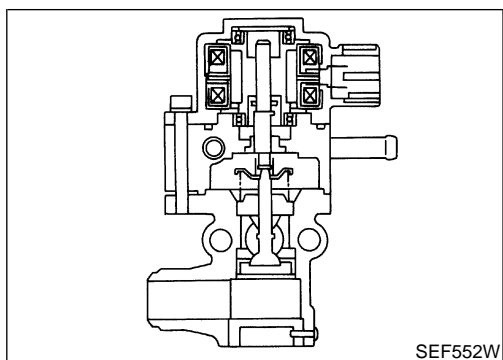


SEF551W

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Description (Cont'd)



COMPONENT DESCRIPTION

EGR volume control valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle 0 step
		Revvng engine up to 3,000 rpm quickly 10 - 55 step

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

FAIL-SAFE MODE

When the ECM enters the fail-safe mode, the MIL illuminates.

Detected items	Engine operating condition in fail-safe mode
EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

WITH CONSULT-II

NIEC1417S01

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Rev engine from idle to 2,000 rpm 10 times.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1030.

WITH GST

NIEC1417S02

Follow the procedure "With CONSULT-II" above.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

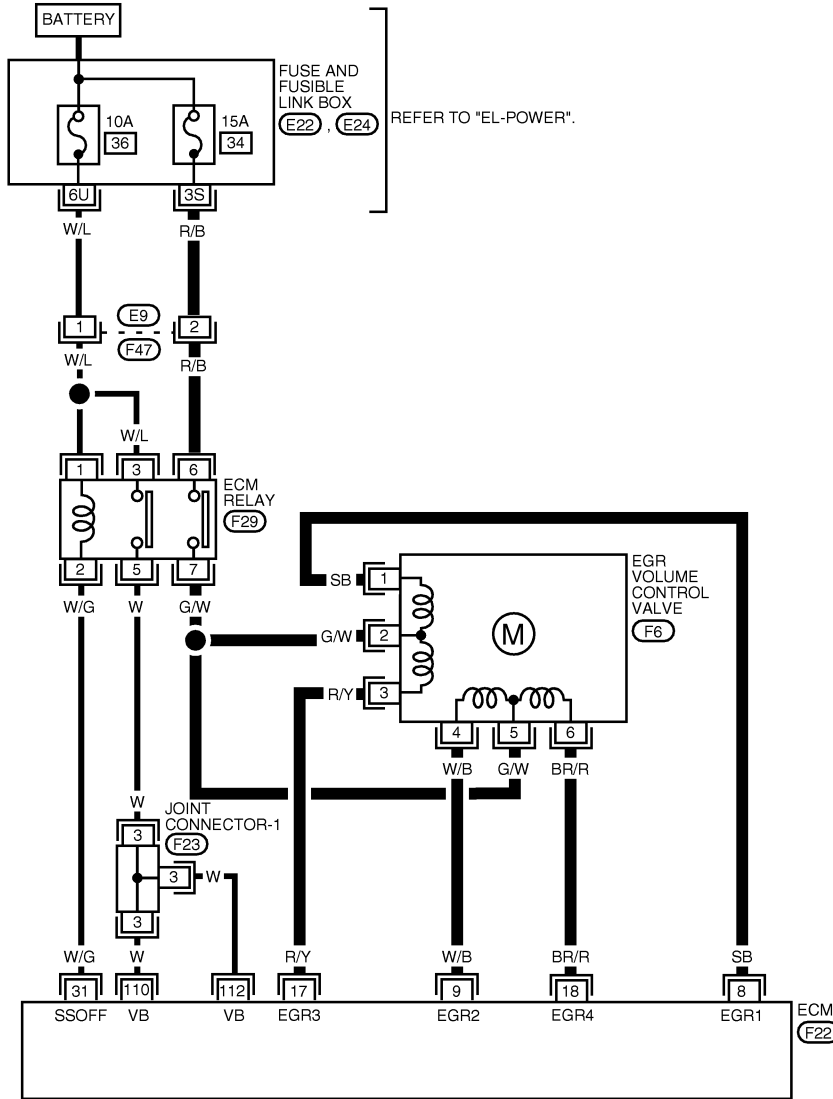
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

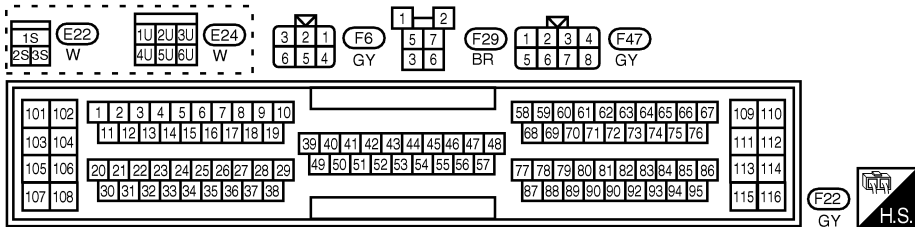
=NIEC1418

EC-EGVC/V-01



— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

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REFER TO THE FOLLOWING.
 (F23) -JOINT CONNECTOR

WEC398

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	BR/R			

SEF575YA

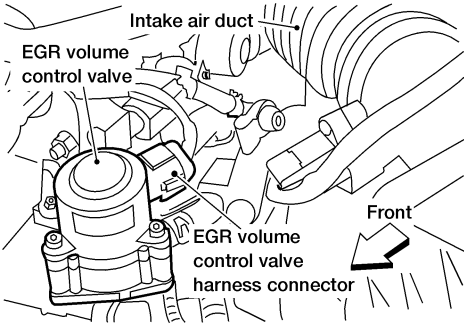
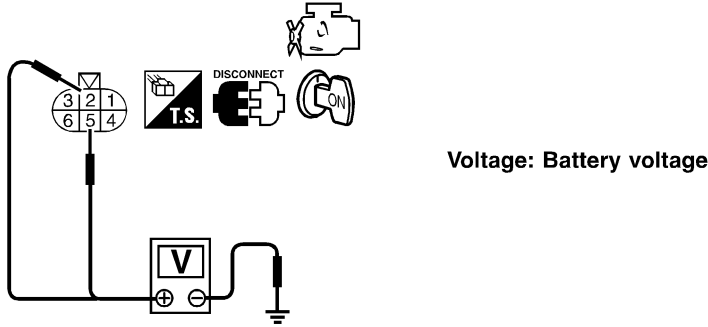
DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1419

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC333</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">SEF327X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>		OK	▶	GO TO 3.	NG	▶	GO TO 2.
OK	▶	GO TO 3.					
NG	▶	GO TO 2.					

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and EGR volume control valve.	
▶	Repair harness or connectors.

3	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																
<p>1. Turn ignition switch "OFF".</p> <p>2. disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0543</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	EGR volume control valve																
8	1																
9	4																
17	3																
18	6																
OK	▶	GO TO 4.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

OK (With CONSULT-II) ▶	GO TO 5.
OK (Without CONSULT-II) ▶	GO TO 6.
NG ▶	Replace EGR volume control valve.

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5 CHECK EGR VOLUME CONTROL VALVE-II

With CONSULT-II

- Remove EGR volume control valve.
- Reconnect ECM harness connector and EGR volume control valve harness connector.
- Turn ignition switch "ON".
- Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.

ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
ENG SPEED	XXX rpm
EGR TEMP SEN	XXX V

SEF491Y

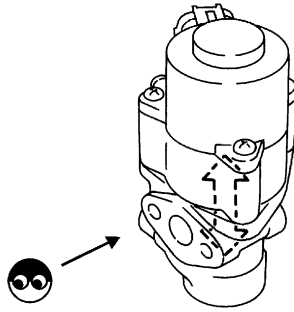
OK or NG

OK ▶	GO TO 7.
NG ▶	Replace EGR volume control valve.

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK EGR VOLUME CONTROL VALVE-II
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none">1. Remove EGR volume control valve.2. Reconnect ECM harness connector and EGR volume control valve harness connector.3. Turn ignition switch "ON" and "OFF".4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.	
	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace EGR volume control valve.

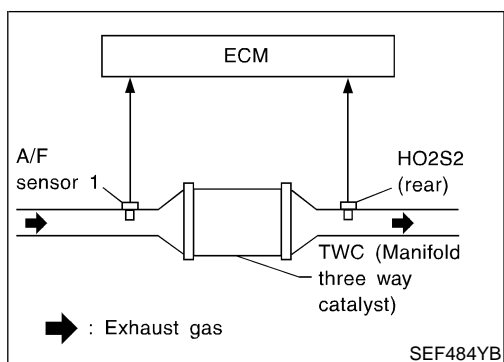
SEF560W

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P0420 THREE WAY CATALYST FUNCTION

QG18DE (CALIF CA)

On Board Diagnosis Logic



On Board Diagnosis Logic

NIEC1420

The ECM monitors the switching frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2 (rear). A TWC (Manifold three way catalyst) with high oxygen storage capacity will indicate a low switching frequency of heated oxygen sensor 2 (rear). As oxygen storage capacity decreases, the heated oxygen sensor 2 (rear) switching frequency will increase. When the frequency ratio of air fuel ratio (A/F) sensor 1 and heated oxygen sensor 2 (rear) approaches a specified limit value, the three way catalyst malfunction is diagnosed.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0420	<ul style="list-style-type: none"> TWC (Manifold three way catalyst) does not operate properly. TWC (Manifold three way catalyst) does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> TWC (Manifold three way catalyst) Exhaust tube Intake air leaks Injectors Injector leaks Spark plug Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
A/F SEN1 (B1)	XXX V

SEF533Z

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
HO2S HTR	CMPLT
HO2S	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
A/F SEN1 (B1)	XXX V

SEF534Z

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF535Z

DTC Confirmation Procedure

NIEC1421

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

WITH CONSULT-II

NIEC1421S01

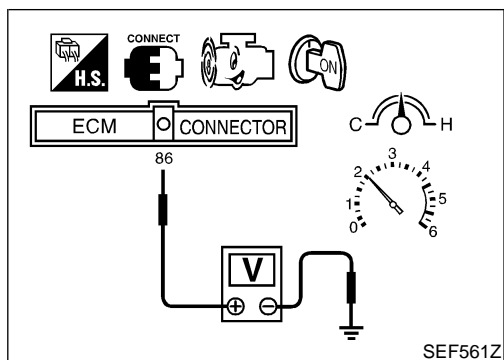
TESTING CONDITION:

- Open engine hood before conducting the following procedure.
- Do not hold engine speed for more than the specified minutes below.
 - Turn ignition switch "ON".
 - Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
 - Start engine.
 - Rev engine up to 3,000±500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely. If "INCMP" of CATALYST changes to "CMPLT", go to step 7.
 - Wait 5 seconds at idle.
 - Rev engine up to 2,500±500 rpm and maintain it until "INCMP" of CATALYST changes to "CMPLT" (It will take approximately 5 minutes). If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
 - Select "SELF-DIAG RESULTS" mode with CONSULT-II.
 - Confirm that the 1st trip DTC is not detected. If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1034.

DTC P0420 THREE WAY CATALYST FUNCTION

QG18DE (CALIF CA)

Overall Function Check



Overall Function Check

NIEC1422

Use this procedure to check the overall function of the three way catalyst. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probe between ECM terminal 86 and ground.
- 4) Keep engine speed at 2,500 rpm constant under no load.
- 5) Make sure that the voltage does not vary for more than 5 seconds.

If the voltage fluctuation cycle takes less than 5 seconds, go to "Diagnostic Procedure", EC-1034

- 1 cycle: 0.6 - 1.0 V → 0 - 0.3 V → 0.6 - 1.0 V

Diagnostic Procedure

NIEC1423

1	CHECK EXHAUST SYSTEM	
Visually check exhaust tubes and muffler for dent.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK EXHAUST AIR LEAK	
<ol style="list-style-type: none"> 1. Start engine and run it at idle. 2. Listen for an exhaust air leak before the TWC (Manifold three way catalyst). 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

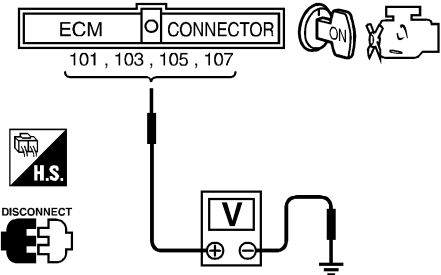
SEF099P

DTC P0420 THREE WAY CATALYST FUNCTION

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK INTAKE AIR LEAK	
Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace.

4	CHECK IGNITION TIMING	
Check for ignition timing. Refer to "Basic Inspection", EC-798.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Adjust ignition timing.

5	CHECK INJECTORS	
<ol style="list-style-type: none"> 1. Refer to Wiring Diagram for Injectors, EC-1325. 2. Stop engine and then turn ignition switch "ON". 3. Check voltage between ECM terminals 101, 103, 105, 107 and ground with CONSULT-II or tester. 		
		
Battery voltage should exist.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Perform "Diagnostic Procedure" INJECTOR, EC-1326.

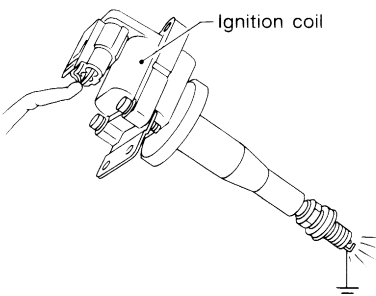
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DTC P0420 THREE WAY CATALYST FUNCTION

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SPARK	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove ignition coil from the engine. 3. Place end of spark plug against a suitable ground and crank engine. 4. Check for spark properly. 		
		
SEF575Q		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace ignition coil.

7	CHECK INJECTOR	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove injector assembly. Refer to EC-744. Keep fuel hose and all injectors connected to injector gallery. 3. Disconnect ignition coil assembly harness connector. 4. Turn ignition switch "ON". Make sure fuel does not drip from injector. 		
OK or NG		
OK (Does not drip)	▶	GO TO 8.
NG (Drips)	▶	Replace the injector(s) from which fuel is dripping.

8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
Trouble is fixed	▶	INSPECTION END
Trouble is not fixed	▶	Replace TWC (Manifold three way catalyst) together with ADS-TWC (Adsorber pre-catalyst).

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC1424

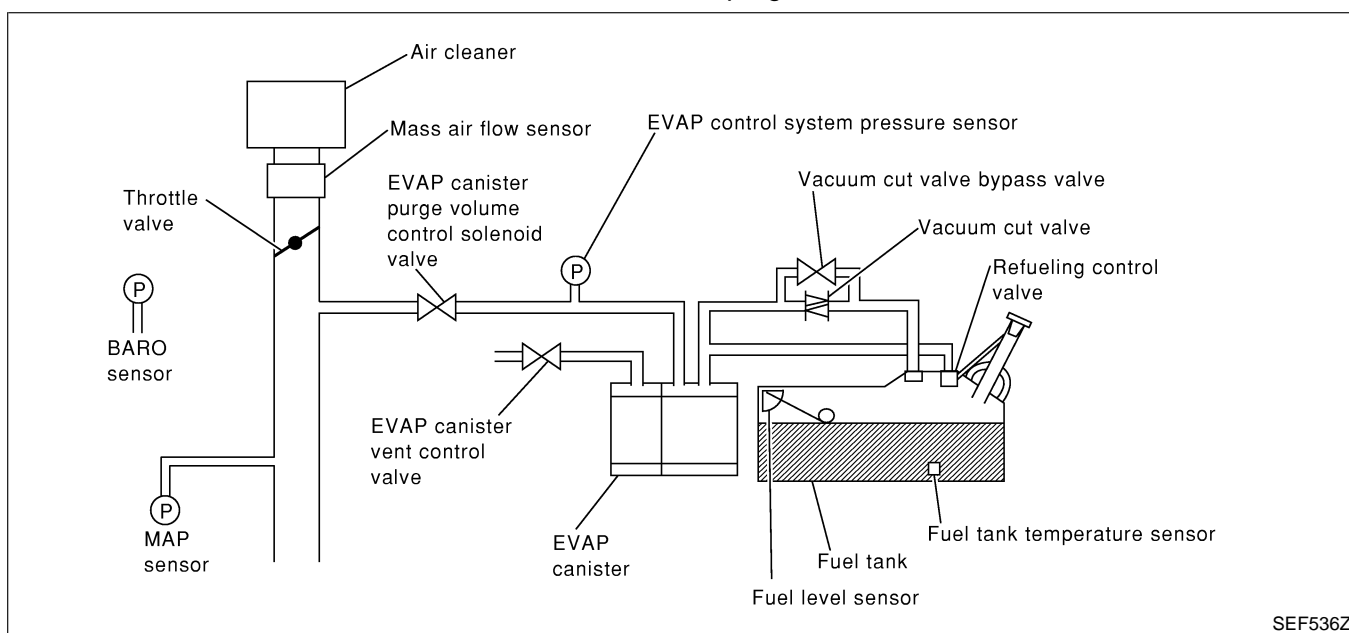
NOTE:

If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1287.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC1425

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Manifold absolute pressure (MAP) sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- EVAP control system pressure sensor
- Fuel level sensor and the circuit
- Refueling control valve
- ORVR system leaks

EVAP SML LEAK P0440/P1440
<p>1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.</p> <p>-FUEL LEVEL: 1/4-3/4</p> <p>-AMBIENT TEMP: 0-30 C(32-86F)</p> <p>-OPEN ENGINE HOOD.</p> <p>2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC.THEN RESTART.</p> <p>3)TOUCH START.</p>

SEF565X

5	EVAP SML LEAK P0440/P1440
	<p>WAIT</p> <p>2 TO 10 MINUTES.</p> <p>KEEP ENGINE RUNNING AT IDLE SPEED.</p>

SEF566X

5	EVAP SML LEAK P0440/P1440
	OK
	SELF-DIAG RESULTS
	<p>NO DTC DETECTED.</p> <p>FURTHER TESTING MAY BE REQUIRED.</p>

SEF567X

DTC Confirmation Procedure

NIEC1426

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1287.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting following procedure.

WITH CONSULT-II

NIEC1426S01

- 1) Turn ignition switch "ON".
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
- 5) Select "EVAP SML LEAK P0440/P1440" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
 Follow the instruction displayed.

NOTE:

- If the engine speed cannot be maintained within the range

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-798.

- Make sure that EVAP hoses are connected to the EVAP canister purge volume control solenoid valve properly.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, refer to “Diagnostic Procedure”, EC-1039.

 **WITH GST**

NIEC1426S02

NOTE:

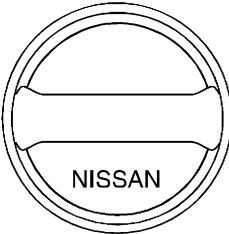
Be sure to read the explanation of “Driving Pattern” on EC-764 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-764.
- 3) Stop vehicle.
- 4) Select “MODE 1” with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch “OFF” and wait at least 10 seconds.
- 6) Start engine.

It is not necessary to cool engine down before driving.
- 7) Drive vehicle again according to the “Driving Pattern”, EC-764.
- 8) Stop vehicle.
- 9) Select “MODE 3” with GST.
 - If P0440 or P1440 is displayed on the screen, go to “Diagnostic Procedure”, EC-1039.
 - If P1447 is displayed on the screen, go to “Diagnostic Procedure” for DTC P1447, EC-1278.
 - If P0440, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select “MODE 1” with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NIEC1427

1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch “OFF”. 2. Check for genuine NISSAN fuel filler cap design.		
		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

SEF915U

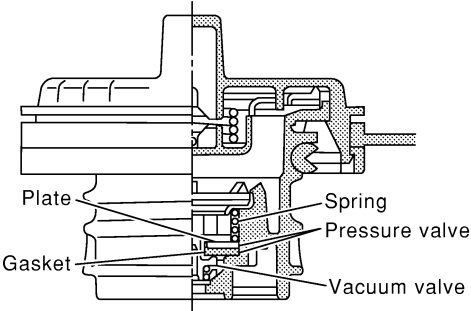
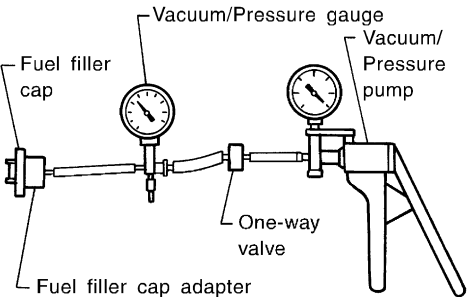
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 4.

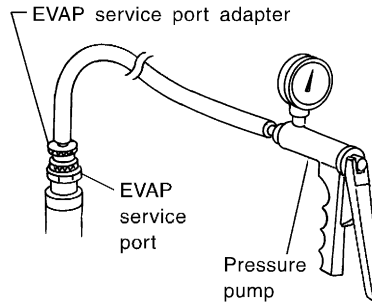
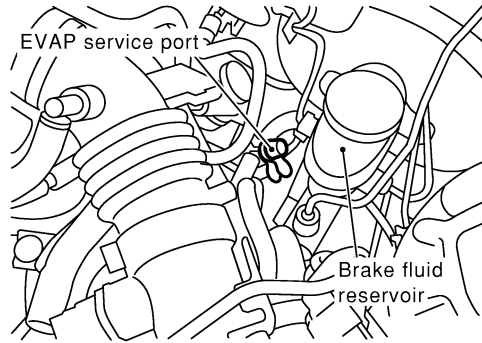
4	CHECK FUEL TANK VACUUM RELIEF VALVE	
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.50 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



SEF400Z

SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II ▶	GO TO 6.
Models without CON- SULT-II ▶	GO TO 7.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

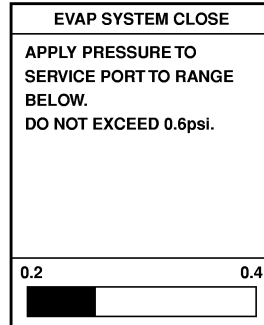
6 CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

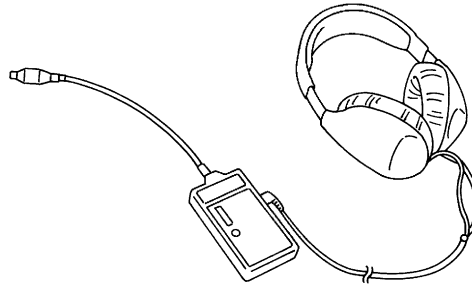
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

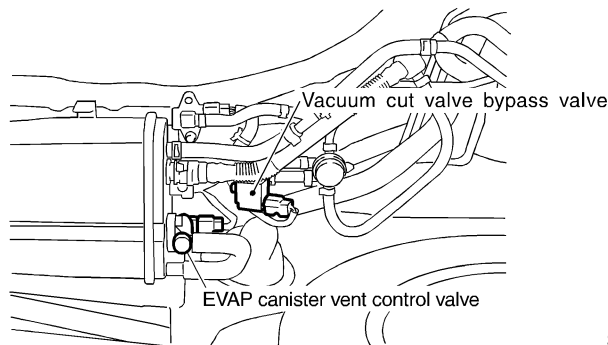
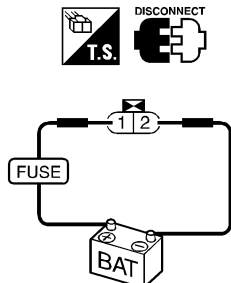
Diagnostic Procedure (Cont'd)

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7 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



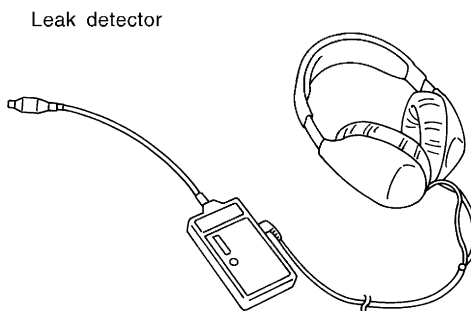
SEF401Z

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

8 RELEASE EVAP LINE PRESSURE

Ⓜ With CONSULT-II

1. Touch "BACK" on CONSULT-II screen.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF" and wait at least 10 seconds.
4. Start engine and let it idle for 90 seconds.
5. Keep engine speed at about 2,000 rpm for 30 seconds.
6. Turn ignition switch "OFF".

⊗ Without CONSULT-II

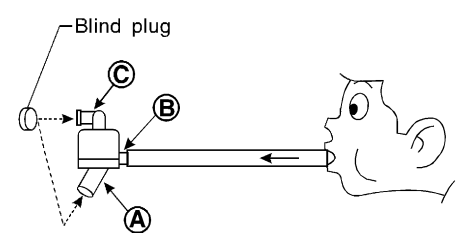
1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve.
2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve.
3. Start engine and warm it up to normal operating temperature.
4. Turn ignition switch "OFF" and wait at least 10 seconds.
5. Start engine and let it idle for 90 seconds.
6. Keep engine speed at about 2,000 rpm for 30 seconds.
7. Turn ignition switch "OFF".

	▶	GO TO 9.
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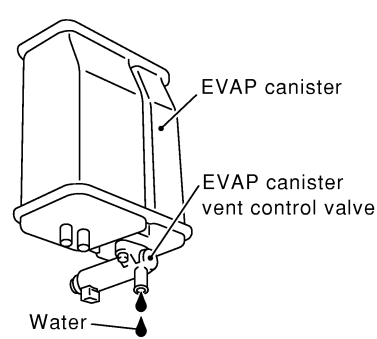
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
 <p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace water separator.

10	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
Refer to "DTC Confirmation Procedure", EC-1052.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

11	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister? 		
		
Yes or No		
Yes	▶	GO TO 12.
No (With CONSULT-II)	▶	GO TO 14.
No (Without CONSULT-II)	▶	GO TO 15.

SEF504Z

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

12	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING PART	
Check the following.		
<ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶		Repair hose or replace EVAP canister.

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>THRTL POS SEN</td><td>X.XX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X.XX V								
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
THRTL POS SEN	X.XX V																					
Vacuum should exist.																						
SEF537Z																						
OK or NG																						
OK	▶	GO TO 17.																				
NG	▶	GO TO 16.																				

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue;">Vacuum should exist.</p>		
OK or NG		
OK	▶	GO TO 19.
NG	▶	GO TO 16.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

16	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 17.
OK (Without CONSULT-II)	▶	GO TO 18.
NG	▶	Repair or reconnect the hose.

17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>VENT CONTROL/V</td><td style="text-align: center;">OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td style="text-align: center;">XXX %</td></tr> <tr><td>THRTL POS SEN</td><td style="text-align: center;">XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	THRTL POS SEN	XXX V								
ACTIVE TEST																						
VENT CONTROL/V	OFF																					
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ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
THRTL POS SEN	XXX V																					
SEF539Z																						
OK or NG																						
OK	▶	GO TO 19.																				
NG	▶	GO TO 18.																				

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

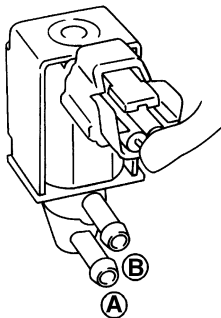
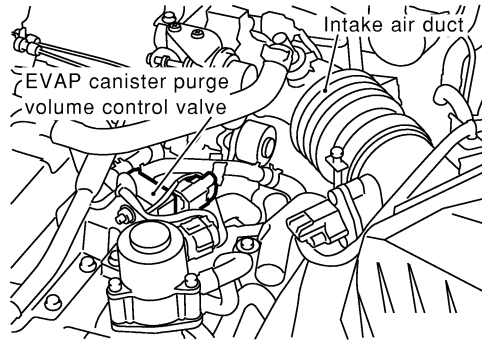
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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18 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



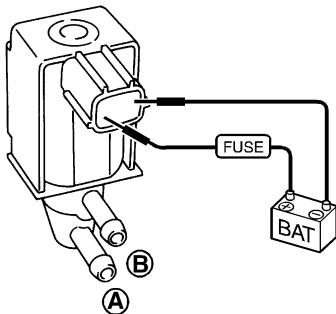
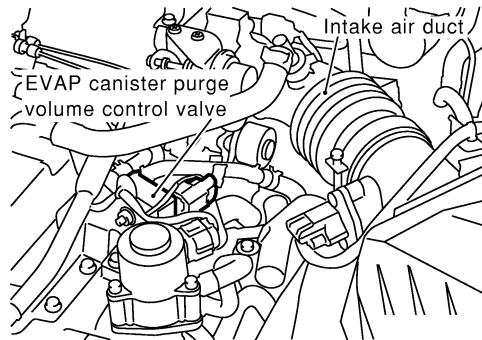
Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF402Z

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF402Z

SEF335X

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

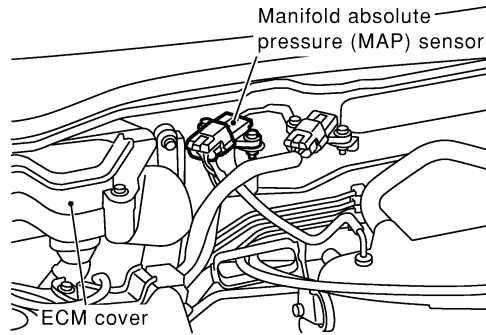
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

19 CHECK MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

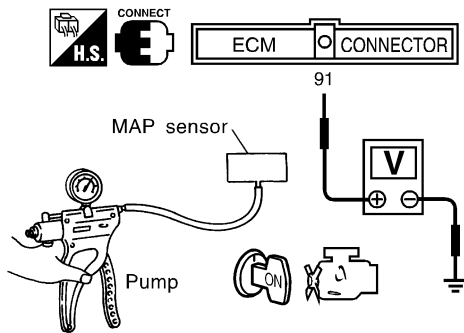
1. Remove manifold absolute pressure (MAP) sensor with its harness connector connected.



SEF389Z

2. Install a vacuum pump to MAP sensor.

3. Turn ignition switch "ON" and check output voltage between ECM terminal 91 and engine ground under the following conditions.



Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value

SEF541Z

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or over 101.3 kPa (760 mmHg, 29.92 inHg) of pressure.

OK or NG

OK	▶	GO TO 20.
NG	▶	Replace MAP sensor.

20 CHECK FUEL TANK TEMPERATURE SENSOR

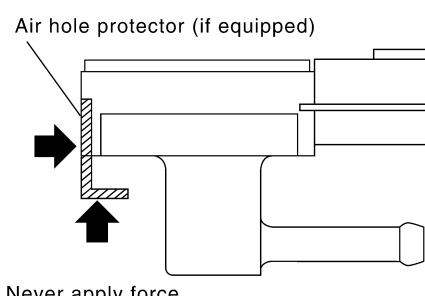
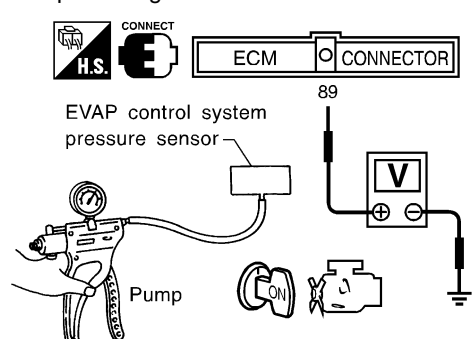
1. Remove fuel level sensor unit.
2. Check fuel tank temperature sensor.
Refer to "Component Inspection", EC-975.

OK or NG

OK	▶	GO TO 21.
NG	▶	Replace fuel level sensor unit.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

21	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. <div style="text-align: center;">  </div> <p style="text-align: right;">SEF799W</p> <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 89 and ground.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> </div> <p style="text-align: right;">SEF543Z</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. <p style="text-align: center;">OK or NG</p>	Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
Pressure (Relative to atmospheric pressure)	Voltage V								
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6								
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6								
OK	▶	GO TO 22.							
NG	▶	Replace EVAP control system pressure sensor.							

22	CHECK EVAP PURGE LINE	<p>Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-725.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 23.	
NG	▶	Repair or reconnect the hose.	

23	CLEAN EVAP PURGE LINE	<p>Clean EVAP purge line (pipe and rubber tube) using air blower.</p>	
	▶	GO TO 24.	

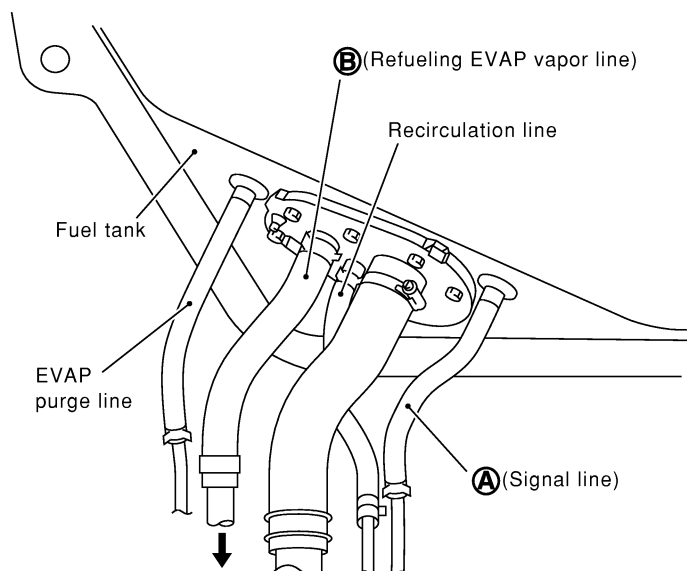
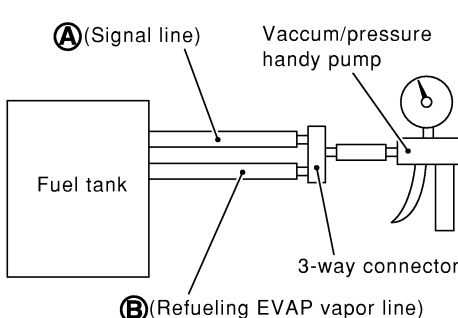
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

24	CHECK REFUELING EVAP VAPOR LINE
<p>Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-731.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 25.
NG	▶ Repair or replace hoses and tubes.

25	CHECK SIGNAL LINE AND RECIRCULATION LINE
<p>Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 26.
NG	▶ Repair or replace hoses, tubes or filler neck tube.

26	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p style="font-size: small;">Labels: Fuel tank, EVAP purge line, (B) (Refueling EVAP vapor line), Recirculation line, (A) (Signal line)</p> </div> <div style="text-align: center;">  <p style="font-size: small;">Labels: (A) (Signal line), Vacuum/pressure handy pump, Fuel tank, 3-way connector, (B) (Refueling EVAP vapor line)</p> </div> </div> <p style="text-align: right; font-size: x-small;">SEF505Z</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 27.
NG	▶ Replace refueling control valve with fuel tank.

27	CHECK FUEL LEVEL SENSOR
<p>Refer to EL-102, "Fuel Level Sensor Unit Check".</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 28.
NG	▶ Replace fuel level sensor unit.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

28	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

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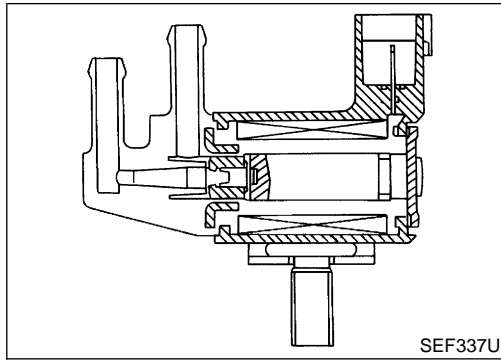
EL

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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (CALIF CA)

Description



Description

NIEC1428

COMPONENT DESCRIPTION

NIEC1428S01

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1429

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load 	Idle (Vehicle stopped)
	2,000 rpm	—

On Board Diagnosis Logic

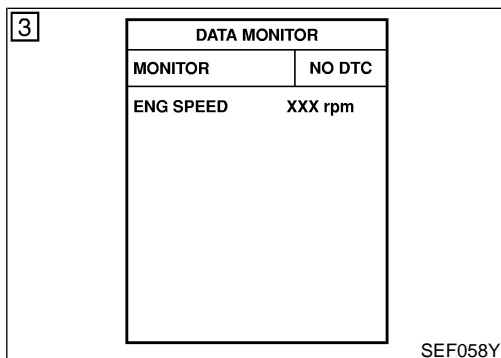
NIEC1430

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

Possible Cause

NIEC1431

- Harness or connectors
(The valve circuit is open or shorted.)
- EVAP canister purge volume control solenoid valve



DTC Confirmation Procedure

NIEC1432

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

Ⓜ WITH CONSULT-II

NIEC1432S01

- 1) Turn ignition switch "ON".

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 13 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1055. GI



WITH GST

Follow the procedure "WITH CONSULT-II" above.

NIEC1432S02

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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (CALIF CA)

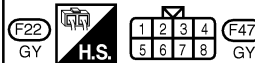
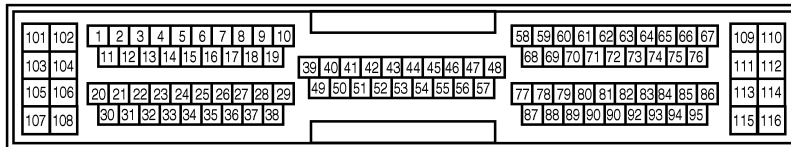
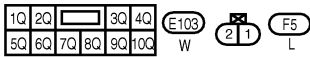
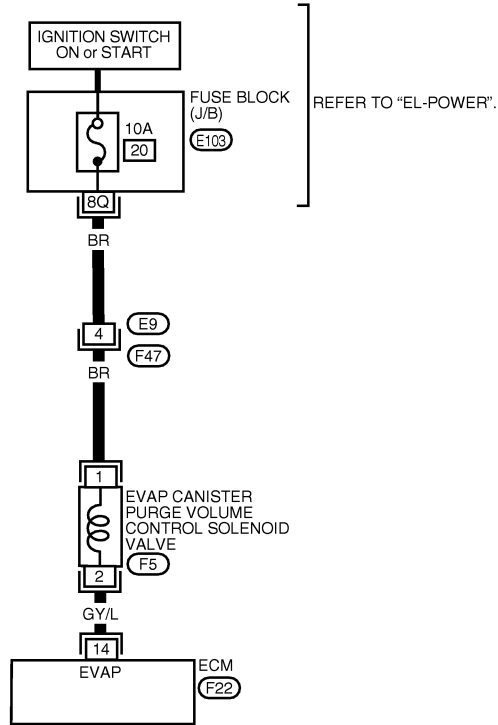
Wiring Diagram

Wiring Diagram

=NIEC1433

EC-PGC/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC401

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	GY/L	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE (V)
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE (V)

SEF576Y

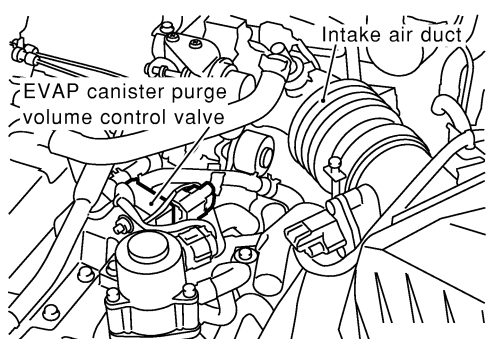
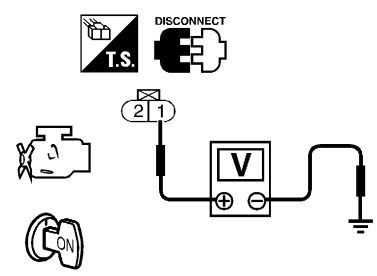
DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1434

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>Labels in diagram: Intake air duct, EVAP canister purge volume control valve</p> </div> <p style="text-align: right;">SEF402Z</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF206W</p> </div> <p style="text-align: center; color: blue;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	▶	GO TO 5.
OK (Without CONSULT-II)	▶	GO TO 6.
NG	▶	GO TO 4.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the harness for open or short between EVAP canister purge volume control solenoid valve and ECM.	
	Repair open circuit or short to ground and short to power in harness or connectors.

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>A/F ALPHA-B1</th> <th>XX %</th> </tr> <tr> <th>THRTL POS SEN</th> <th>X. XX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X. XX V										
ACTIVE TEST																							
PURG VOL CONT/V	XXX %																						
MONITOR																							
ENG SPEED	XXX rpm																						
A/F ALPHA-B1	XX %																						
THRTL POS SEN	X. XX V																						
SEF538Z																							
OK or NG																							
OK	GO TO 7.																						
NG	GO TO 6.																						

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

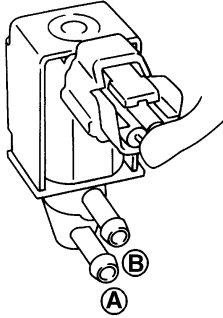
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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6 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

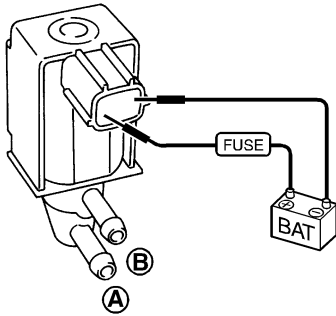


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

7 CHECK INTERMITTENT INCIDENT

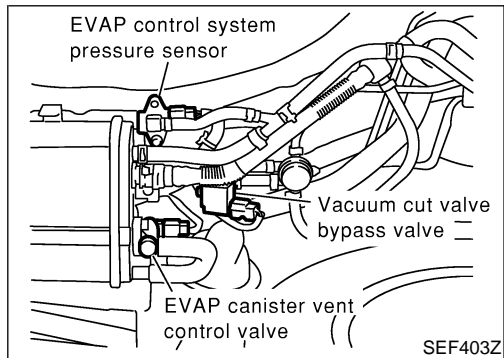
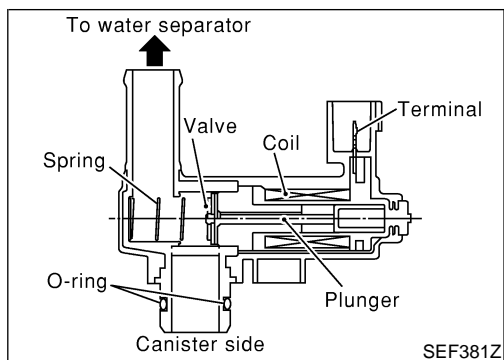
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.

▶ **INSPECTION END**

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1435

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1436

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

NIEC1437

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve.

Possible Cause

NIEC1438

- Harness or connectors (The valve circuit is open or shorted.)
- EVAP canister vent control valve

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC1439

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC1439S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 8 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1061.

WITH GST

NIEC1439S02

Follow the procedure "WITH CONSULT-II" above.

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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

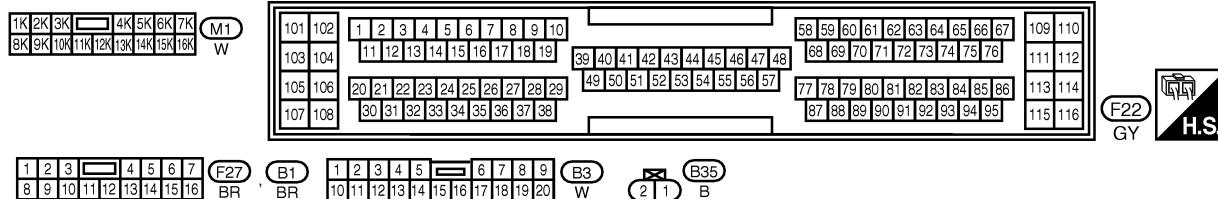
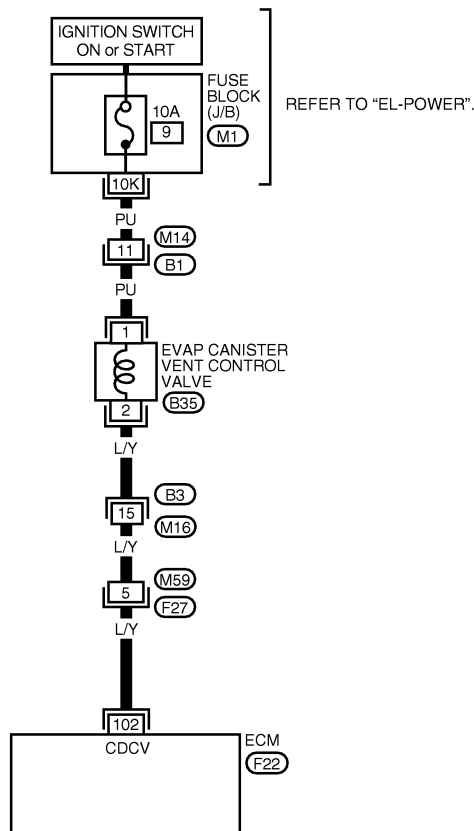
Wiring Diagram

Wiring Diagram

NIEC1440

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF577Y

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)


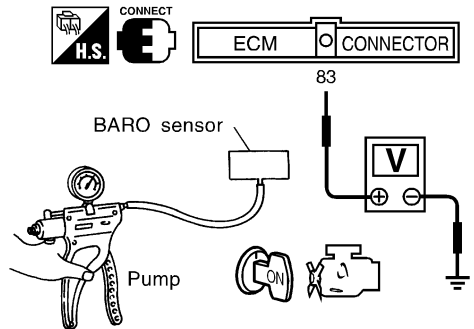
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1441

1	INSPECTION START	
1. Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT							
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "OFF" and then turn "ON". Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II. Touch "ON/OFF" on CONSULT-II screen. 								
<div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1;"> <table border="1" style="width: 100%;"> <thead> <tr> <th>Applied vacuum kPa (mmHg, inHg)</th> <th>Voltage V</th> </tr> </thead> <tbody> <tr> <td>Not applied</td> <td>3.2 - 4.8</td> </tr> <tr> <td>-26.7 (-200, -7.87)</td> <td>1.0 to 1.4V lower than above value</td> </tr> </tbody> </table> </div> </div>			Applied vacuum kPa (mmHg, inHg)	Voltage V	Not applied	3.2 - 4.8	-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value
Applied vacuum kPa (mmHg, inHg)	Voltage V							
Not applied	3.2 - 4.8							
-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value							
<p>4. Check for operating sound of the valve. Clicking noise should be heard.</p>								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	GO TO 3.						

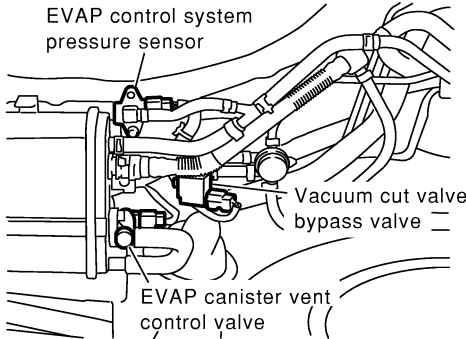
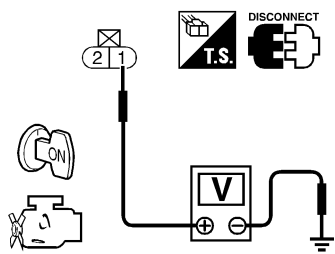
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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister vent control valve harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>		
SEF403Z		
SEF336X		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between EVAP canister vent control valve and fuse 		
▶		Repair harness or connectors.

5	CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 102 and EVAP canister vent control valve terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	GO TO 6.

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connectors M59, F27 ● Harness for open or short between EVAP canister vent control valve and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Clean the rubber tube using an air blower.

8	CHECK EVAP CANISTER VENT CONTROL VALVE-I
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.	
<p style="text-align: center;">5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p>	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace EVAP canister vent control valve.

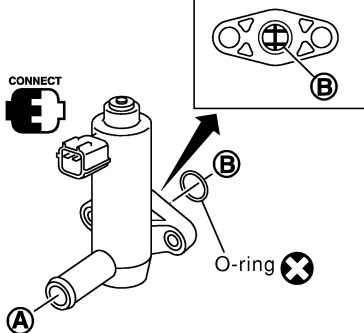
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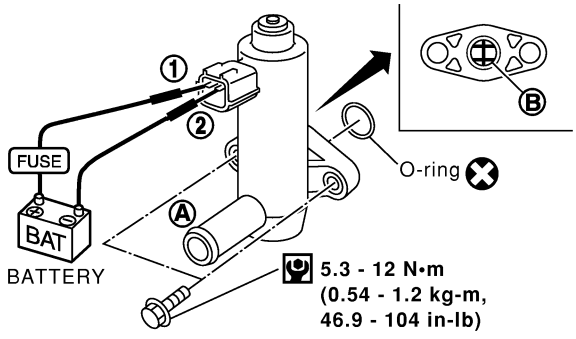
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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II																											
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																												
<table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F SEN1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <div style="display: flex; align-items: center; justify-content: space-between;">  <table border="1" style="width: 40%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> </div> <p style="text-align: center; margin-top: 5px;">Operation takes less than 1 second.</p>			ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
ENG SPEED	XXX rpm																											
A/F ALPHA-B1	XXX %																											
A/F SEN1 (B1)	XXX V																											
THRTL POS SEN	XXX V																											
Condition	Air passage continuity between A and B																											
VENT CONTROL/V ON	No																											
VENT CONTROL/V OFF	Yes																											
SEF544Z																												

	<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
<div style="display: flex; align-items: center; justify-content: space-between;">  <table border="1" style="width: 40%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> </div> <p style="text-align: center; margin-top: 5px;">Operation takes less than 1 second.</p>			Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B							
12V direct current supply between terminals 1 and 2	No							
OFF	Yes							
SEF378Z								
Make sure new O-ring is installed properly.								
OK or NG								
OK	▶	GO TO 11.						
NG	▶	GO TO 10.						

10	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 9 again. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure

- Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

NIEC1446

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 0°C (41°F) or more.

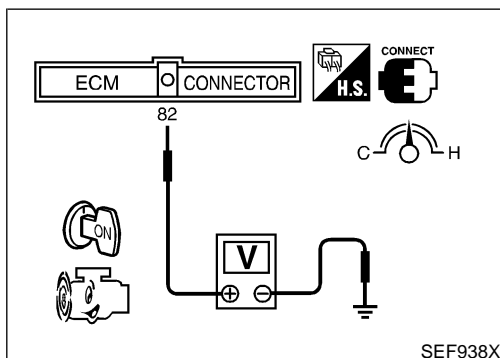
6	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	FUEL T/TMP SE	XXX °C

SEF194Y

WITH CONSULT-II

NIEC1446S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
- 6) Start engine and wait at least 20 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1068.



WITH GST

NIEC1446S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 82 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and wait at least 20 seconds.
- 5) Select "MODE 7" with GST.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1068.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

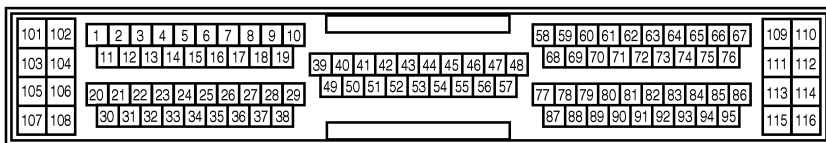
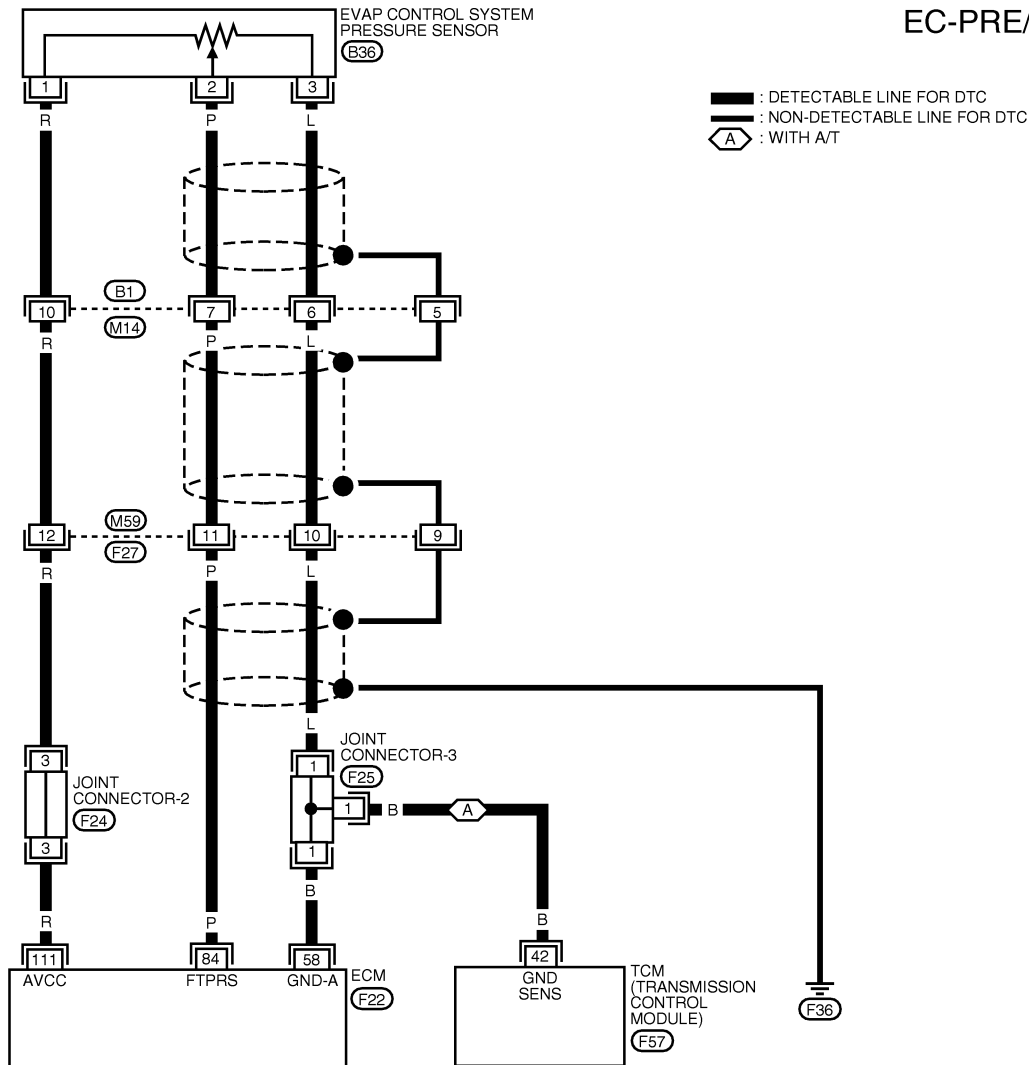
QG18DE (CALIF CA)

Wiring Diagram

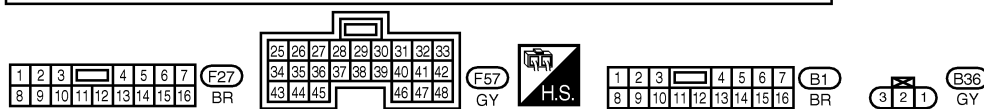
Wiring Diagram

NIEC1447

EC-PRE/SE-01



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR



LEC205

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
89	P	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF578YA

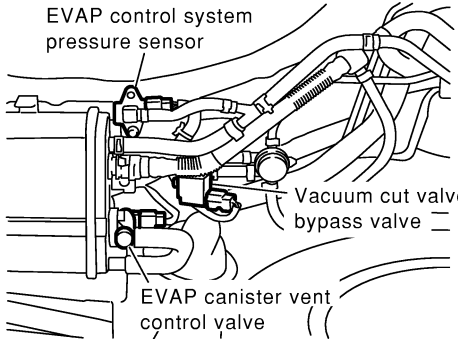
DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

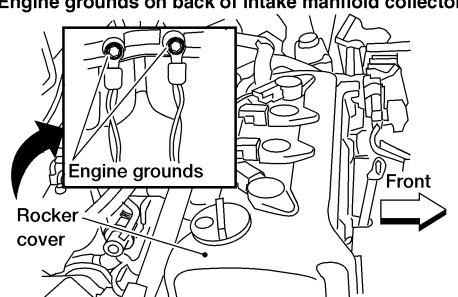
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1448

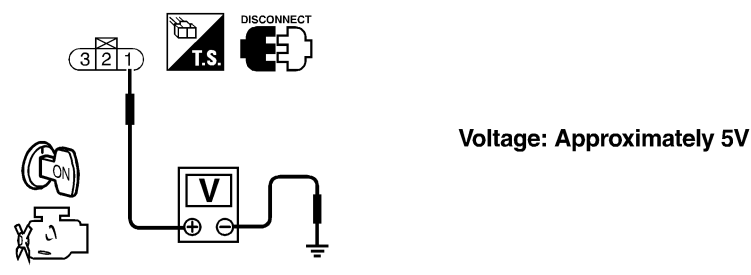
1	CHECK RUBBER TUBE		
<p>1. Turn ignition switch "OFF".</p> <p>2. Check rubber tube connected to the EVAP control system pressure sensor for clogging, vent, kink, disconnection or improper connection.</p>			
			
SEF403Z			
OK or NG			
OK	▶	GO TO 2.	
NG	▶	Reconnect, repair or replace.	

2	RETIGHTEN GROUND SCREWS		
Loosen and retighten engine ground screws.			
<p>Engine grounds on back of intake manifold collector</p> 			
WEC249			
▶		GO TO 3.	

3	CHECK CONNECTOR		
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <p>2. Check sensor harness connector for water.</p> <p style="color: blue;">Water should not exist.</p>			
OK or NG			
OK	▶	GO TO 4.	
NG	▶	Repair or replace harness connector.	

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>		
		
SEF341X		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-2 ● Harness for open or short between EVAP control system pressure sensor and ECM 		
▶ Repair harness or connectors.		

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6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-3 ● Harness for open or short between EVAP control system pressure sensor and TCM ● Harness for open or short between EVAP control system pressure sensor and ECM 		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 89 and EVAP control system pressure sensor terminal 2. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II)	▶	GO TO 10.
OK (Without CONSULT-II)	▶	GO TO 11.
NG	▶	GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Harness for open or short between ECM and EVAP control system pressure sensor 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																									
<p>Ⓜ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>A/F ALPHA-B1</th> <th>XX %</th> </tr> <tr> <th>THRTL POS SEN</th> <th>X. XX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X. XX V												
ACTIVE TEST																										
PURG VOL CONT/V	XXX %																									
MONITOR																										
ENG SPEED	XXX rpm																									
A/F ALPHA-B1	XX %																									
THRTL POS SEN	X. XX V																									
OK or NG																										
OK	▶	GO TO 12.																								
NG	▶	GO TO 11.																								

SEF538Z

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

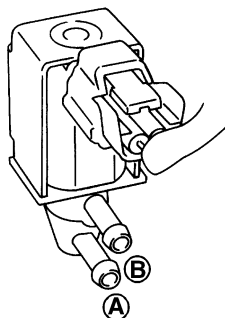
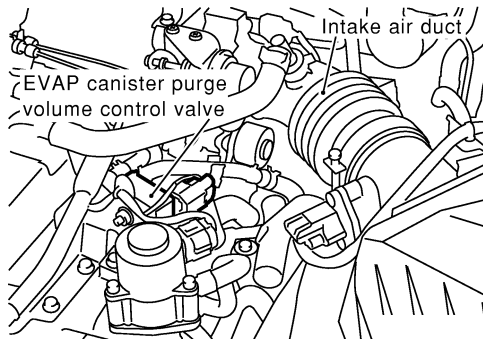
Diagnostic Procedure (Cont'd)

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11 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



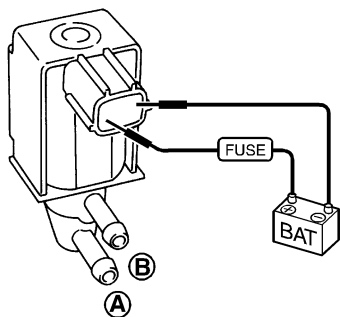
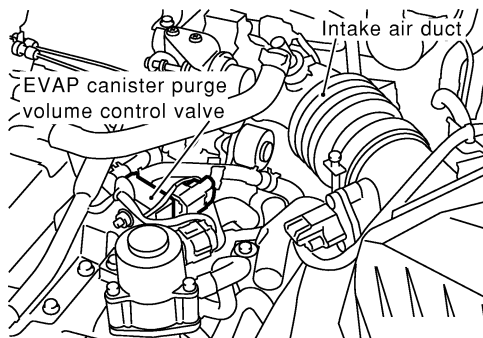
SEF402Z

Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF402Z

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

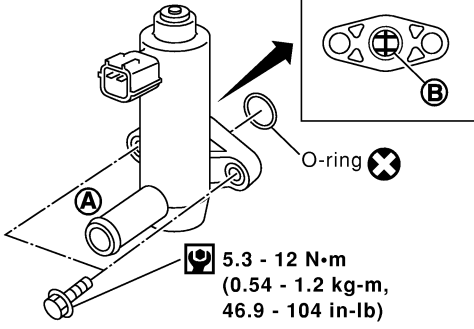
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

12	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Clean the rubber tube using an air blower.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

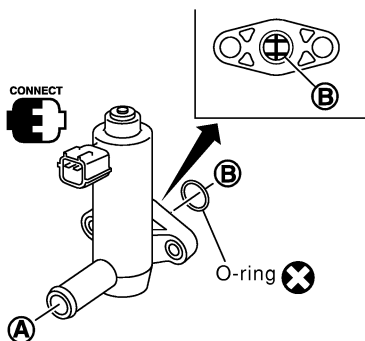
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14 CHECK EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time under the following conditions.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	XXX V



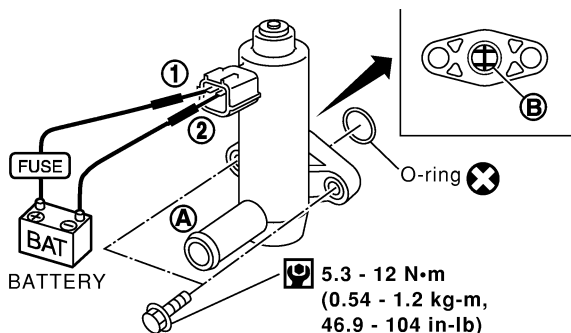
Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEF544Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

15 CHECK EVAP CANISTER VENT CONTROL VALVE-III

- Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.
- Perform Test No. 14 again.

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 89 and ground.</p>	
SEF543Z	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP control system pressure sensor.

17	CHECK RUBBER TUBE
<p>Check obstructed rubber tube connected to EVAP canister vent control valve.</p>	
OK or NG	
OK	▶ GO TO 18.
NG	▶ Clean rubber tube using an air blower, repair or replace rubber tube.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

18	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
<p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. 	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace water separator.

19	CHECK IF EVAP CANISTER SATURATED WITH WATER
<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister. 	
<p style="text-align: center;">Yes or No</p>	
Yes	▶ GO TO 20.
No	▶ GO TO 22.

20	CHECK EVAP CANISTER
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached.</p> <p>The weight should be less than 1.8 kg (4.0 lb).</p>	
OK or NG	
OK	▶ GO TO 18.
NG	▶ GO TO 21.

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

21	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● EVAP canister for damage● EVAP hose between EVAP canister and water separator for clogging or poor connection	
▶	Repair hose or replace EVAP canister.
22	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

On Board Diagnosis Logic

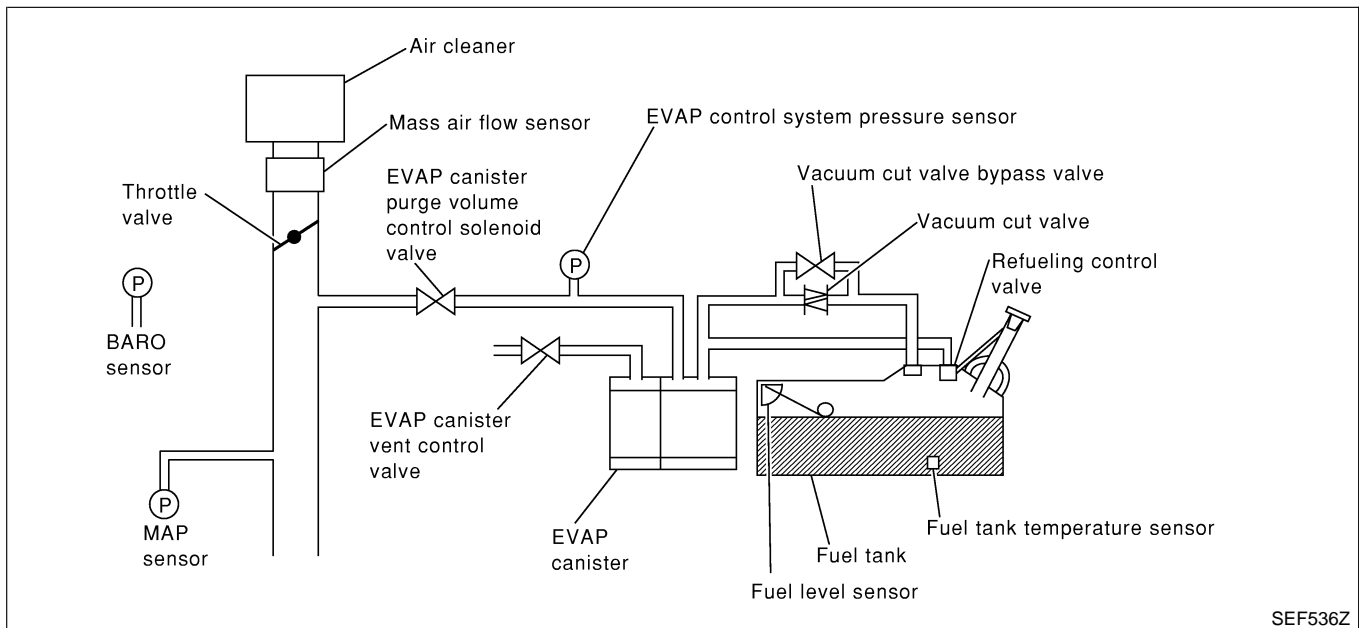
On Board Diagnosis Logic

NIEC1449

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1287.)

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in the EVAP system between the fuel tank and the EVAP canister purge volume control solenoid valve.



SEF536Z

Malfunction is detected when EVAP control system has very large leaks such as when fuel filler cap has fallen off, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC1450

- Fuel filler cap remains open or fails to close.
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Manifold absolute pressure (MAP) sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)
DTC Confirmation Procedure

NIEC1451

6 EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
-FUEL LEVEL: 1/4-3/4
-AMBIENT TEMP: 0-30 C(32-86F)
-OPEN ENGINE HOOD.
2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
3)TOUCH START.

SEF565X

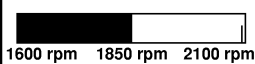
6 EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

SEF566X

6 EVAP SML LEAK P0440/P1440

MAINTAIN
1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
(APPROX. 3 MINUTES)



1600 rpm 1850 rpm 2100 rpm

SEF874X

6 EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

DTC Confirmation Procedure

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1287.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform "DTC WORK SUPPORT" when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

WITH CONSULT-II

- 1) Tighten fuel filler cap securely until ratcheting sound is heard.
- 2) Turn ignition switch "ON".
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
- 6) Select "EVAP SML LEAK P0440/P1440" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-798.

- 7) Make sure that "OK" is displayed.
If "NG" is displayed, select "SELF-DIAG RESULTS" mode with CONSULT-II and make sure that "EVAP GROSS LEAK [P0455]" is displayed. If it is displayed, refer to "Diagnostic Procedure", EC-1080.
If P0440 is displayed, perform "Diagnostic Procedure" for DTC P0440, EC-1039.

WITH GST

NOTE:

Be sure to read the explanation of "Driving Pattern" on EC-764 before driving vehicle.

- 1) Start engine.
 - 2) Drive vehicle according to "Driving Pattern", EC-764.
 - 3) Stop vehicle.
 - 4) Select "MODE 1" with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
 - 5) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 6) Start engine.
- It is not necessary to cool engine down before driving.

EC-1079

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

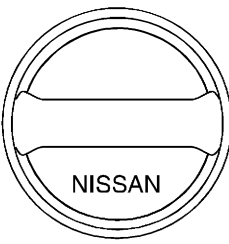
QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Drive vehicle again according to the "Driving Pattern", EC-764.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-1080.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0440, EC-1039.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-1278.
 - If P0440, P0455, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NIEC1452

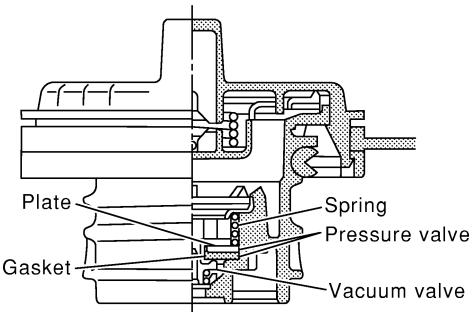
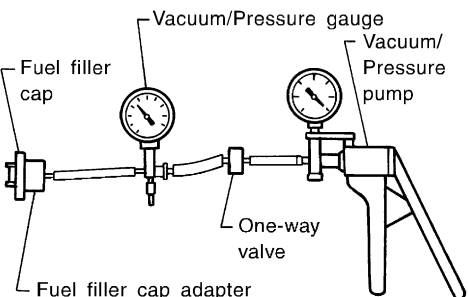
1	CHECK FUEL FILLER CAP DESIGN	
<p>1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><small>SEF915U</small></p>		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION	
<p>Check that the cap is tightened properly by rotating the cap clockwise.</p>		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum.		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.3 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.50 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

5	CHECK EVAP PURGE LINE	
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection. Refer to "Evaporative Emission System", EC-725.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or reconnect the hose.

6	CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.		
	▶	GO TO 7.

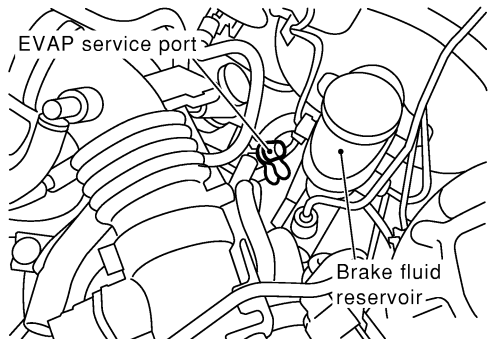
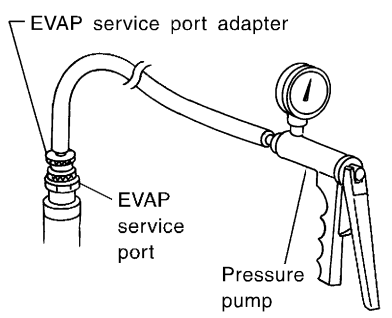
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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
Refer to "DTC Confirmation Procedure", EC-1059.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

8	INSTALL THE PRESSURE PUMP	
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.		
		
SEF400Z		
		
SEF916U		
NOTE:		
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.		
Models with CONSULT-II	▶	GO TO 9.
Models without CON- SULT-II	▶	GO TO 10.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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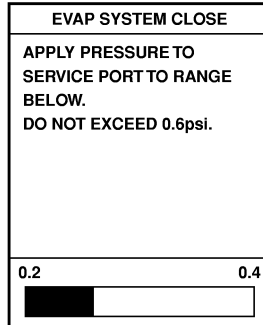
9 CHECK FOR EVAP LEAK

Ⓟ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

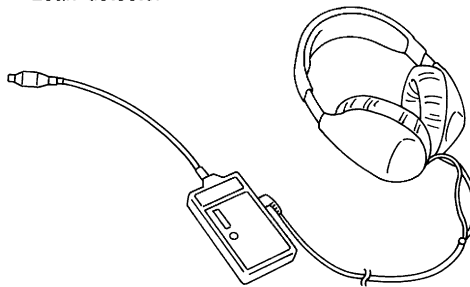
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

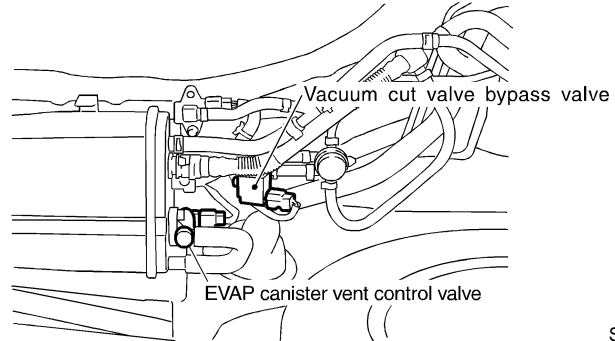
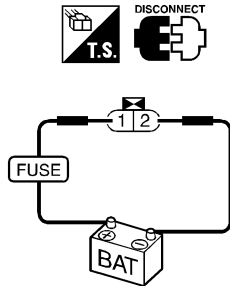
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

10 CHECK FOR EVAP LEAK

⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)
3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



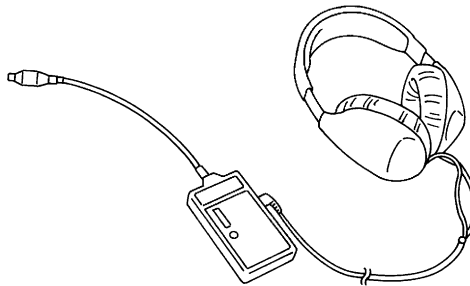
4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

11	RELEASE EVAP LINE PRESSURE	
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine and warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 		
<p><input type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine and warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 		
Models with CONSULT-II		▶ GO TO 12.
Models without CONSULT-II		▶ GO TO 13.

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12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XX %</td></tr> <tr><td>THRTL POS SEN</td><td>X.XX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X.XX V								
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XX %																					
THRTL POS SEN	X.XX V																					
Vacuum should exist.																						
OK or NG																						
OK		▶ GO TO 15.																				
NG		▶ GO TO 14.																				

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13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p><input type="checkbox"/> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue;">Vacuum should exist.</p>		
OK or NG		
OK		▶ GO TO 16.
NG		▶ GO TO 14.

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DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

14	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	Repair or reconnect the hose.

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																							
<p>ⓘ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>A/F ALPHA-B1</th> <th>XX %</th> </tr> <tr> <th>THRTL POS SEN</th> <th>X. XX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X. XX V										
ACTIVE TEST																								
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THRTL POS SEN	X. XX V																							
SEF538Z																								
OK or NG																								
OK	▶	GO TO 17.																						
NG	▶	GO TO 16.																						

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

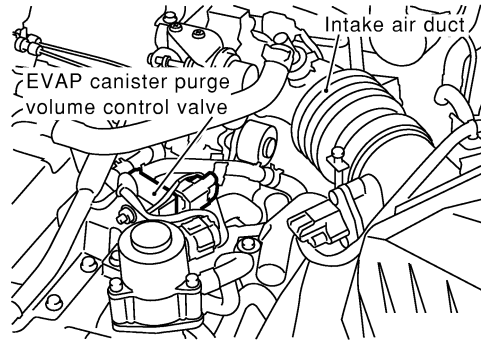
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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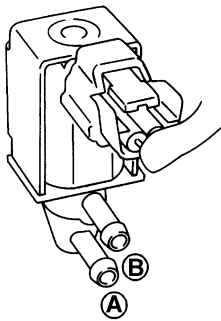
16 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF402Z

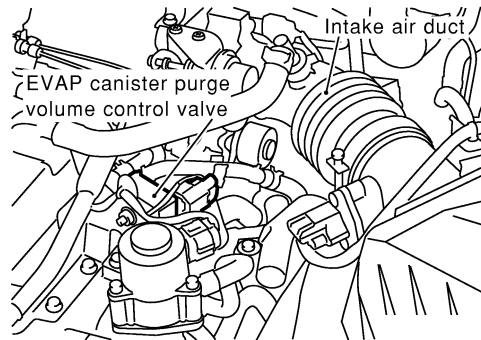


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

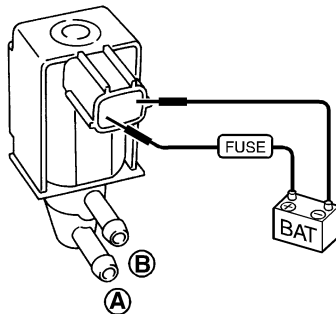
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



SEF402Z



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 17.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

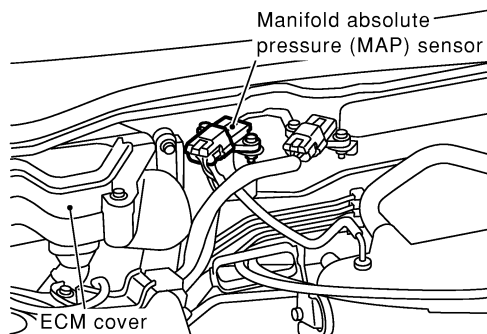
DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

17 CHECK MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

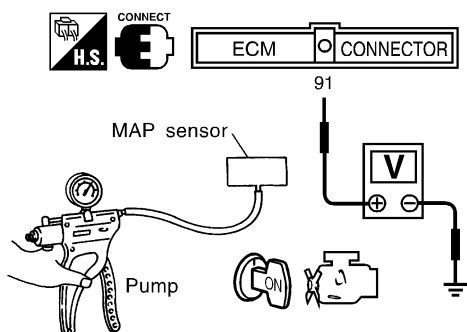
1. Remove manifold absolute pressure (MAP) sensor with its harness connector connected.



SEF389Z

2. Install a vacuum pump to MAP sensor.

3. Turn ignition switch "ON" and check output voltage between ECM terminal 91 and engine ground under the following conditions.



Applied vacuum kPa (mmHg, inHg)	Voltage V
Not applied	1.8 - 4.8
-26.7 (-200, -7.87)	1.0 to 1.4V lower than above value

SEF541Z

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or over 101.3 kPa (760 mmHg, 29.92 inHg) of pressure.

OK or NG

OK	▶	GO TO 18.
NG	▶	Replace MAP sensor.

18 CHECK FUEL TANK TEMPERATURE SENSOR

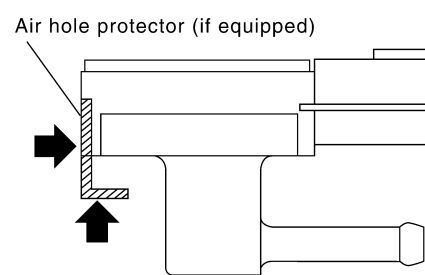
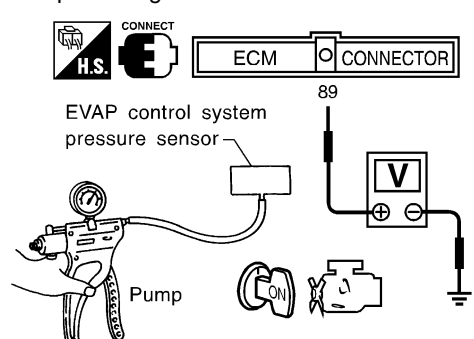
1. Remove fuel level sensor unit.
2. Check fuel tank temperature sensor.
Refer to "Component Inspection", EC-975.

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace fuel level sensor unit.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

19	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. <div style="text-align: center;">  </div> <p style="text-align: right;">SEF799W</p> <p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 89 and ground.</p> <div style="display: flex; align-items: center;"> <div style="flex: 1;">  </div> <div style="flex: 1; margin-left: 20px;"> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Pressure (Relative to atmospheric pressure)</th> <th style="text-align: center;">Voltage V</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0 kPa (0 mmHg, 0 inHg)</td> <td style="text-align: center;">3.0 - 3.6</td> </tr> <tr> <td style="text-align: center;">-9.3 kPa (-70 mmHg, -2.76 inHg)</td> <td style="text-align: center;">0.4 - 0.6</td> </tr> </tbody> </table> </div> </div> <p style="text-align: right;">SEF543Z</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. <p style="text-align: center;">OK or NG</p>	Pressure (Relative to atmospheric pressure)	Voltage V	0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6	-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6	GI MA EM LC EC FE CL MT AT AX SU BR ST RS
Pressure (Relative to atmospheric pressure)	Voltage V								
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6								
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6								
OK	▶	GO TO 20.							
NG	▶	Replace EVAP control system pressure sensor.							

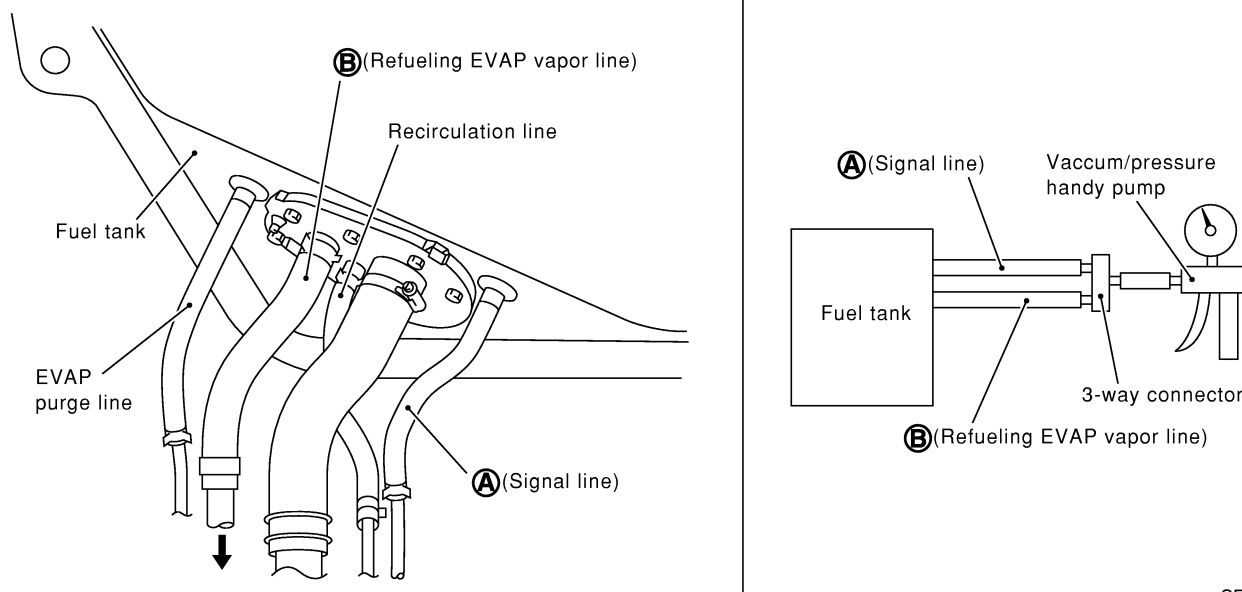
20	CHECK REFUELING EVAP VAPOR LINE	<p>Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-732.</p> <p style="text-align: center;">OK or NG</p>	BT HA SC
OK	▶	GO TO 21.	
	▶	Repair or replace hoses and tubes.	

21	CHECK SIGNAL LINE AND RECIRCULATION LINE	<p>Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.</p> <p style="text-align: center;">OK or NG</p>	EL IDX
OK	▶	GO TO 22.	
	▶	Repair or replace hoses, tubes or filler neck tube.	

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

22	CHECK REFUELING CONTROL VALVE
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 	
	
OK or NG	
OK	▶ GO TO 23.
	▶ Replace refueling control valve with fuel tank.

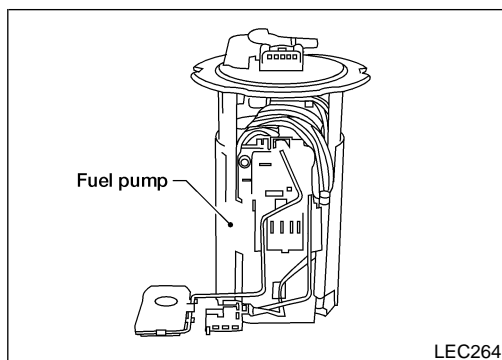
SEF505Z

23	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC1453} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected. ^{NIEC1454}

Malfunction is detected when even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

Possible Cause

- Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.) ^{NIEC1455}
- Fuel level sensor

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC1456}

Ⓟ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC1456S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait maximum of 2 consecutive minutes. ^{HA}
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1093.

Ⓢ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC1456S02}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF563X

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

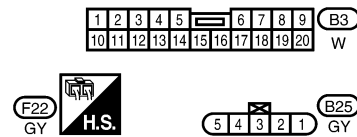
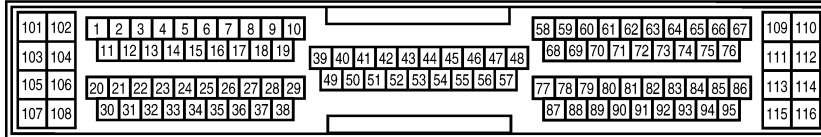
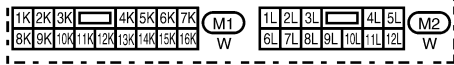
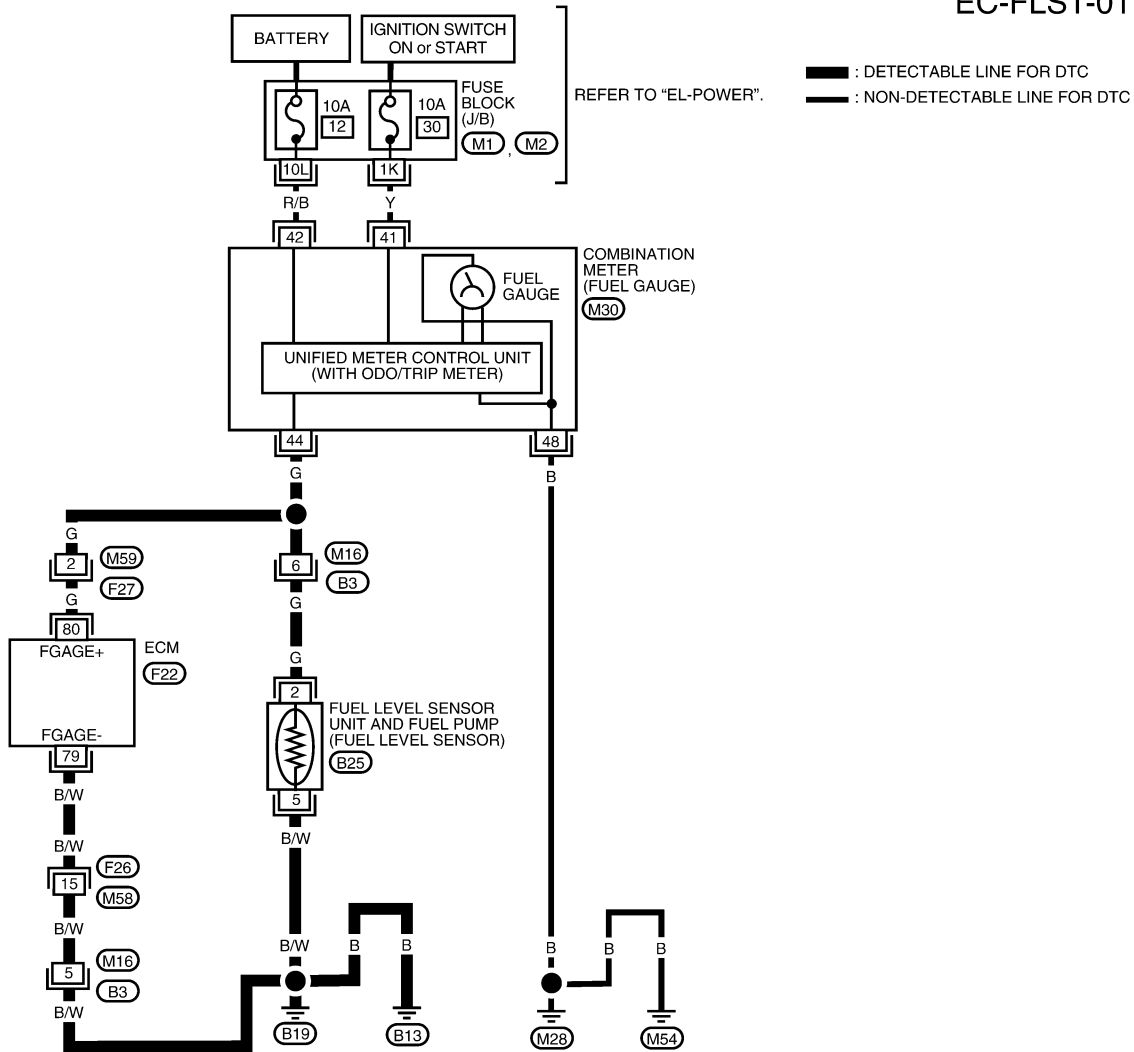
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1457

EC-FLS1-01



WEC143A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
80	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
79	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF579YA

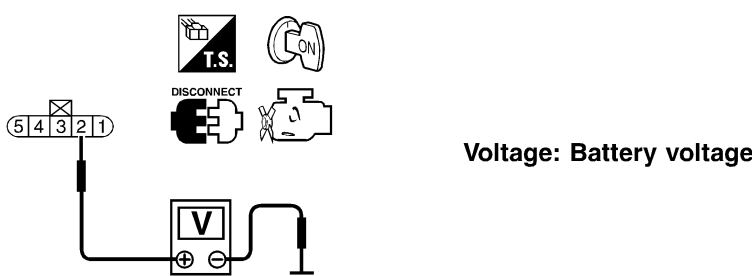
DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC1458

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor until and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or a tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT	
	OK	▶	GO TO 3.	
	NG	▶	GO TO 2.	

SEF524Z

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M16, B3 ● Harness for open or short between combination meter and fuel level sensor unit 	
		▶	Repair or replace harness or connectors.

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	SU BR ST RS
	OK	▶	GO TO 4.
	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 80 and fuel level sensor unit terminal 2, ECM terminal 79 and fuel level sensor unit terminal 5. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	BT HA SC EL IDX
	OK	▶	GO TO 6.
	NG	▶	GO TO 5.

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

QG18DE (CALIF CA)

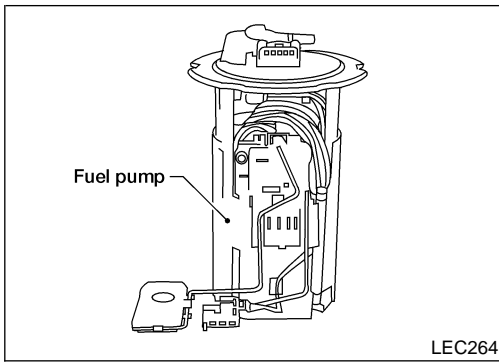
Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors F27, M59● Harness connectors F26, M58● Harness connectors M16, B3● Harness for open or short between ECM and combination meter● Harness for open or short between ECM and fuel level sensor	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.
6	CHECK FUEL LEVEL SENSOR
Refer to EL-102 , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.
7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P0461 FUEL LEVEL SENSOR FUNCTION

QG18DE (CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC1459} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

Driving long distances naturally affect fuel gauge level. ^{NIEC1460}

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

Malfunction is detected when the output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.

Possible Cause

- Harness or connectors (The level sensor circuit is open or shorted.)
- Fuel level sensor

Overall Function Check

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed. ^{NIEC1462}

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to *FE-5*, "FUEL SYSTEM".

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

Ⓜ WITH CONSULT-II

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-743.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

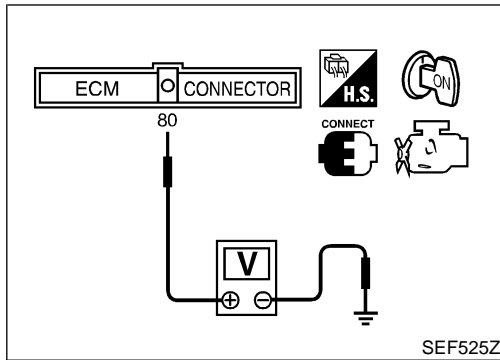
SEF195Y

DTC P0461 FUEL LEVEL SENSOR FUNCTION

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
- 7) Check "FUEL LEVEL SE" output voltage and note it.
- 8) Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
- 9) Touch "ON" and drain fuel approximately 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
- 10) Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Check "FUEL LEVEL SE" output voltage and note it.
- 12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11.
If NG, check the fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK".



WITH GST

NIEC1462S02

NOTE:

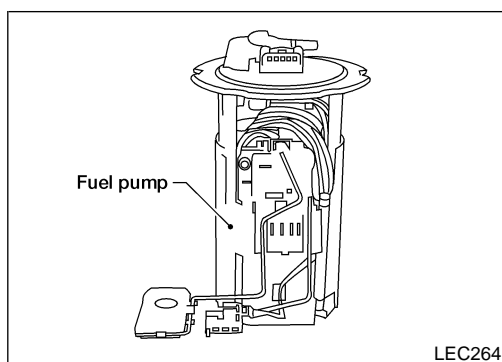
Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-743.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.
- 5) Turn ignition switch "OFF".
- 6) Set voltmeters probe between ECM terminal 80 (fuel level sensor signal) and ground.
- 7) Turn ignition switch "ON".
- 8) Check voltage between ECM terminal 80 and ground and note it.
- 9) Drain fuel by 30ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
- 10) Fill fuel into the fuel tank for 30ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Confirm that the voltage between ECM terminal 80 and ground changes more than 0.03V during step 8 - 10.
If NG, check component of fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK".

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC1463} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor circuit. ^{NIEC1464} One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

Malfunction is detected when an excessively low or high voltage is sent from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.) ^{NIEC1465}
- Fuel level sensor

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

Ⓜ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC1466S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1099.

Ⓜ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC1466S02}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

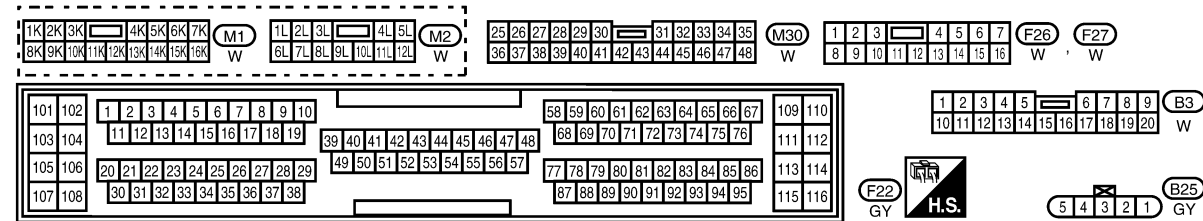
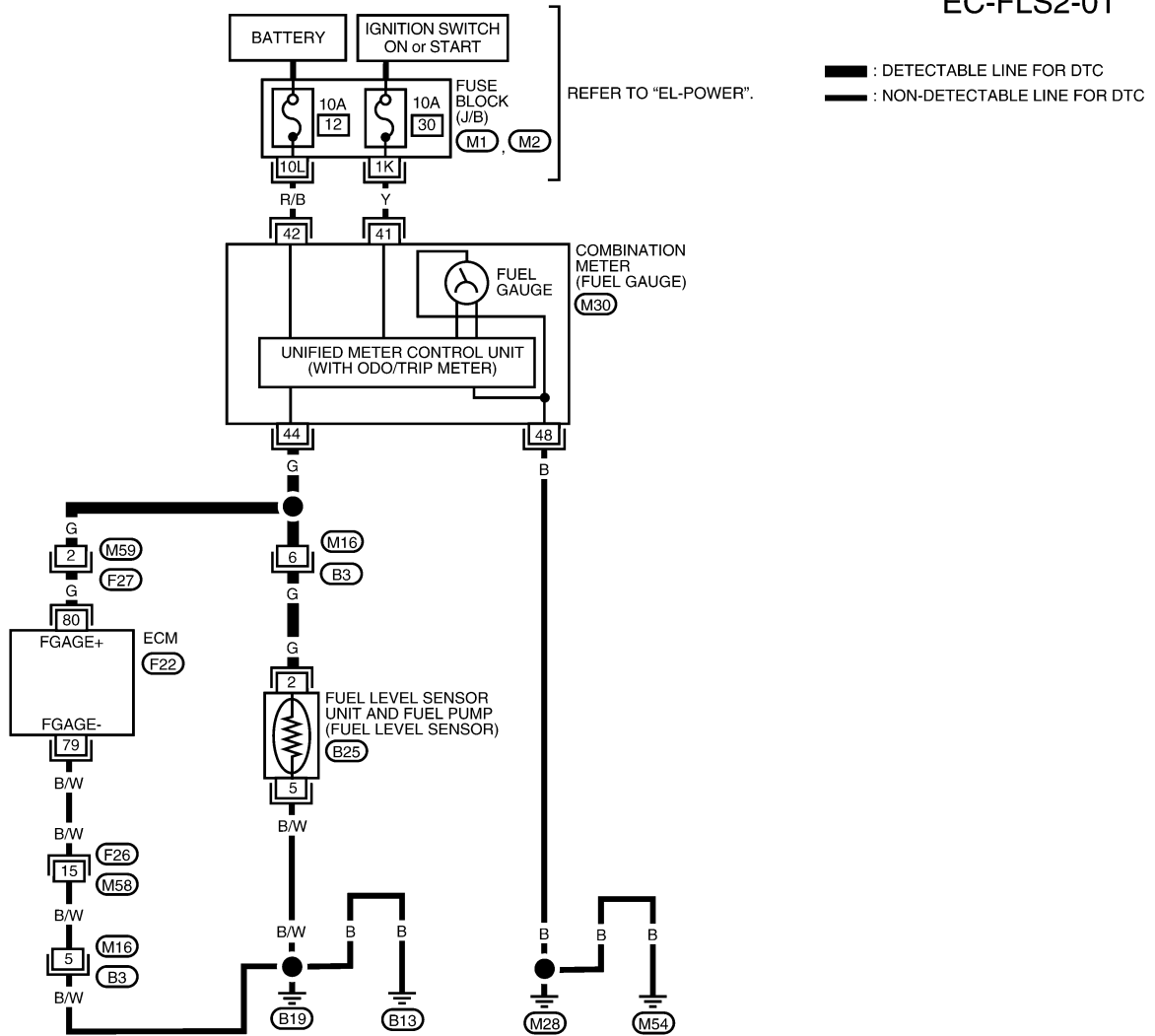
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1467

EC-FLS2-01



WEC144A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
80	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
79	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF579YA

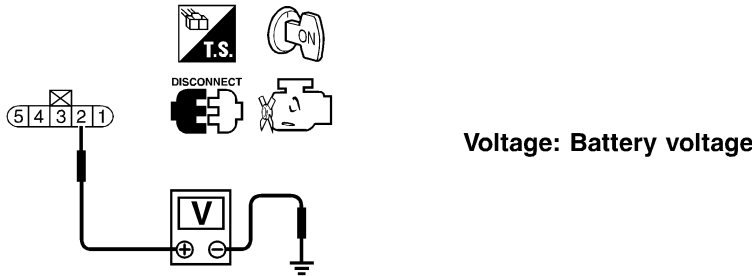
DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC1468

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit terminal 2 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> </div> <p style="text-align: right;">SEF524Z</p>	GI MA EM LC EC FE CL MT
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M16, B3 ● Harness for open or short between combination meter and fuel level sensor unit 	
	▶	Repair or replace harness or connectors.	

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit terminal 5 and body ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	SU BR ST RS
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 80 and fuel level sensor unit terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	BT HA SC EL
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F27, M59 ● Harness for open or short between ECM and combination meter 	
	▶	Repair open circuit or short to ground or short to power in harness on connectors.	

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

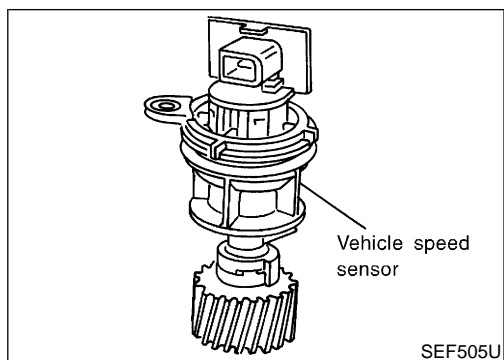
6	CHECK FUEL LEVEL SENSOR
Refer to EL-102 , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (CALIF CA)

Component Description



Component Description

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the speedometer. The speedometer then sends a signal to the ECM.

NIEC1469

GI
MA
EM
LC

On Board Diagnosis Logic

NIEC1470

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0500	<ul style="list-style-type: none"> The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. 	<ul style="list-style-type: none"> Harness or connector (The vehicle speed sensor circuit is open or shorted.) Vehicle speed sensor

EC
FE
CL

DTC Confirmation Procedure

NIEC1471

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

AT
AX
SU
BR

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

With CONSULT-II

- Start engine
- Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- If NG, go to "Diagnostic Procedure", EC-1104. If OK, go to following step.
- Select "DATA MONITOR" mode with CONSULT-II.
- Warm engine up to normal operating temperature.
- Maintain the following conditions for at least 10 consecutive seconds.

ST
RS
BT
HA
SC

ENG SPEED	2,100 - 3,000 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	6.5 - 10.75 msec
Selector lever	Suitable position
PW/ST SIGNAL	OFF

EL
IDX

- If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1104.

DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (CALIF CA)

Overall Function Check

Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a 1st trip DTC might not be confirmed. NIEC1472

With GST

- 1) Lift up drive wheels.
- 2) Start engine.
- 3) Read vehicle speed sensor signal in "MODE 1" with GST. The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4) If NG, go to "Diagnostic Procedure", EC-1104.

DTC P0500 VEHICLE SPEED SENSOR (VSS)

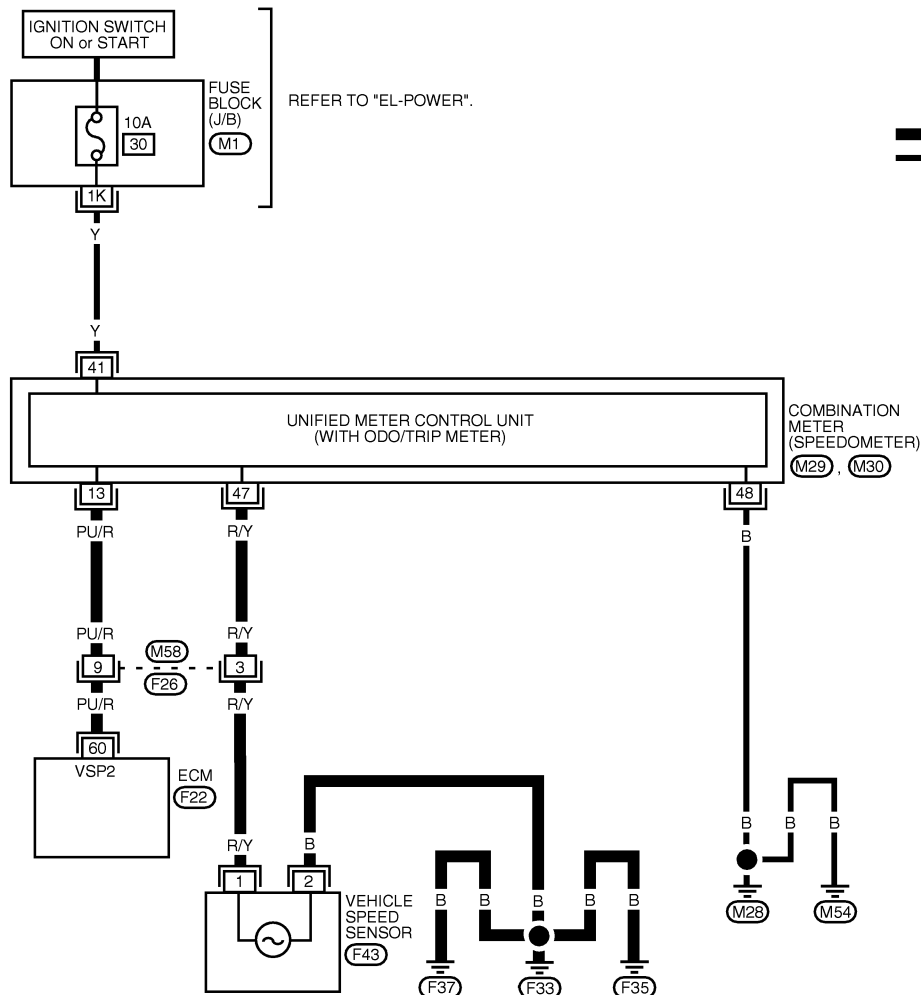
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1473

EC-VSS-01



— : Detectable line for DTC
 - - - : Non-detectable line for DTC

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

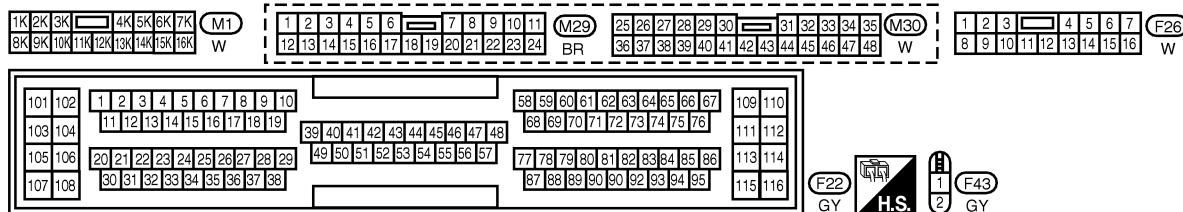
BT

HA

SC

EL

IDX



WEC400

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
60	PU/R	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 40 KM/H (25 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	0 - APPROX. 4.2V

SEF580YA

DTC P0500 VEHICLE SPEED SENSOR (VSS)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1474

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and combination meter harness connector.</p> <p>3. Check harness continuity between ECM terminal 60 and combination meter terminal 13. Refer to Wiring Diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between ECM and combination meter 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK SPEEDOMETER FUNCTION	
<p>Make sure that speedometer functions properly.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between combination meter and vehicle speed sensor <p style="text-align: center;">OK or NG</p>		
OK	▶	Check combination meter and vehicle speed sensor. Refer to EL-85 , "METERS AND GAUGES".
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>		
▶		INSPECTION END

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

Description

Description SYSTEM DESCRIPTION

NIEC1475

NIEC1475S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Idle air control	IACV-AAC valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Park/neutral position (PNP) switch	Park/neutral position		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		
Intake air temperature sensor	Intake air temperature		
Absolute pressure sensor	Ambient barometric pressure		

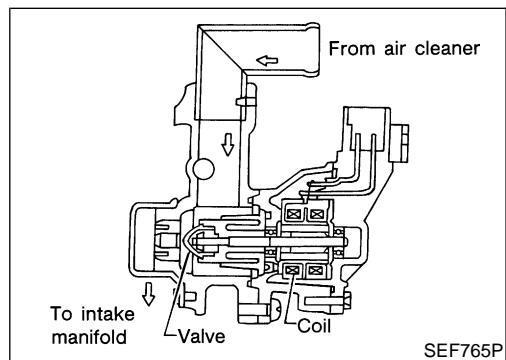
This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which by-passes the throttle valve via IACV-AAC valve. The IACV-AAC valve changes the opening of the air by-pass passage to control the amount of auxiliary air. This valve is actuated by a step motor built into the valve, which moves the valve in the axial direction in steps corresponding to the ECM output signals. One step of IACV-AAC valve movement causes the respective opening of the air by-pass passage. (i.e. when the step advances, the opening is enlarged.) The opening of the valve is varied to allow for optimum control of the engine idling speed. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the step position of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warm up, deceleration, and engine load (air conditioner, power steering and cooling fan operation).

COMPONENT DESCRIPTION IACV-AAC Valve

NIEC1475S02

NIEC1475S0201

The IACV-AAC valve is operated by a step motor for centralized control of auxiliary air supply. This motor has four winding phases and is actuated by the output signals of ECM which turns ON and OFF two windings each in sequence. Each time the IACV-AAC valve opens or closes to change the auxiliary air quantity, the ECM sends a pulse signal to the step motor. When no change in the auxiliary air quantity is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.



DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC1476

MONITOR ITEM	CONDITION		SPECIFICATION
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	5 - 20 steps
		2,000 rpm	—

On Board Diagnosis Logic

NIEC1477

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0505	A)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is open.) ● IACV-AAC valve
	B)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is shorted.) ● Air control valve (Power steering) ● IACV-AAC valve

DTC Confirmation Procedure

NIEC1478

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- **Perform "Procedure for malfunction A" first. If 1st trip DTC cannot be confirmed, perform "Procedure for malfunction B".**
- **If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", EC-755, before conducting "DTC Confirmation Procedure". For the target idle speed, refer to "SERVICE DATA AND SPECIFICATIONS (SDS)", EC-1359.**

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC1478S01

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for three seconds, then let it idle for three seconds.
- 5) Perform step 4 once more.

EC-1106

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1109.

 **With GST**

Follow the procedure “With CONSULT-II” above.

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DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION B

NIEC1478S02

TESTING CONDITION:

- Before performing the following procedure, make sure battery voltage is more than 11V at idle.
- For best results, perform the test at a temperature above -10°C (14°F).
- Electrical load (rear window defogger, headlamps, air conditioner, etc.) is not applied.

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 **With CONSULT-II**

- 1) Open engine hood.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
- 5) Start engine and run it for at least 1 minute at idle speed.
- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1109.

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 **With GST**

Follow the procedure “With CONSULT-II” above.

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DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

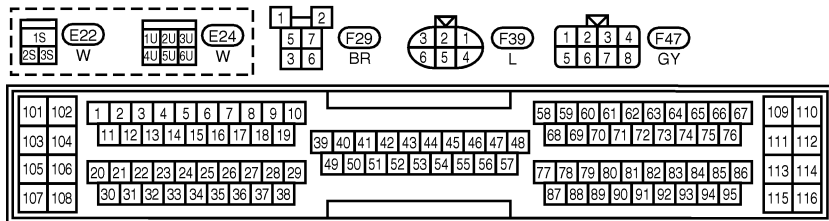
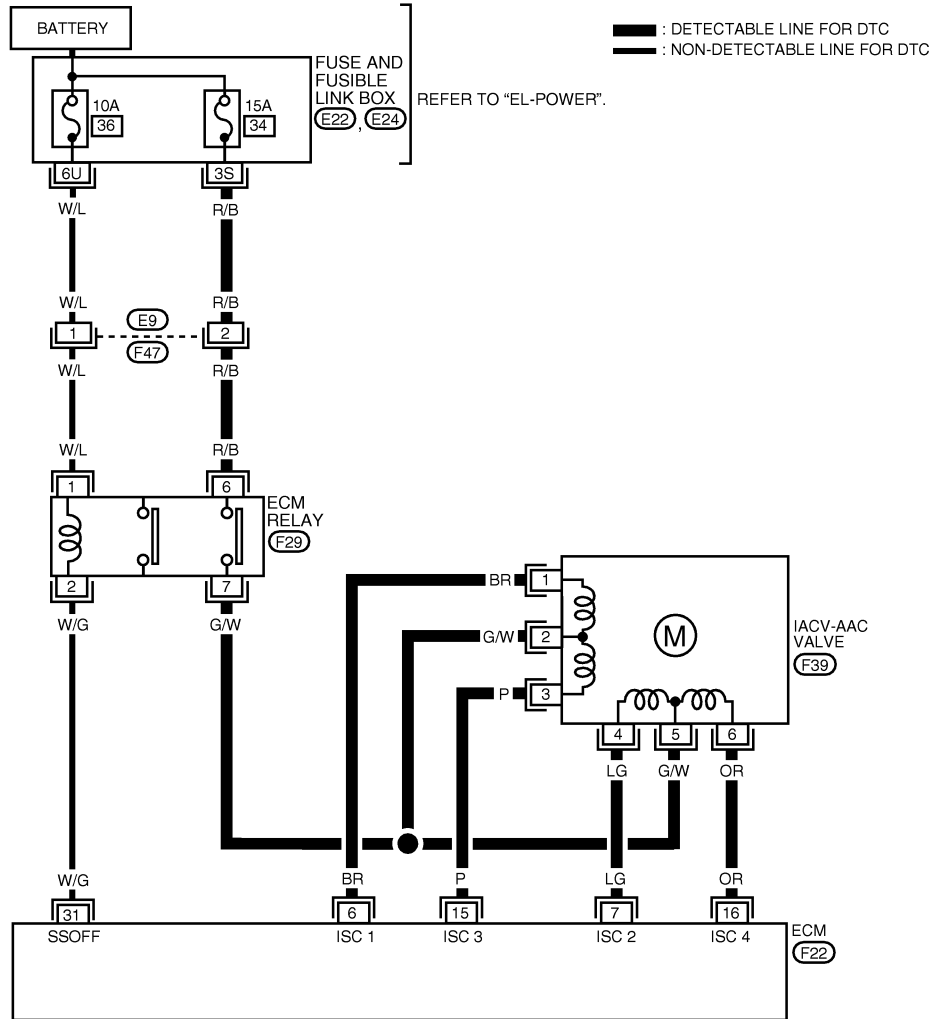
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1479

EC-AAC/V-01



LEC208

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
6	BR	IACV-AAC VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
7	LG			
15	P			
16	OR			

SEF581Y

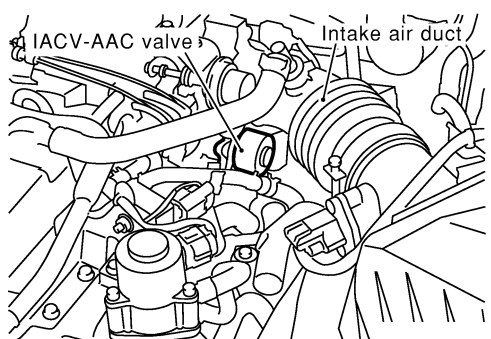
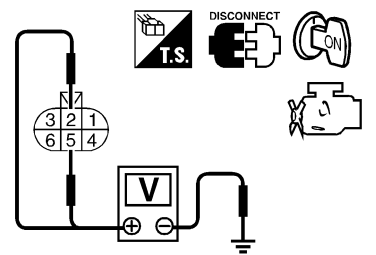
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1480

1	CHECK IACV-AAC VALVE POWER SUPPLY CIRCUIT
<p>1. Stop engine. 2. Disconnect IACV-AAC valve harness connector.</p> <div style="text-align: center;">  <p>IACV-AAC valve Intake air duct</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between IACV-AAC valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF404Z</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF343X</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between IACV-AAC valve and ECM relay.	
▶	Repair harness or connectors.

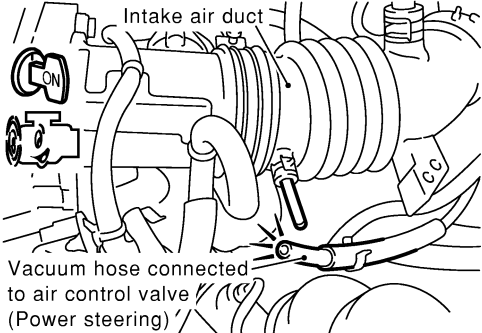
3	CHECK IACV-AAC VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and IACV-AAC valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">IACV-AAC valve terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">6</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">7</td> <td style="text-align: center; padding: 5px;">4</td> </tr> <tr> <td style="text-align: center; padding: 5px;">15</td> <td style="text-align: center; padding: 5px;">3</td> </tr> <tr> <td style="text-align: center; padding: 5px;">16</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0544</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		ECM terminal	IACV-AAC valve terminal	6	1	7	4	15	3	16	6
ECM terminal	IACV-AAC valve terminal										
6	1										
7	4										
15	3										
16	6										
OK	▶ GO TO 4.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

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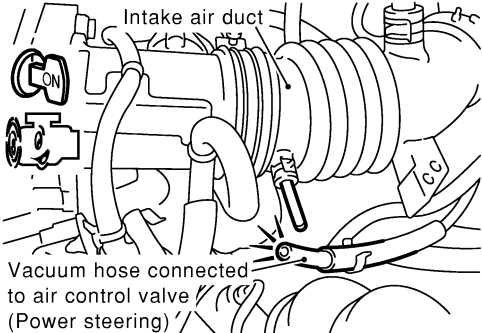
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-I	
<ol style="list-style-type: none"> 1. Reconnect ECM harness connector and IACV-AAC valve harness connector. 2. Disconnect vacuum hose connected to air control valve (Power steering) at intake air duct. 3. Start engine and let it idle. 4. Check vacuum hose for vacuum existence. 		
		
<p>Vacuum slightly exists or does not exist.</p> <p>OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	Replace air control valve (Power steering).

SEF583Z

5	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-II	
Check vacuum hose for vacuum existence when steering wheel is turned.		
		
<p>Vacuum should exist.</p> <p>OK or NG</p>		
OK	▶	GO TO 8.
NG	▶	GO TO 6.

SEF583Z

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

6	CHECK VACUUM PORT	<p>1. Stop engine. 2. Disconnect vacuum hose connected to air control valve (Power steering) at the vacuum port. 3. Blow air into vacuum port. 4. Check that air flows freely.</p>	
		LEC325	OK or NG
OK	▶	GO TO 7.	
NG	▶	Repair or clean vacuum port.	

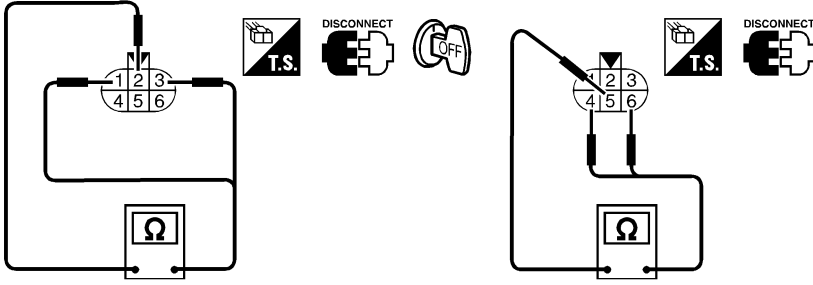
7	CHECK VACUUM HOSES AND TUBES	<p>1. Disconnect vacuum hoses between air control valve (Power steering) and vacuum port, air control valve (Power steering) and intake air duct. 2. Check the hoses and tubes for cracks, clogging, improper connection or disconnection.</p>	
		SEF109L	OK or NG
OK	▶	GO TO 8.	
NG	▶	Repair hoses or tubes.	

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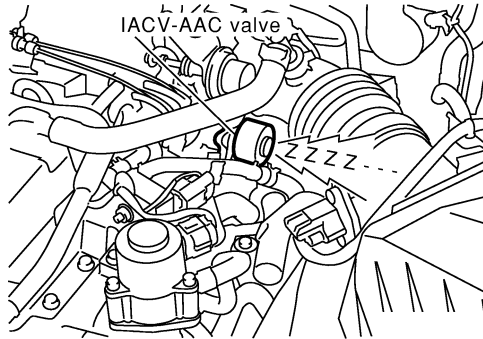
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK IACV-AAC VALVE-I	<p>1. Disconnect IACV-AAC valve harness connector.</p> <p>2. Check resistance between IACV-AAC valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>		
			<p>Resistance: 20 - 24 Ω [at 20°C (68°F)]</p>	
		OK or NG		
OK		▶	GO TO 9.	
NG		▶	GO TO 10.	

SEF214Z

9	CHECK IACV-AAC VALVE-II	<p>1. Reconnect IACV-AAC valve harness connector and ECM harness connector.</p> <p>2. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve makes operating sound according to the ignition switch position.</p>		
				
		OK or NG		
OK		▶	GO TO 11.	
NG		▶	GO TO 10.	

SEF405Z

10	REPLACE IACV-AAC VALVE	<p>1. Replace IACV-AAC valve assembly.</p> <p>2. Perform "Idle Air Volume Learning", EC-755. Is the result CMPLT or INCMP?</p>		
		CMPLT or INCMP		
CMPLT		▶	INSPECTION END	
INCMP		▶	Follow the construction of "Idle Air Volume Learning".	

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK TARGET IDLE SPEED	
	<p>1. Turn ignition switch "OFF".</p> <p>2. Reconnect all harness connectors and vacuum hoses.</p> <p>3. Start engine and warm it up to normal operating temperature.</p> <p>4. Also warm up transmission to normal operating temperature.</p> <ul style="list-style-type: none"> ● For models with CONSULT-II, drive vehicle until "FUEL TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9 V. ● For models without CONSULT-II, drive vehicle for 10 minutes. <p>5. Check target idle speed.</p> <p style="padding-left: 40px;">800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 12.
	NG	▶ Perform "Idle Air Volume Learning", EC-755.

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12	CHECK INTERMITTENT INCIDENT	
	Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶	INSPECTION END

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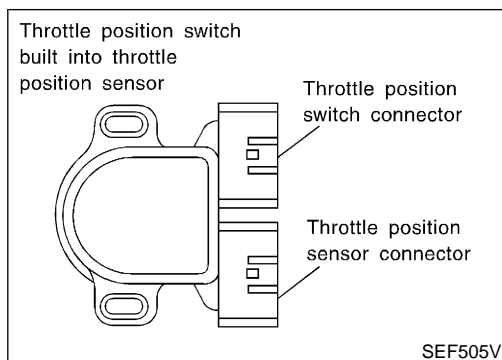
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IDX

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1481

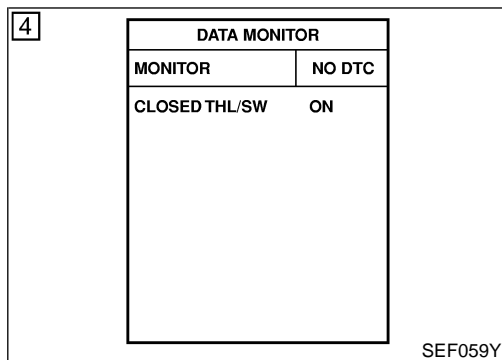
A closed throttle position switch and wide open throttle position switch are built into the throttle position sensor unit. The wide open throttle position switch is used only for A/T control.

When the throttle valve is in the closed position, the closed throttle position switch sends a voltage signal to the ECM. The ECM only uses this signal to open or close the EVAP canister purge control valve when the throttle position sensor is malfunctioning.

On Board Diagnosis Logic

NIEC1482

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0510	<ul style="list-style-type: none"> Battery voltage from the closed throttle position switch is sent to ECM with the throttle valve opened. 	<ul style="list-style-type: none"> Harness or connectors (The closed throttle position switch circuit is shorted.) Closed throttle position switch Throttle position sensor



DTC Confirmation Procedure

NIEC1483

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

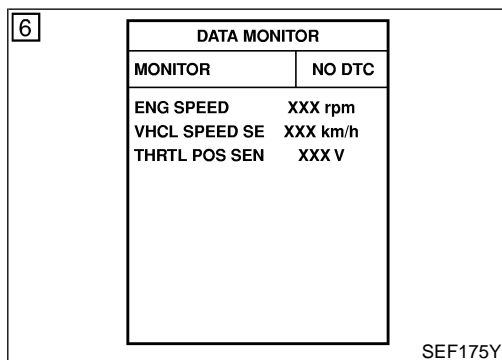
- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF", wait at least 10 seconds and then start engine.
- Select "A/T", then select "CLOSED THL/SW" in "DATA MONITOR" mode with CONSULT-II.
- Check the signal under the following conditions.

Condition	Signal indication
Throttle valve: Idle position	ON
Throttle valve: Slightly open	OFF

If the result is NG, go to "Diagnostic Procedure", EC-1117.
If OK, go to following step.

- Select "ENGINE", then select "DATA MONITOR" mode with CONSULT-II.
- Drive the vehicle for at least 5 consecutive seconds under the following condition.

THRTL POS SEN	More than 2.3V
VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

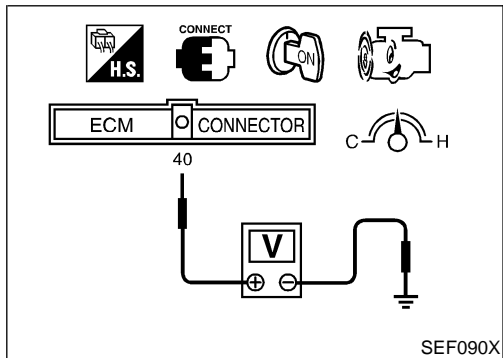


DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)

Overall Function Check

- 7) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1117.



Overall Function Check

Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check the voltage between ECM terminal 40 (Closed throttle position switch signal) and ground under the following conditions.

Condition	Voltage
At idle	Battery voltage
At 2,000 rpm	Approximately 0V

- 3) If NG, go to “Diagnostic Procedure”, EC-1117.

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DTC P0510 CLOSED THROTTLE POSITION SWITCH

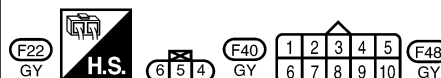
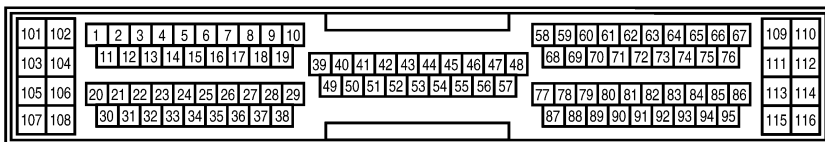
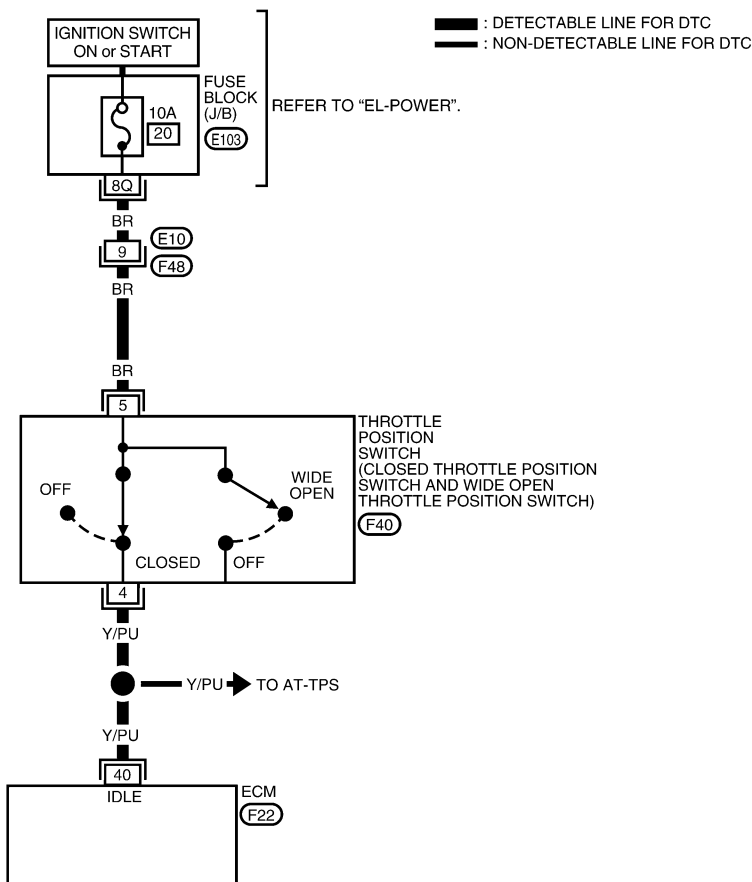
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1485

EC-TP/SW-01



WEC594

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	Y/PU	THROTTLE POSITION SWITCH (CLOSED POSITION)	ENGINE RUNNING WITH ACCELERATOR PEDAL FULLY RELEASED UNDER WARM-UP CONDITION	BATTERY VOLTAGE
			IGN ON WITH ACCELERATOR PEDAL DEPRESSED	APPROX. 0V

SEF582Y

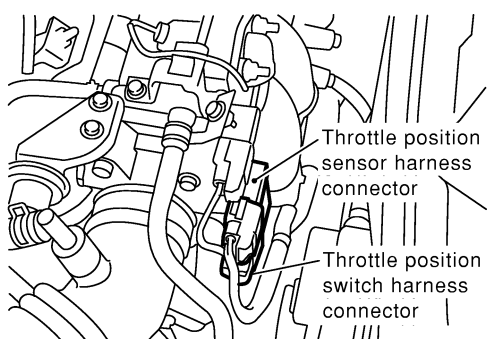
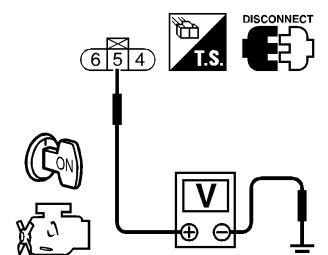
DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1486

1	CHECK CLOSED THROTTLE POSITION SWITCH POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect throttle position switch harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between throttle position switch terminal 5 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF392Z</p> <p style="text-align: right;">SEF346X</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between throttle position switch and fuse 		
▶		Repair harness or connectors.

3	CHECK CLOSED THROTTLE POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 40 and throttle position switch terminal 4. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

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DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM and throttle position switch.	
	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK IGNITION TIMING AND ENGINE IDLE SPEED						
Check the following items. Refer to "Basic Inspection", EC-798.							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Items</th> <th style="width: 50%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>9° ± 5° BTDC</td> </tr> <tr> <td>Idle speed</td> <td>800 ± 50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>		Items	Specifications	Ignition timing	9° ± 5° BTDC	Idle speed	800 ± 50 rpm (in "P" or "N" position)
Items	Specifications						
Ignition timing	9° ± 5° BTDC						
Idle speed	800 ± 50 rpm (in "P" or "N" position)						
MTBL0585							
Models with CONSULT-II	GO TO 6.						
Models without CONSULT-II	GO TO 7.						

6	CHECK THROTTLE POSITION SWITCH						
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Remove vacuum hose connected to throttle opener. 4. Connect suitable vacuum hose to vacuum pump and the throttle opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 							
SEF793W							
<ol style="list-style-type: none"> 6. Turn ignition switch "ON". 7. Select "A/T" then select "DATA MONITOR" mode with CONSULT-II. 8. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. 							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td>Completely closed</td> <td>ON</td> </tr> <tr> <td>Partially open or completely open</td> <td>OFF</td> </tr> </tbody> </table>		Throttle valve conditions	CLSD THL/P SW	Completely closed	ON	Partially open or completely open	OFF
Throttle valve conditions	CLSD THL/P SW						
Completely closed	ON						
Partially open or completely open	OFF						
MTBL0355							
OK or NG							
OK (With CONSULT-II)	GO TO 9.						
OK (Without CONSULT-II)	GO TO 10.						
NG	GO TO 8.						

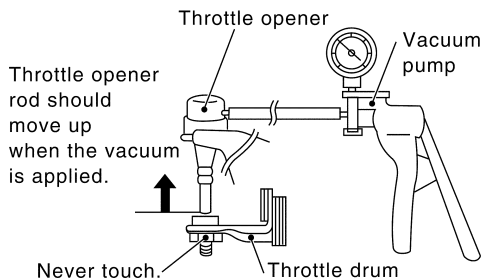
DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

7 CHECK THROTTLE POSITION SWITCH

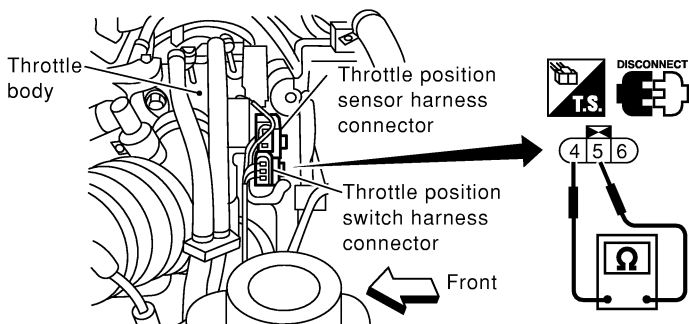
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Remove vacuum hose connected to throttle opener.
4. Connect suitable vacuum hose to vacuum pump and the throttle opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Disconnect closed throttle position switch harness connector.
7. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

SEF770Y

OK or NG

OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	GO TO 8.

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DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	ADJUST THROTTLE POSITION SWITCH									
Check the following items. Refer to "Basic Inspection", EC-798.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Items</th> <th style="width: 50%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>9°±5° BTDC</td> </tr> <tr> <td>Closed throttle position switch idle position adjustment</td> <td>Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td>Target idle speed</td> <td>800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>			Items	Specifications	Ignition timing	9°±5° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	800±50 rpm (in "P" or "N" position)
Items	Specifications									
Ignition timing	9°±5° BTDC									
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF									
Target idle speed	800±50 rpm (in "P" or "N" position)									
MTBL0584										
Is it possible to adjust closed throttle position switch?										
Yes or No										
Yes (With CONSULT-II) ▶	GO TO 9.									
Yes (Without CONSULT-II) ▶	GO TO 10.									
No ▶	Replace throttle position switch.									

9	CHECK THROTTLE POSITION SENSOR									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine (ignition switch OFF). 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to the vacuum pump and the opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 										
SEF793W										
<ol style="list-style-type: none"> 6. Turn ignition switch ON. 7. Select "DATA MONITOR" mode with CONSULT-II. 8. Check voltage of "THRTL POS SEN" under the following conditins. <p>Voltage measurement must be made with throttle position sensor installed in vehicle.</p>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Completely closed (a)</td> <td>0.15 - 0.85V</td> </tr> <tr> <td>Partially open</td> <td>Between (a) and (b)</td> </tr> <tr> <td>Completely open (b)</td> <td>3.5 - 4.7V</td> </tr> </tbody> </table>			Throttle valve conditions	Voltage	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	Voltage									
Completely closed (a)	0.15 - 0.85V									
Partially open	Between (a) and (b)									
Completely open (b)	3.5 - 4.7V									
MTBL0231										
OK or NG										
OK ▶	GO TO 11.									
NG ▶	Replace throttle position sensor.									

DTC P0510 CLOSED THROTTLE POSITION SWITCH

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

10	CHECK THROTTLE POSITION SENSOR														
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine (ignition switch OFF). 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to the vacuum pump and the opener. 5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. <div style="text-align: center; margin: 10px 0;"> </div> <p style="text-align: right; margin-right: 20px;">SEF793W</p> <ol style="list-style-type: none"> 6. Turn ignition switch ON. 7. Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground. Voltage measurement must be made with throttle position sensor installed in vehicle. <div style="display: flex; justify-content: space-between; align-items: flex-start; margin-top: 20px;"> <div style="width: 30%;"> </div> <div style="width: 30%; text-align: center;"> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Throttle valve conditions</th> <th style="padding: 5px;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Completely closed (a)</td> <td style="padding: 5px;">0.15 - 0.85V</td> </tr> <tr> <td style="padding: 5px;">Partially open</td> <td style="padding: 5px;">Between (a) and (b)</td> </tr> <tr> <td style="padding: 5px;">Completely open (b)</td> <td style="padding: 5px;">3.5 - 4.7V</td> </tr> </tbody> </table> </div> </div> <p style="text-align: right; margin-right: 20px;">SEF526Z</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 5px;">OK</td> <td style="width: 10%; text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">GO TO 11.</td> </tr> <tr> <td style="padding: 5px;">NG</td> <td style="text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">Replace throttle position sensor.</td> </tr> </table>		Throttle valve conditions	Voltage	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V	OK	▶	GO TO 11.	NG	▶	Replace throttle position sensor.
Throttle valve conditions	Voltage														
Completely closed (a)	0.15 - 0.85V														
Partially open	Between (a) and (b)														
Completely open (b)	3.5 - 4.7V														
OK	▶	GO TO 11.													
NG	▶	Replace throttle position sensor.													

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11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

System Description

NIEC1487

These circuit lines are used to control the smooth shifting up and down of A/T during the hard acceleration/ deceleration. Voltage signals are exchanged between ECM and TCM (Transmission control module).

On Board Diagnosis Logic

NIEC1488

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0600*	<ul style="list-style-type: none"> ECM receives incorrect signal from TCM (Transmission control module) continuously. 	<ul style="list-style-type: none"> Harness or connectors [The circuit between ECM and TCM (Transmission control module) is open or shorted.]

*: This DTC can be detected only by "DATA MONITOR (AUTO TRIG)" with CONSULT-II.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1489

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-1124.

Wiring Diagram

NIEC1490

EC-AT/C-01

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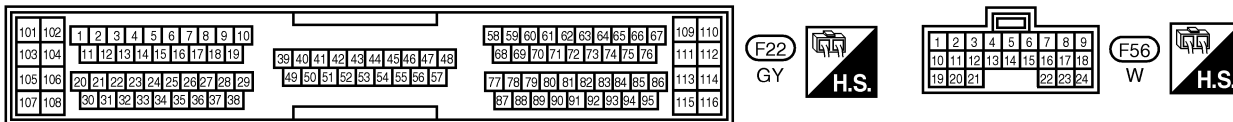
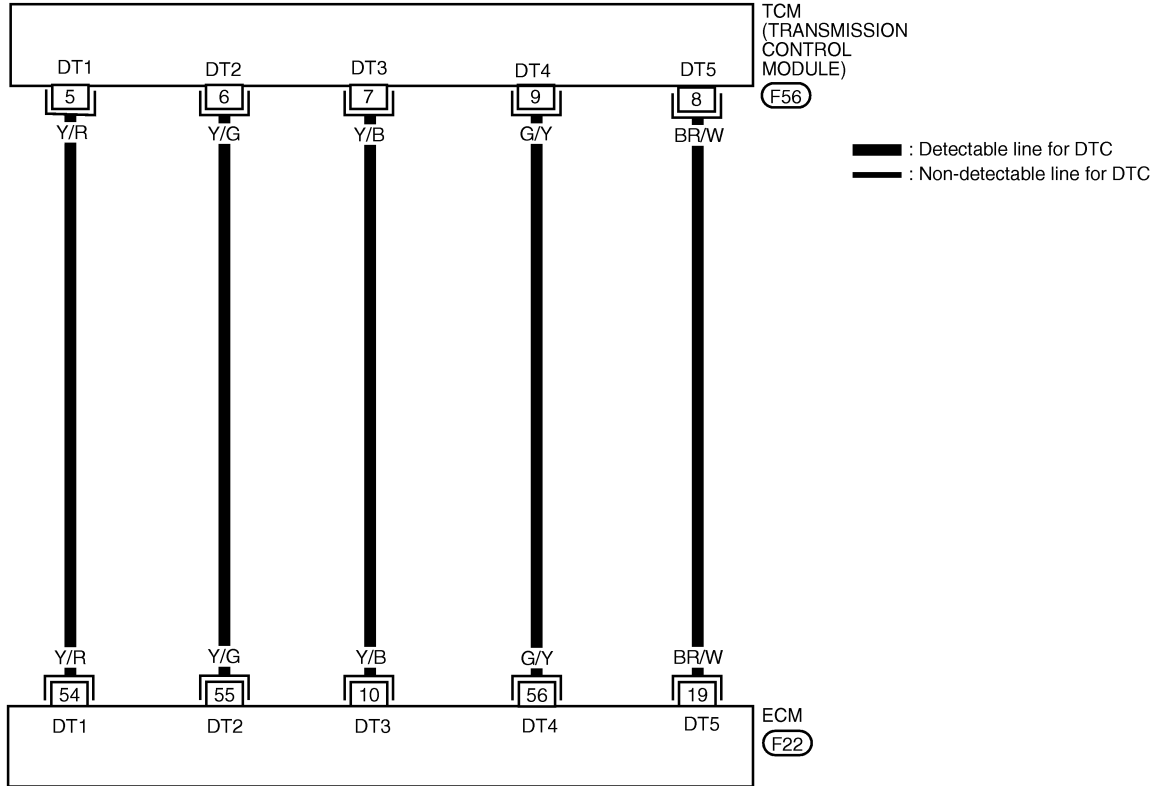
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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

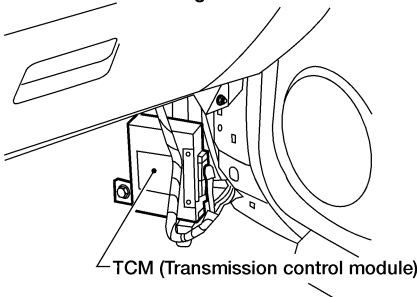
CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	Y/B	A/T SIGNAL NO. 3	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
19	BR/W	A/T SIGNAL NO. 5	ENGINE RUNNING AT IDLE SPEED	APPROX. 8V
54	Y/R	A/T SIGNAL NO. 1	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
55	Y/G	A/T SIGNAL NO. 2	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
56	G/Y	A/T SIGNAL NO. 4	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V

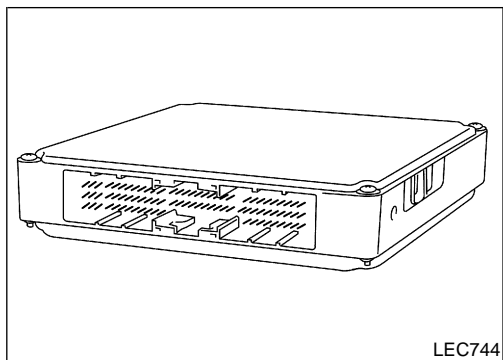
Diagnostic Procedure

NIEC1491

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM (Transmission control module) harness connector.</p> <p style="text-align: center;">View with dash side lower garnish RH removed</p>  <p style="text-align: center;">TCM (Transmission control module)</p> <p style="text-align: right;">LEC306</p> <p>3. Check harness continuity between ECM terminal 10 and TCM terminal 7, ECM terminal 19 and TCM terminal 8, ECM terminal 54 and terminal 5, ECM terminal 55 and TCM terminal 6, ECM terminal 56 and TCM terminal 9. Refer to Wiring Diagram. Continuity should exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Repair harness or connectors.

2	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Check harness continuity between ECM terminal 10 and ground, ECM terminal 19 and ground, ECM terminal 54 and ground, ECM terminal 55 and ground, ECM terminal 56 and ground. Refer to Wiring Diagram. Continuity should not exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	Repair short to ground or short to power in harness.

3	CHECK INTERMITTENT INCIDENT	
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>		
	▶	INSPECTION END



Component Description

The ECM consists of a microcomputer and connector for signal input and output and for power supply. The ECM controls the engine.

NIEC1492

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On Board Diagnosis Logic

NIEC1493

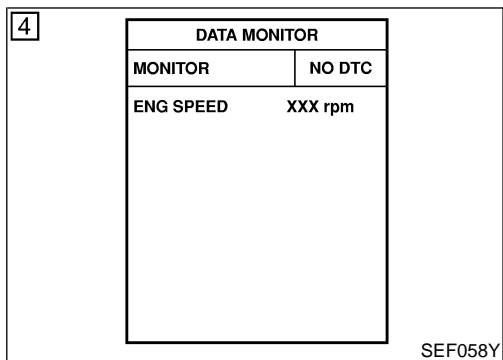
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0605	<ul style="list-style-type: none"> ECM calculation function is malfunctioning. 	<ul style="list-style-type: none"> ECM

EC

FE

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MT



DTC Confirmation Procedure

NIEC1494

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

AT

AX

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Run engine for at least 30 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1126.

SU

BR

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With GST

Follow the procedure "With CONSULT-II" above.

RS

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HA



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Diagnostic Procedure

NIEC1495

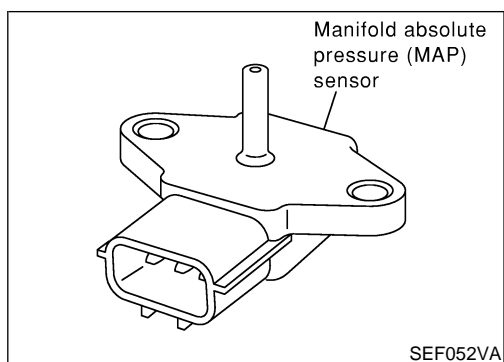
1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Select "SELF DIAG RESULTS" mode with CONSULT-II. Touch "ERASE". Perform "DTC Confirmation Procedure". See EC-1125. Is the 1st trip DTC P0605 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> Turn ignition switch "ON". Select MODE 4 with GST. Touch "ERASE". Perform "DTC Confirmation Procedure". See EC-1125. Is the 1st trip DTC P0605 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> Replace ECM. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (Nissan Vehicle Immobilizer System — NATS)", EC-771. Perform "Idle Air Volume Learning", EC-755, Which is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the construction of "Idle Air Volume Learning".

DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

QG18DE (CALIF CA)

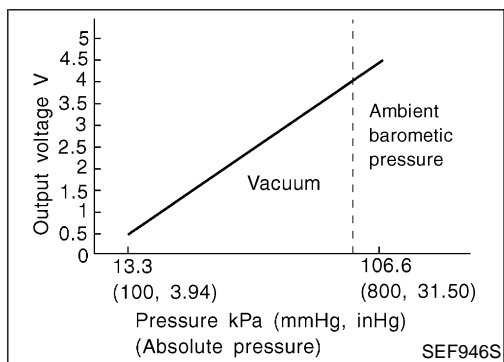
Component Description



Component Description

NIEC1496

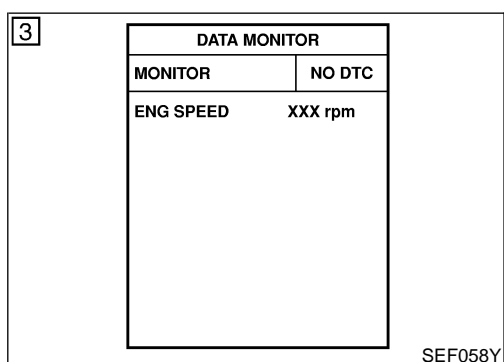
The manifold absolute pressure (MAP) sensor detects intake manifold pressure and sends the voltage signal to the ECM. As the pressure increases, the voltage rises.



On Board Diagnosis Logic

NIEC1497

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1108	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Manifold absolute pressure sensor circuit is open or shorted.) • Manifold absolute pressure sensor



DTC Confirmation Procedure

NIEC1498

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF", wait at least 10 seconds and then turn it "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine and let it idle for at least 10 seconds.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1130.
If 1st trip DTC is not detected, go to the next step.
- 6) Drive vehicle for at least 10 seconds under conditions similar to the freeze frame data.

TESTING CONDITION:

The condition in which "B/FUEL SCHDL" indication is more than that of the freeze frame data is advised.

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1130.

**DTC P1108 MANIFOLD ABSOLUTE PRESSURE
(MAP) SENSOR**

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)



With GST

Follow the procedure "With CONSULT-II" above.

DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1499

EC-MAP-01

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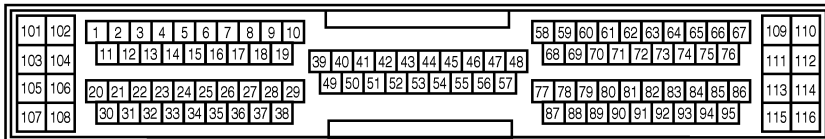
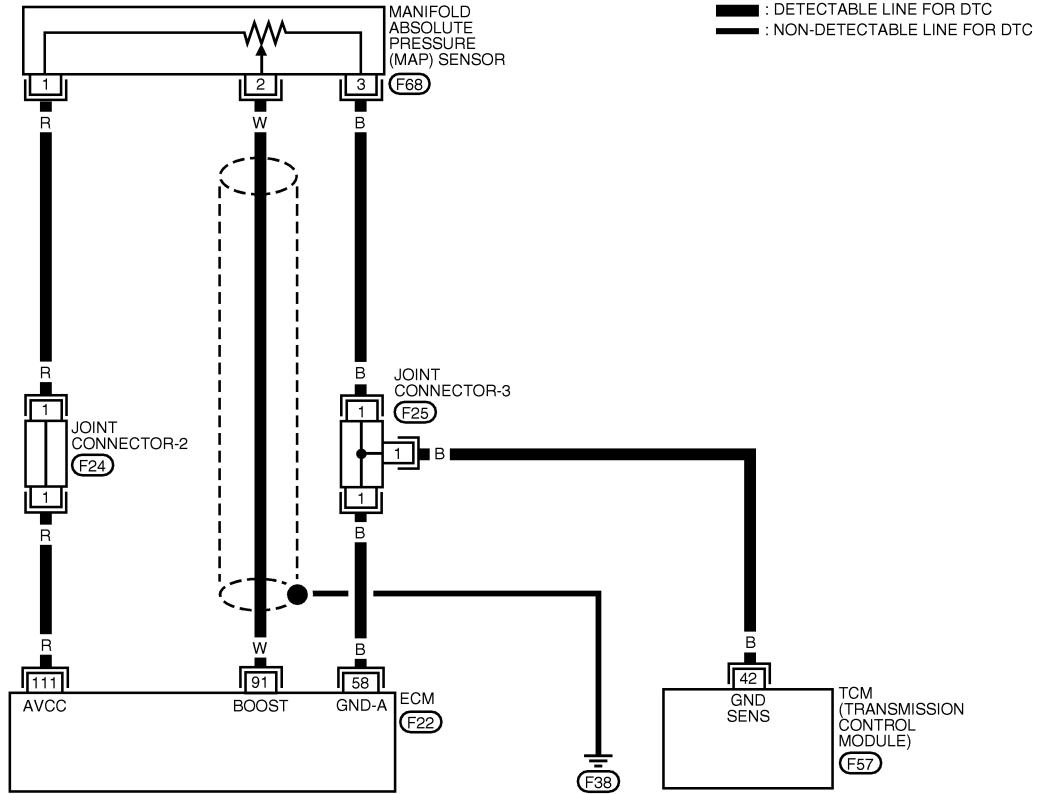
BT

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REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR

WEC381

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
91	W	MAP SENSOR	IGN ON	APPROX. 1.3V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF607Z

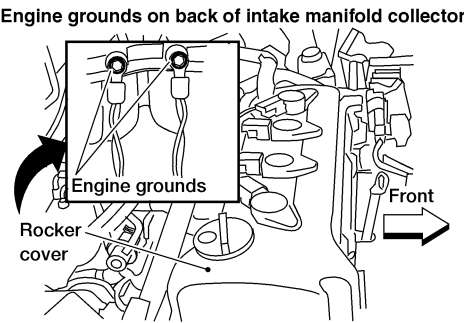
DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

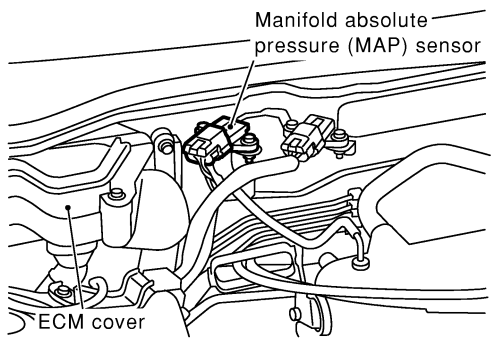
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1500

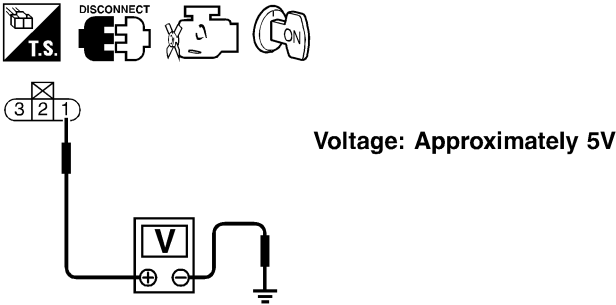
1	RETIGHTEN GROUND SCREWS
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 	
	
WEC249	
▶	GO TO 2.

2	CHECK CONNECTOR
<ol style="list-style-type: none"> 1. Disconnect manifold absolute pressure (MAP) sensor harness connector. 	
	
<ol style="list-style-type: none"> 2. Check MAP sensor harness connector for water. Water should not exist. 	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace harness connector.

SEF389Z

DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK POWER SUPPLY	<p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between MAP sensor terminal 1 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: right;">SEF299X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

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4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between ECM and MAP sensor <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 5.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

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5	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between MAP sensor terminal 3 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

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RS

6	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between TCM and MAP sensor ● Harness for open or short between ECM and MAP sensor <p style="text-align: center;">OK or NG</p>	
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

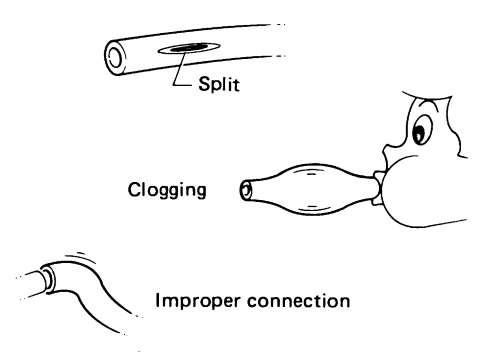
BT
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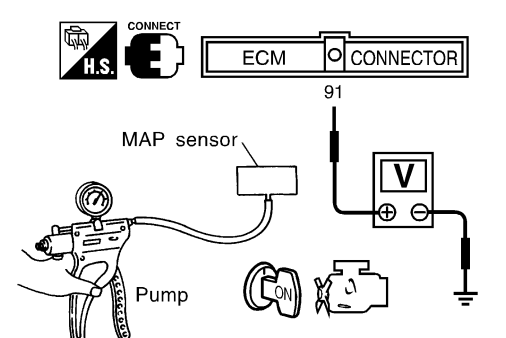
DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK INPUT SIGNAL CIRCUIT	
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 91 and MAP sensor terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. 		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK HOSE	
<ol style="list-style-type: none"> 1. Remove hose connected to MAP sensor. 2. Check hose for clogging, cracks or improper connection. 		
		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace hose.

9	CHECK MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR	
<ol style="list-style-type: none"> 1. Remove MAP sensor with its harness connector connected. 2. Install a vacuum pump to MAP sensor. 3. Turn ignition switch "ON" and check output voltage between ECM terminal 91 and engine ground under the following conditions. 		
		
		SEF541Z
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -93.3 kPa (-700 mmHg, -27.56 inHg) or over 101.3 kPa (760 mmHg, 29.92 inHg) of pressure. 		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Replace MAP sensor.

DTC P1108 MANIFOLD ABSOLUTE PRESSURE (MAP) SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

GI

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DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)

Description

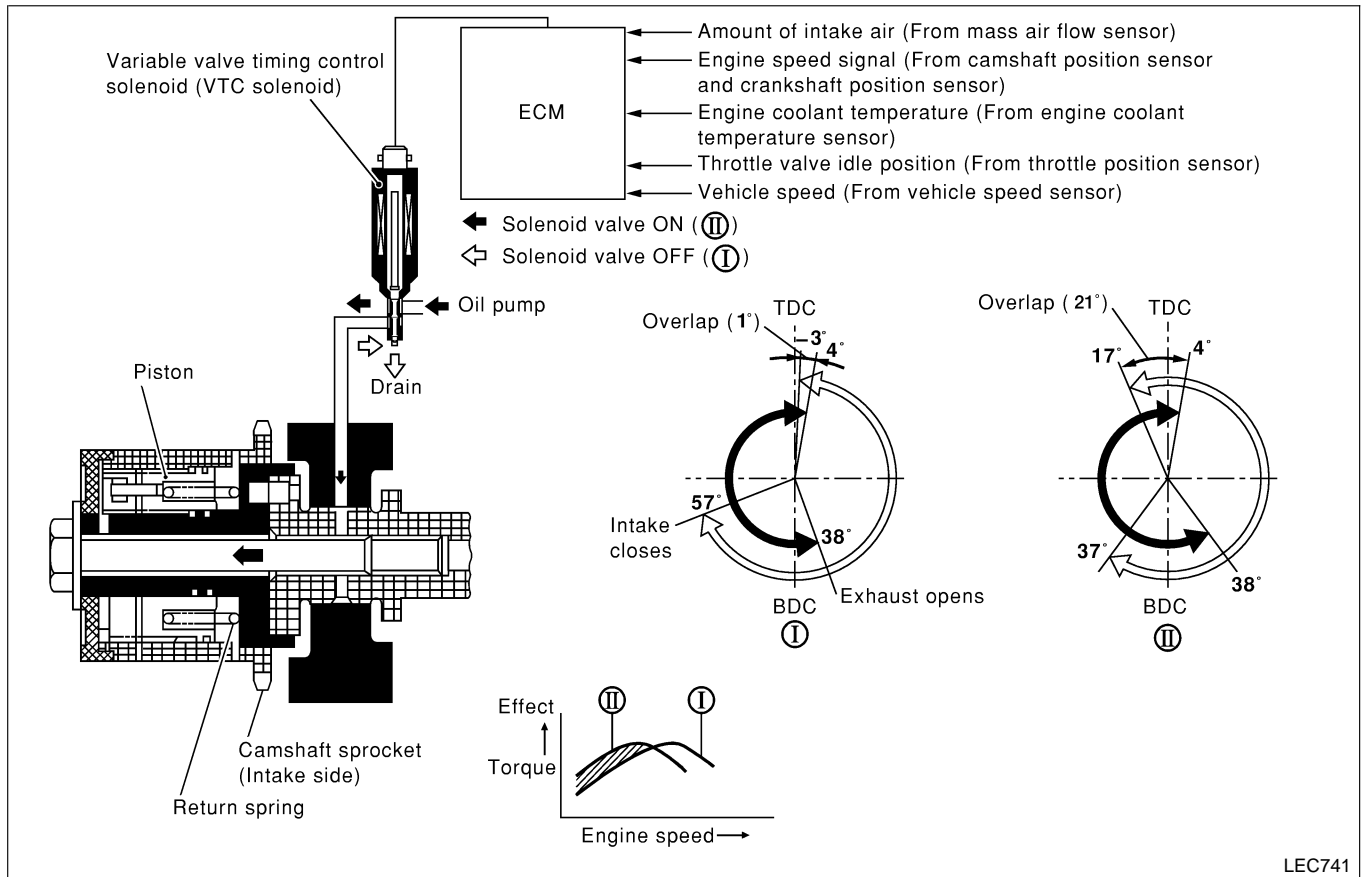
Description SYSTEM DESCRIPTION

NIEC1501

NIEC1501S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE)	Engine speed and cylinder number	Intake valve timing control	Intake valve timing control solenoid valve
Crankshaft position sensor (POS)	Engine speed		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position		
Vehicle speed sensor	Vehicle speed		

The intake valve timing control system is utilized to control intake valve opening and closing timing. Engine coolant temperature signals, engine speed, amount of intake air, vehicle speed and throttle position are used to determine intake valve timing. The intake camshaft sprocket position is regulated by oil pressure controlled by the intake valve timing control. When ECM sends ON signal to intake valve timing control solenoid valve, oil pressure is transmitted to camshaft sprocket. Then, intake side camshaft is advanced.



DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)

Description (Cont'd)

OPERATION

—NIEC1501S02

Engine operating condition	Intake valve timing control solenoid valve	Intake valve opening and closing time	Valve overlap	Engine valve timing
<ul style="list-style-type: none"> Engine coolant temperature is between 15°C (59°F) to 119°C (246°F) and engine speed is between 1,100 rpm and 4,200 rpm. During high load condition 	ON	Advance	Increased	II
Those other than above	OFF	Normal	Normal	I

CONSULT-II Reference Value in Data Monitor Mode

NIEC1502

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V SOL-B1	<ul style="list-style-type: none"> Engine is in warm up condition. Engine speed is more than 2,000 rpm. Quickly depressed accelerator pedal 	OFF → ON

On Board Diagnosis Logic

NIEC1503

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1110	<ul style="list-style-type: none"> Comparing the intake valve timing position when the intake valve timing solenoid is ON with that when the solenoid is OFF, the difference does not exceed a certain limit. 	<ul style="list-style-type: none"> Harness or connectors (The intake valve timing control position sensor circuit is open.) Intake valve timing control position sensor Accumulation of debris to the signal pick-up portion of the camshaft

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec
INT/V SOL-B1	OFF
INT/V TIM-B1	XXX deg

SEF493Y

DTC Confirmation Procedure

NIEC1504

CAUTION:
Always drive at safe speed.

NOTE:
If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:
Do not apply electrical load (e.g. cooling fan, rear defogger, headlamp, etc.).

With CONSULT-II

- 1) Warm up engine to normal operating temperature.
- 2) Turn ignition switch “OFF” and wait at least 10 seconds.
- 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 4) Restart engine and wait at least 30 seconds.
- 5) Keep engine speed between idle and 1,000 rpm for at least 50 seconds. (Test is completed when “INT/V SOL - B1” in “DATA MONITOR” with CONSULT-II remains “OFF”. If indication is “ON”, repeat step 6.)
- 6) Shift selector lever to “2nd” position.

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 7) Quickly raise engine speed to more than 2,000 rpm and maintain the following conditions for at least 30 seconds. (Test is completed when "INT/V SOL - B1" in "DATA MONITOR" with CONSULT-II remains "ON". If indication is "OFF", repeat step 7.

ENG SPEED	More than 2,000 rpm
B/FUEL SCHDL	More than 6 msec

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1138.

With GST

- 1) Warm up engine to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Restart engine and wait at least 30 second.
- 4) Keep engine speed between idle and 1,000 rpm for at least 50 seconds.
- 5) Shift selector lever to "2nd" position.
- 6) Quickly raise engine speed to more than 2,000 rpm and keep it there for at least 30 seconds.
- Driving location: Driving vehicle uphill (increased engine load) will help maintain the driving conditions required for this test.
- 7) Select "MODE 7" with GST.
- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1138.

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1505

EC-IVC/V-01

GI

MA

EM

LC

EC

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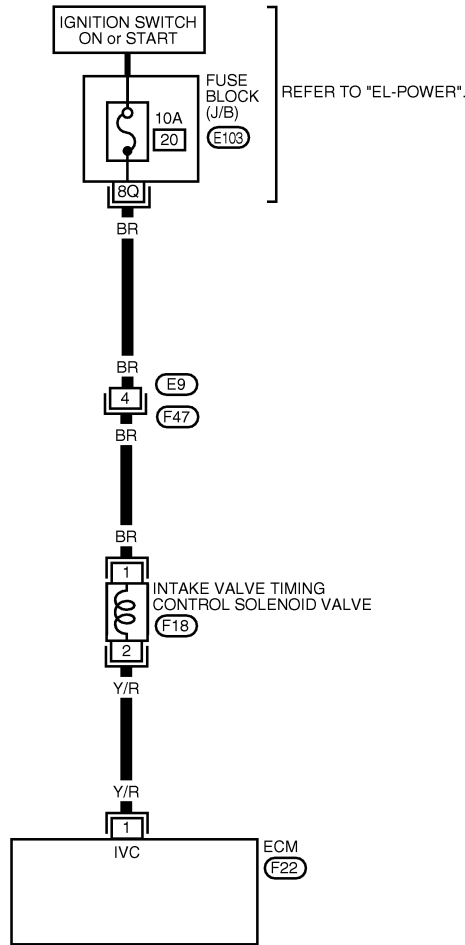
BT

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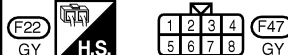
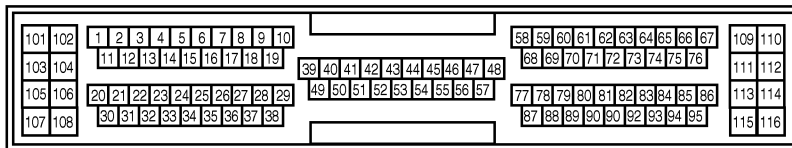
EL

IDX



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC

REFER TO "EL-POWER".



WEC410

PCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE PCM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE PCM'S TRANSISTOR. USE A GROUND OTHER THAN PCM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y/R	INTAKE VALVE TIMING CONTROL SOLENOID VALVE	SOLENOID VALVE IS OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	APPROX. 0V
			SOLENOID VALVE IS NOT OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	BATTERY VOLTAGE

SEF737Y

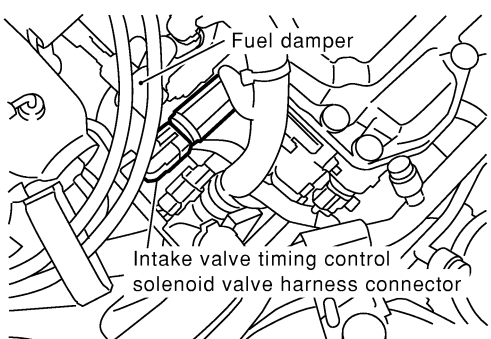
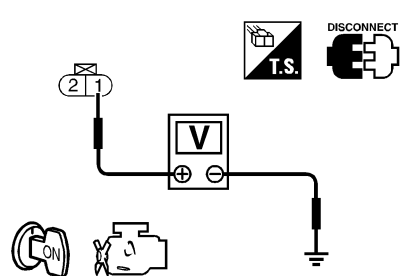
DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1506

1	CHECK POWER SUPPLY		
		<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect intake valve timing control solenoid valve harness connector. 	
		 <p style="text-align: center;">Intake valve timing control solenoid valve harness connector</p>	SEF406Z
		<ol style="list-style-type: none"> 3. Turn ignition switch "ON". 4. Check voltage between terminal 1 and ground. 	
		 <p style="text-align: right; margin-right: 50px;">Voltage: Battery voltage</p>	SEF527Z
		OK or NG	
OK		▶	GO TO 3.
NG		▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
		<ul style="list-style-type: none"> ● Harness connectors F47, E9 ● 10A fuse ● Harness for open or short between the intake valve timing control solenoid valve and fuse 	
		▶	Repair harness or connectors.

3	CHECK OUTPUT SIGNAL CIRCUIT		
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 1 and intake valve timing control solenoid valve terminal 2. Refer to wiring diagram. <p style="margin-left: 20px;">Continuity should exist.</p> <p style="margin-left: 20px;">If OK, check harness for short to ground and short to power.</p>	
		OK or NG	
OK		▶	GO TO 4.
NG		▶	Repair harness or connectors.

DTC P1110 INTAKE VALVE TIMING CONTROL

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4	CHECK ENGINE OIL PRESSURE	
Refer to LC-5 , "Oil Pressure Check".		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair lubrication system.

GI

MA

EM

5	CHECK INTAKE AIR SYSTEM	
Check intake air system for leaks.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair intake air system.

LC

EC

6	CHECK INTAKE VALVE TIMING CONTROL POSITION SENSOR	
Refer to "Component Inspection", EC-1171.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace.

FE

CL

MT

7	CHECK INTAKE VALVE TIMING CONTROL SOLENOID VALVE	
Refer to "Component Inspection", EC-1139.		
OK or NG		
OK	▶	Replace intake valve timing control sprocket with camshaft.
NG	▶	Replace intake valve timing control solenoid valve.

AT

AX

SU

8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

BR

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RS

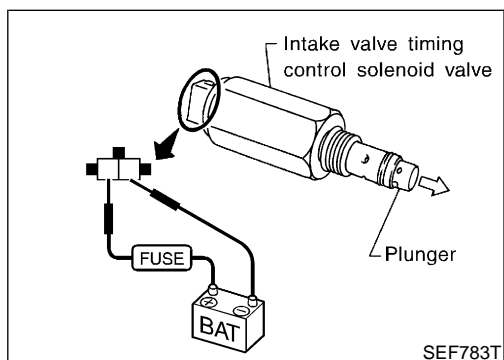
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Component Inspection

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

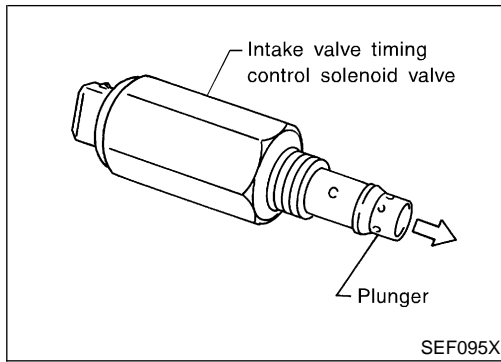
NIEC1507
NIEC1507S01

1. Check oil passage visually for any metal debris.
2. Supply intake valve timing control solenoid valve terminals with battery voltage.
3. Make sure that inside plunger protrudes.
If NG, replace intake valve timing control solenoid valve.

DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1508

The valve timing control system is utilized to control intake valve opening and closing timing. Engine coolant temperature signals, engine speed and throttle position are used to determine intake valve timing.

The intake camshaft sprocket position is regulated by oil pressure controlled by the intake valve timing control.

When ECM sends ON signal to intake valve timing control solenoid valve, oil pressure is transmitted to camshaft sprocket. Then, intake side camshaft is advanced.

Operation

NIEC1509

Engine operating condition				Intake valve timing control solenoid valve	Intake valve opening and closing time	Valve overlap
Engine coolant temperature	Engine speed	B/FUEL SCHDL	Neutral switch			
15°C (59°F) - 55°C (131°F)	1,100 - 4,200 rpm	Above 0 msec	OFF	ON	Advance	Increased
Above 55°C (131°F)		Above 6 msec				
Conditions other than those above				OFF	Normal	Normal

CONSULT-II Reference Value in Data Monitor Mode

NIEC1510

MONITOR ITEM	CONDITION	SPECIFICATION
INT/V TIM SOL	● Engine: After warming up	Idle OFF
		Revsing engine with full throttle opening (Under 4,200 rpm) ON

On Board Diagnosis Logic

NIEC1511

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1111	● An improper voltage signal is entered to ECM through intake valve timing control solenoid valve.	<ul style="list-style-type: none"> ● Harness or connectors (The intake valve timing control solenoid valve circuit is open or shorted.) ● Intake valve timing control solenoid valve

DATA MONITOR	
MONITORING	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V
INT/V TIM SOL	OFF

SEF736Y

DTC Confirmation Procedure

NIEC1512

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.

DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

4) If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-1143.

Without CONSULT-II
Follow the procedure "With CONSULT-II" above.

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DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

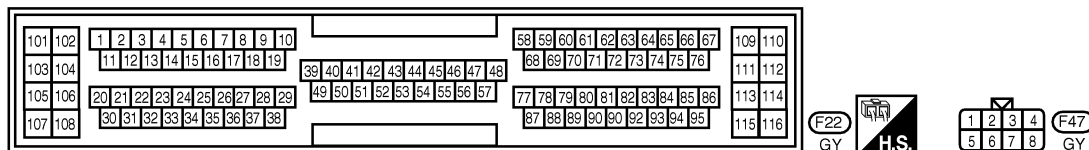
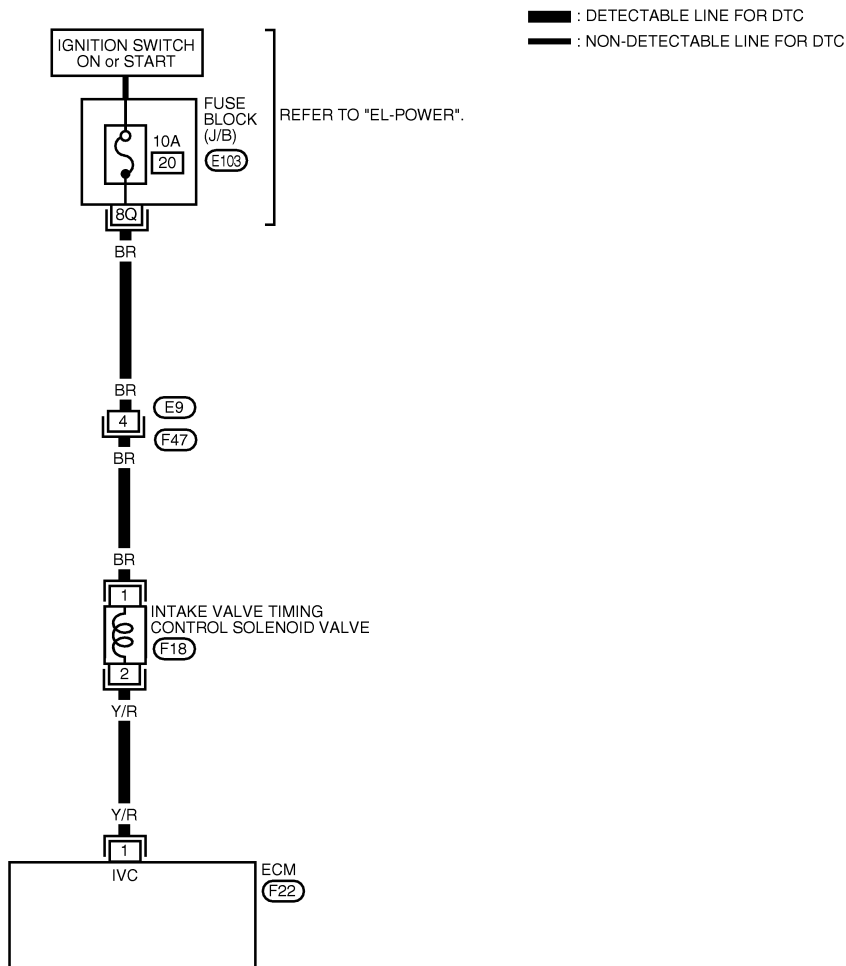
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1513

EC-IVC/V-01



WEC410

PCM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE PCM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE PCM'S TRANSISTOR. USE A GROUND OTHER THAN PCM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
1	Y/R	INTAKE VALVE TIMING CONTROL SOLENOID VALVE	SOLENOID VALVE IS OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	APPROX. 0V
			SOLENOID VALVE IS NOT OPERATING AT ENGINE RUNNING UNDER WARM-UP CONDITION	BATTERY VOLTAGE

SEF737Y

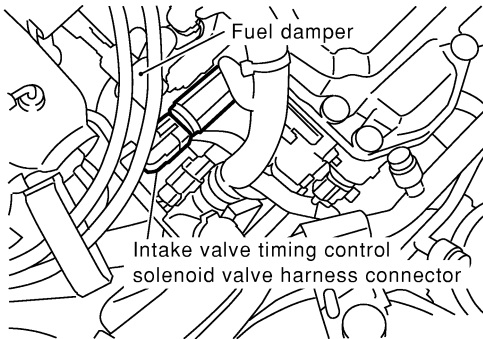
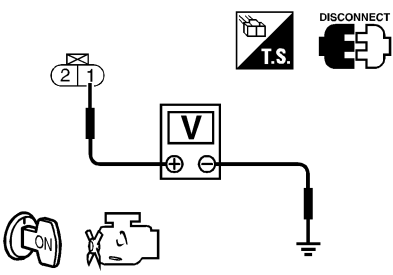
DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1514

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF". 2. Disconnect intake valve timing control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 2 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 200px;">Voltage: Battery voltage</p> </div> <p style="color: blue; margin-left: 20px;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
		<p>SEF406Z</p> <p>SEF527Z</p>	
	OK	▶	GO TO 3.
	NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connector F47, E9 ● 10A fuse ● Harness for open or short between valve timing control solenoid valve and fuse 	
		▶	Repair harness or connectors.

3	CHECK OUTPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 1 and intake valve timing control solenoid valve harness connector terminal 1. Refer to wiring diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
	OK	▶	GO TO 4.
	NG	▶	Repair open circuit or short to ground to short to power or connectors.

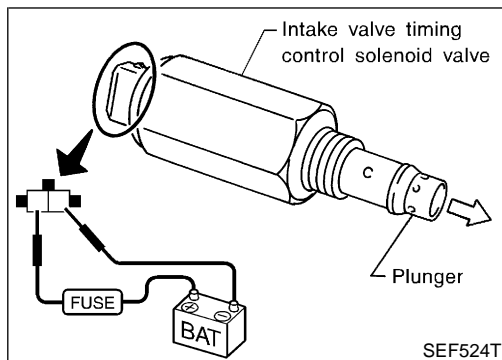
DTC P1111 INTAKE VALVE TIMING CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK VALVE TIMING CONTROL SOLENOID VALVE
Refer to "Component Inspection", EC-1144.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace valve timing control solenoid valve.

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END



Component Inspection

INTAKE VALVE TIMING CONTROL SOLENOID VALVE

NIEC1515
NIEC1515S01

1. Check oil passage visually for any metal debris.
2. Supply intake valve timing control solenoid valve terminals with battery voltage.
3. Make sure that inside plunger protrudes.
If NG, replace intake valve timing control solenoid valve.

On Board Diagnosis Logic

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough. NIEC1516

This is due to a leak in the seal or the thermostat open stuck. Malfunction is detected when the engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

Possible Cause

- Thermostat function
- Leakage from sealing portion of thermostat
- Engine coolant temperature sensor

DTC Confirmation Procedure**NOTE:**

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 60°C (140°F).

WITH CONSULT-II

- 1) Replace thermostat with new one. Refer to **LC-13**, "Thermostat". Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on. NIEC1518S01
- 2) Turn ignition switch "ON".
- 3) Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- 4) Check that the "COOLAN TEMP/S" is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
- 5) Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
---------------	-----------------------------

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1146.

WITH GST

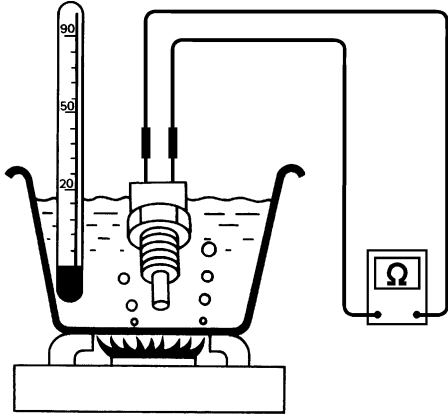
- 1) Follow the procedure "WITH CONSULT-II" above.

Diagnostic Procedure

NIEC1519

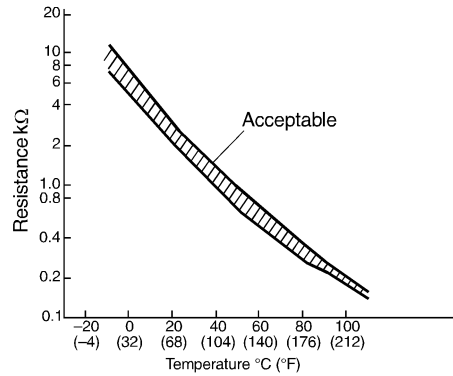
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

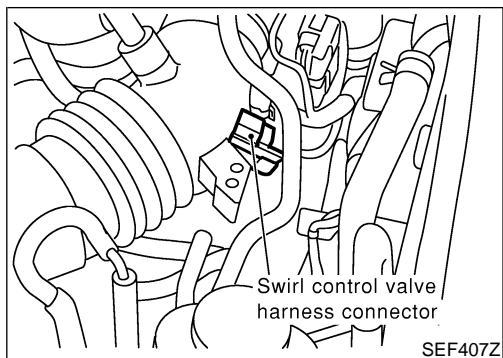
OK ► INSPECTION END

NG ► Replace engine coolant temperature sensor.

DTC P1132 SWIRL CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Component Description



Component Description

Swirl control valve consists of actuator and valve. The valve is installed in the intake manifold, and the actuator is connected to the rear end of the valve shaft.

The swirl control valve uses a step motor which has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes. When no change in the control position is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
SWL C/V (B1)	● Engine speed: Idle ● Engine coolant temperature is below 44°C (111°F).	0 - 5 step
	● Engine coolant temperature is above 45°C (113°F).	115 - 120 step
SWL/C POSI SE	● Engine speed: Idle ● Engine coolant temperature is below 44°C (111°F).	Approximately 0 deg
	● Engine speed: Idle ● Engine coolant temperature is above 45°C (113°F).	Approximately 80 deg

On Board Diagnosis Logic

Malfunction is detected when
An improper voltage signal is sent to ECM through swirl control valve.

Possible Cause

- Harness or connectors
(The swirl control valve circuit is open or shorted.)
- Swirl control valve

DTC P1132 SWIRL CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

DTC Confirmation Procedure

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1524

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and wait at least 2 seconds.
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds.
- 4) Turn ignition switch "OFF" and wait at least 10 seconds.
- 5) Turn ignition switch "ON" and wait at least 2 seconds.
- 6) Start engine and let it idle for at least 10 seconds.
- 7) Maintain engine speed at about 2,000 rpm for at least 10 seconds.
- 8) Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1150.
If 1st trip DTC is not detected, go to next step.
- 9) Perform step 5 through 8 three times.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

DTC P1132 SWIRL CONTROL VALVE (CIRCUIT)

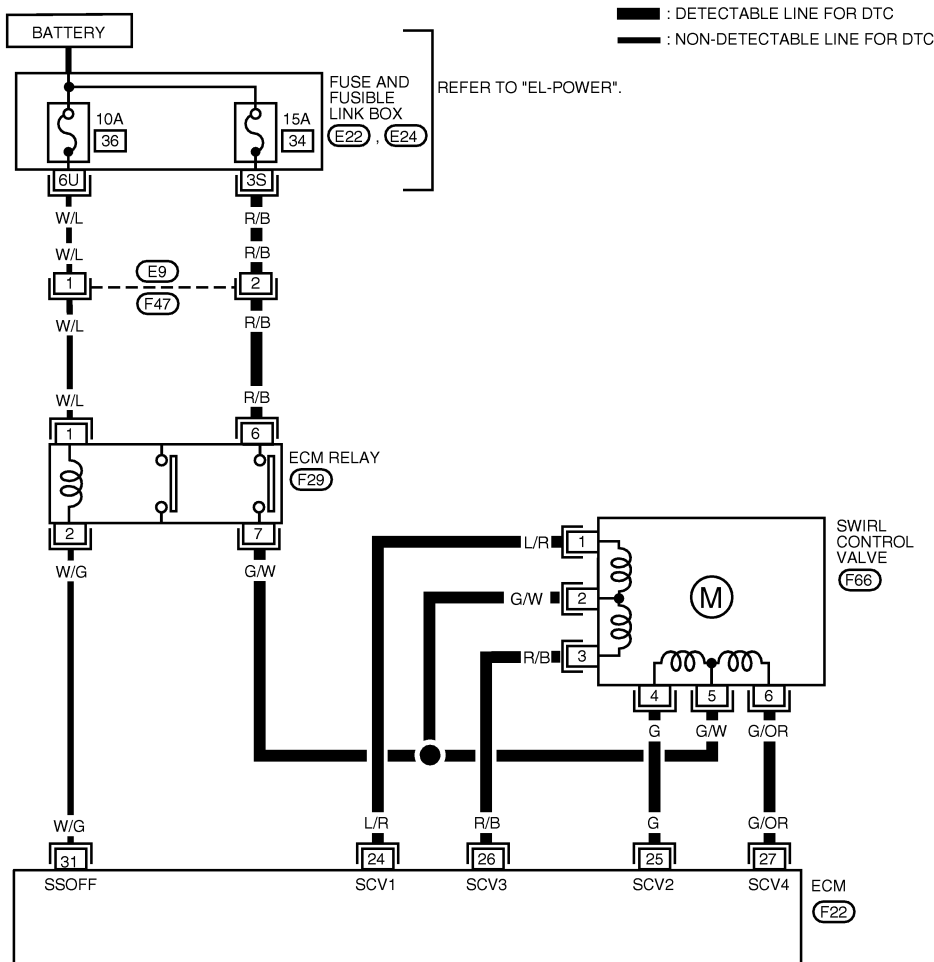
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1525

EC-SWL/V-01



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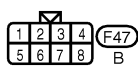
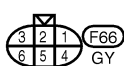
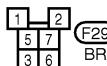
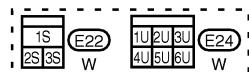
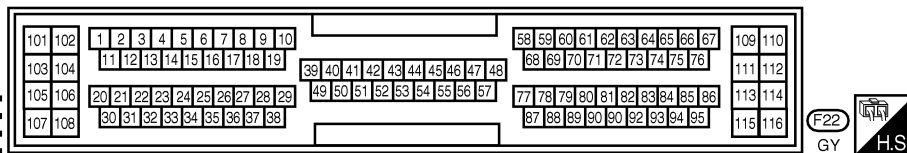
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WEC412

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
24	L/R	SWIRL CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
25	G			
26	R/B			
27	G/OR			

SEF575YB

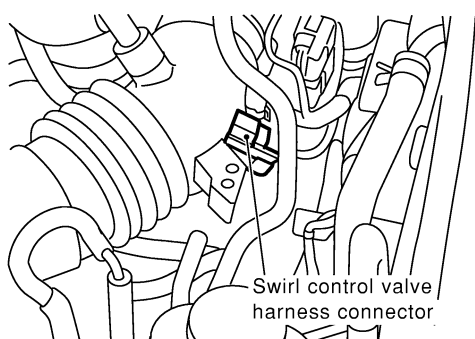
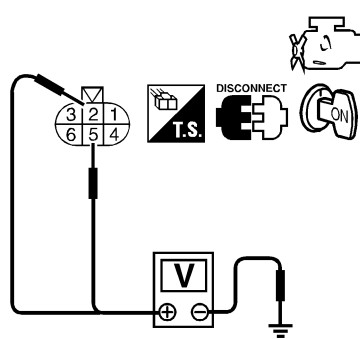
DTC P1132 SWIRL CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1526

1	CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect swirl control valve harness connector.</p> <div style="text-align: center;">  <p>Swirl control valve harness connector</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

SEF407Z

SEF327X

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and swirl control valve.	
▶	Repair harness or connectors.

3	CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">Swirl volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">24</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">26</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">27</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">MTBL0541</p> <p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		ECM terminal	Swirl volume control valve	24	1	25	4	26	3	27	6
ECM terminal	Swirl volume control valve										
24	1										
25	4										
26	3										
27	6										
OK	▶ GO TO 4.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

DTC P1132 SWIRL CONTROL VALVE (CIRCUIT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

4	CHECK SWIRL CONTROL VALVE	
<p>Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>		
<p>Resistance: 20.5 - 23.5 Ω [At 20°C (68°F)]</p>		
SEF540Z		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace intake manifold assembly.

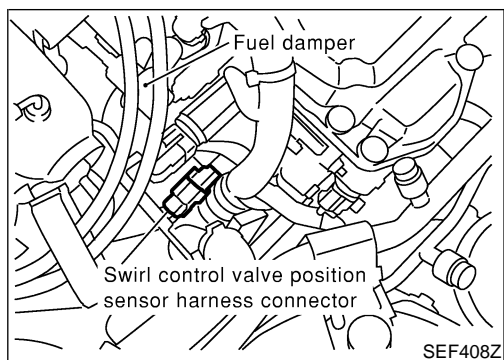
5	CHECK INTERMITTENT INCIDENT	
<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>		
<p style="text-align: right;">▶ INSPECTION END</p>		

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DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1527

Swirl control valve position sensor is installed on the intake manifold. The sensor is connected to the front end of the valve shaft of the swirl control valve.

The sensor responds to the valve shaft movement. This sensor is a kind of potentiometer which transforms the swirl control valve position into output voltage, and emits the voltage signal to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1528

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWL C/V (B1)	<ul style="list-style-type: none"> Engine speed: Idle 	Engine coolant temperature is below 44°C (111°F).	0 - 5 step
		Engine coolant temperature is above 45°C (113°F).	115 - 120 step
SWL/C POSI SE	<ul style="list-style-type: none"> Engine speed: Idle Engine coolant temperature is below 44°C (111°F). 		Approximately 0 deg
	<ul style="list-style-type: none"> Engine speed: Idle Engine coolant temperature is above 45°C (113°F). 		Approximately 80 deg

On Board Diagnosis Logic

NIEC1529

Malfunction is detected when an excessively low or high voltage from the sensor is sent to ECM.

Possible Cause

NIEC1530

- Harness or connectors (Swirl control valve position sensor circuit is open or shorted.)
- Swirl control valve position sensor
- Harness or connectors (Swirl control valve circuit is open or shorted.)
- Swirl control valve

DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)

DTC Confirmation Procedure

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1531

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II and wait at least 5 seconds.

If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1155.

With GST

Follow the procedure "WITH CONSULT-II" above.

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DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

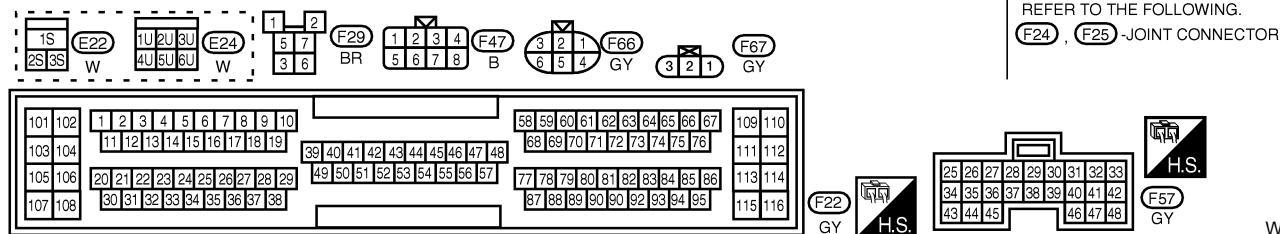
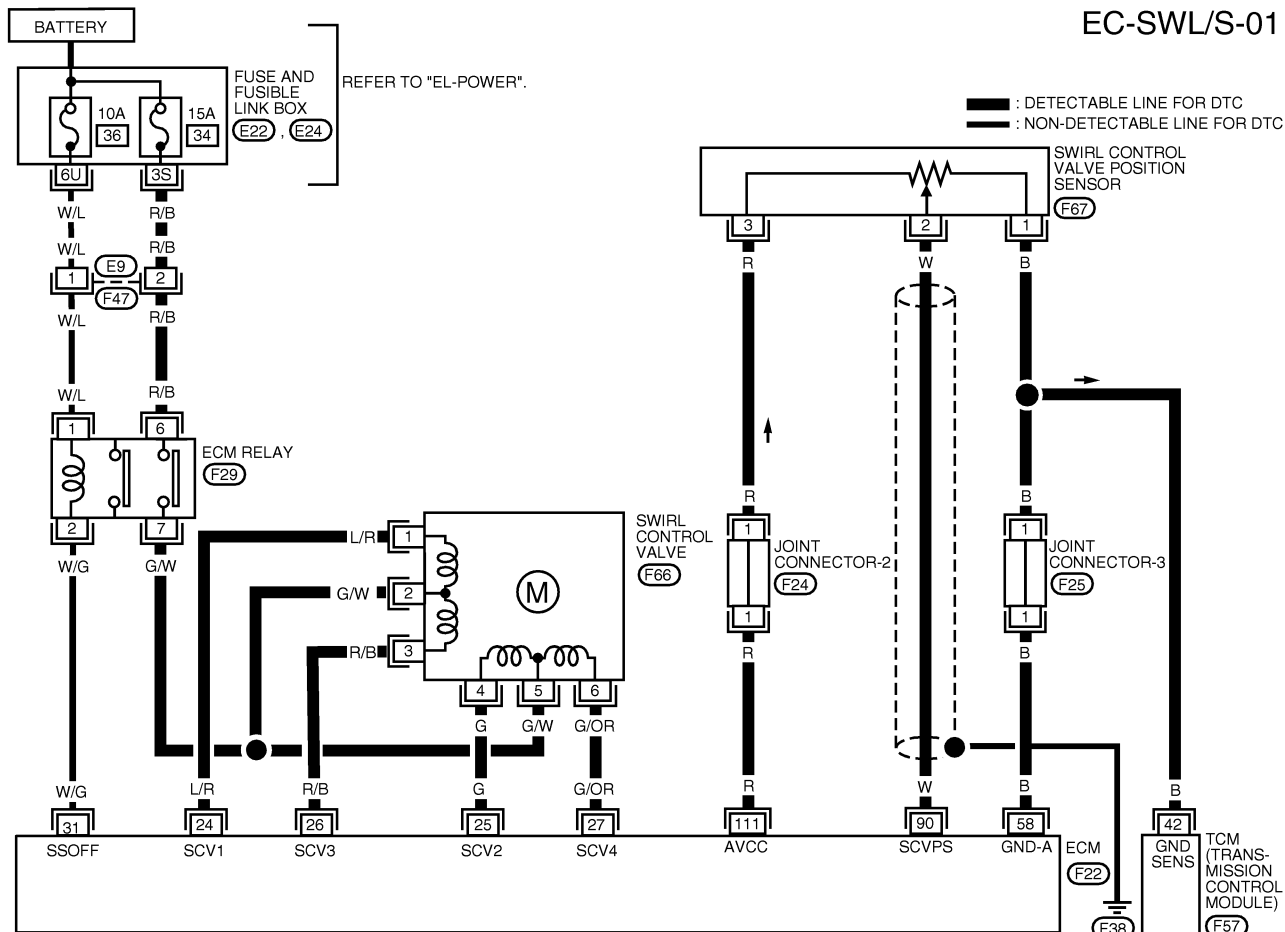
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1532

EC-SWL/S-01



WEC413

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
24	L/R	SWIRL CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
25	G			
26	R/B			
27	G/OR			
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
90	W	SWIRL CONTROL VALVE CONTROL POSITION SENSOR	IGN ON	0.21 - 4.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF608Z

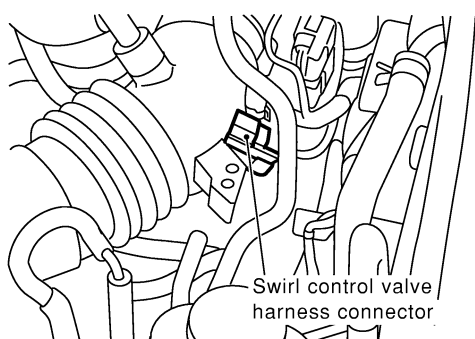
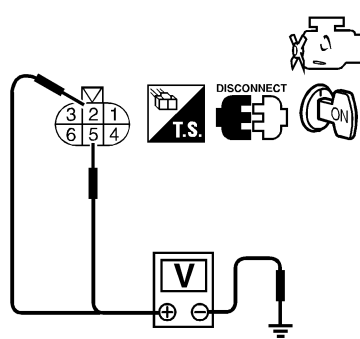
DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1533

1	CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect swirl control valve harness connector.</p> <div style="text-align: center;">  <p>Swirl control valve harness connector</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p>OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

SEF407Z

SEF327X

2	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and swirl control valve.	
▶	Repair harness or connectors.

3	CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">Swirl volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">24</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">25</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">26</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">27</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		ECM terminal	Swirl volume control valve	24	1	25	4	26	3	27	6
ECM terminal	Swirl volume control valve										
24	1										
25	4										
26	3										
27	6										
OK	▶ GO TO 4.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

MTBL0541

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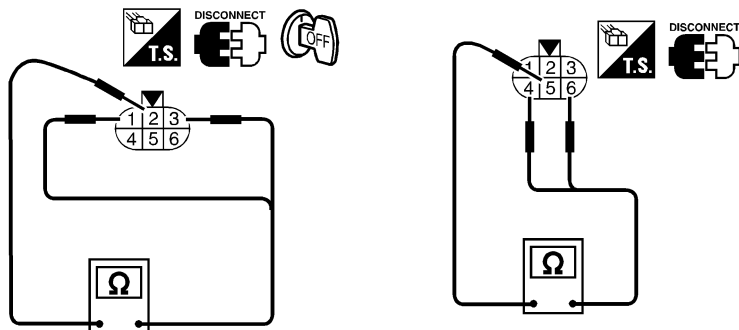
DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK SWIRL CONTROL VALVE

Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.5 - 23.5 Ω [At 20°C (68°F)]

SEF540Z

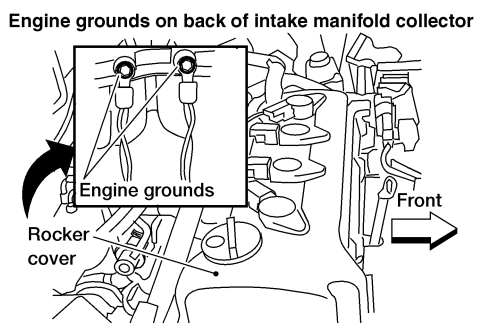
OK or NG

OK ► GO TO 5.

NG ► Replace intake manifold collector assembly.

5 RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.

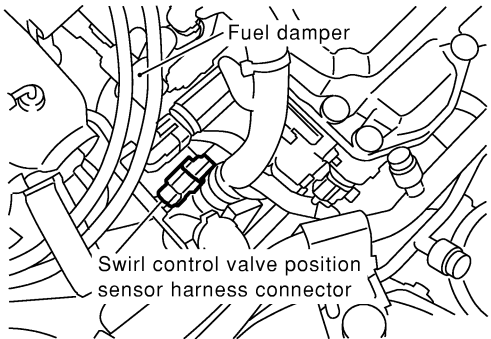
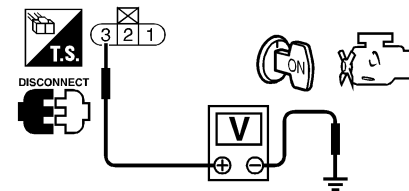


WEC249

► GO TO 6.

DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

6	CHECK SWIRL CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT	
<p>1. Disconnect swirl control valve position sensor harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Fuel damper</p> <p style="margin-left: 100px;">Swirl control valve position sensor harness connector</p> </div>		
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between swirl control valve position sensor terminal 3 and ground with CONSULT-II or tester.</p>		
SEF408Z		
<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Voltage: Approximately 5V</p> </div> </div>		
SEF306X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between swirl control valve position sensor and ECM 		
▶ Repair harness or connectors.		

8	CHECK SWIRL CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between swirl control valve position sensor terminal 1 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between swirl control valve position sensor and TCM ● Harness for open or short between swirl control valve position sensor and ECM 		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P1137 SWIRL CONTROL VALVE CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK SWIRL CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 90 and swirl control valve position sensor terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK (With CONSULT-II)	▶ GO TO 11.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838. <p style="text-align: center;">OK or NG</p>	
OK	▶ Replace intake manifold assembly.
NG	▶ Repair or replace.

Description
SYSTEM DESCRIPTION

NIEC1534

NIEC1534S01

Sensor	Input Signal to ECM	ECM function	Actuator
Throttle position sensor	Throttle position	Swirl control valve control	Swirl control valve
Ignition switch	Start signal		
Crankshaft position sensor (POS)	Engine speed		
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Swirl control valve position sensor	Swirl control valve position		

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Swirl control valve has a valve portion in the intake passage of each cylinder.

While idling and during low engine coolant temperature, the swirl control valve closes. Thus the velocity of the air in the intake passage increases, promoting the vaporization of the fuel and producing a swirl in the combustion chamber.

Because of this operation, this system tends to increase the burning speed of the gas mixture, improve fuel consumption, and increase the stability in running conditions.

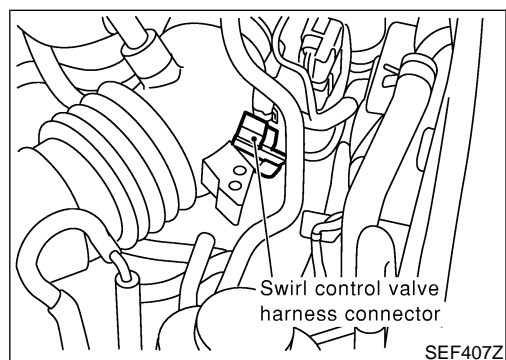
Also, except when idling and during low engine coolant temperature, this system opens the swirl control valve. In this condition, this system tends to increase power by improving intake efficiency via reduction of intake flow resistance, intake flow.

The swirl control valve is operated by the ECM.

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Throttle position sensor (Idle position)	Engine coolant temperature	Swirl control valve
OFF	—	Open
ON	Above 45°C (113°F)	Open
	Below 44°C (111°F)	Close

RS
BT



COMPONENT DESCRIPTION

NIEC1534S02

Swirl Control Valve

NIEC1534S0201

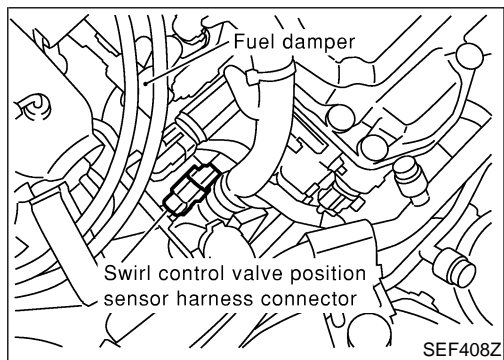
Swirl control valve consists of actuator and valve. The valve is installed in the intake manifold, and the actuator is connected to the rear end of the valve shaft.

The swirl control valve uses a step motor which has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes. When no

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Description (Cont'd)

change in the control position is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.



Swirl Control Valve Position Sensor

NIEC1534S0202

Swirl control valve position sensor is installed on the intake manifold. The sensor is connected to the front end of the valve shaft of the swirl control valve.

The sensor responds to the valve shaft movement. This sensor is a kind of potentiometer which transforms the swirl control valve position into output voltage, and emits the voltage signal to the ECM.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1535

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
SWL C/V (B1)	● Engine speed: Idle	Engine coolant temperature is below 44°C (111°F).	0 - 5 step
		Engine coolant temperature is above 45°C (113°F).	115 - 120 step

On Board Diagnosis Logic

NIEC1536

Malfunction is detected when the target opening angle of swirl control valve controlled by ECM and the input signal from swirl control valve position sensor is not in the normal range.

Possible Cause

NIEC1537

- Harness or connectors
(The swirl control valve circuit is open or shorted.)
- Swirl control valve
- Harness or connectors
(The swirl control valve position sensor circuit is open or shorted.)
- Swirl control valve position sensor

DTC Confirmation Procedure

NIEC1538

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

 **With CONSULT-II**

- 1) Turn ignition switch "ON" and wait at least 2 seconds.
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds.
- 4) Turn ignition switch "OFF" and wait at least 10 seconds.
- 5) Turn ignition switch "ON" and wait at least 2 seconds.
- 6) Start engine and let it idle for at least 10 seconds.
- 7) Maintain engine speed at about 2,000 rpm for at least 10 seconds.
- 8) Turn ignition switch "OFF", wait at least 10 seconds and then turn "ON".
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1163.
If 1st trip DTC is not detected, go to next step.
- 9) Perform step 5 through 8 three times.

 **With GST**

Follow the procedure "With CONSULT-II" above.

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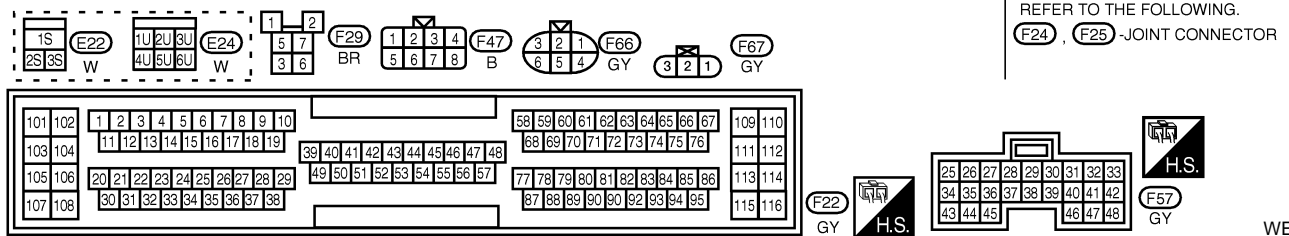
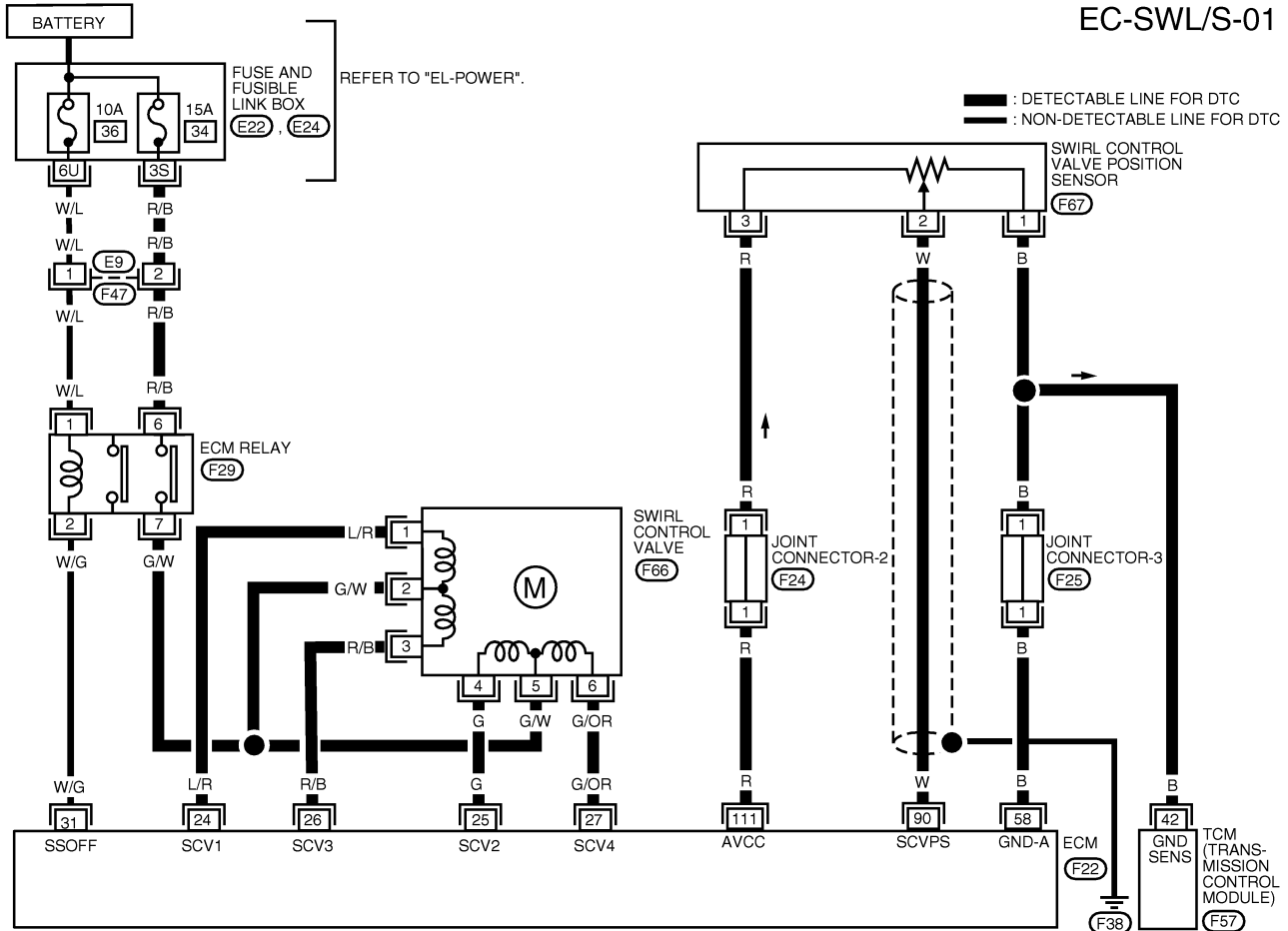
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Wiring Diagram

=NIEC1539

EC-SWL/S-01



WEC413

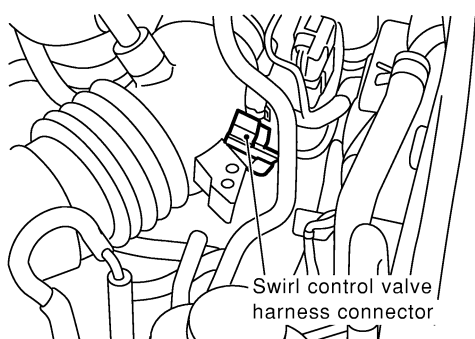
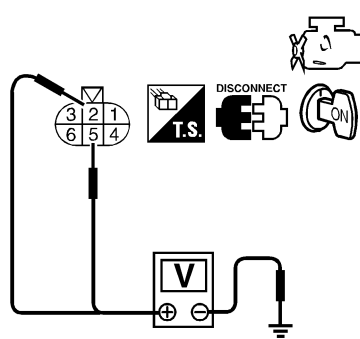
ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
24	L/R	SWIRL CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
25	G			
26	R/B			
27	G/OR			
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
90	W	SWIRL CONTROL VALVE CONTROL POSITION SENSOR	IGN ON	0.21 - 4.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

Diagnostic Procedure

NIEC1540

1	CHECK SWIRL CONTROL VALVE POWER SUPPLY CIRCUIT							
<p>1. Turn ignition switch "OFF". 2. Disconnect swirl control valve harness connector.</p> <div style="text-align: center;">  <p>Swirl control valve harness connector</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between swirl control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p>OK or NG</p> </div>								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>			OK	▶	GO TO 3.	NG	▶	GO TO 2.
OK	▶	GO TO 3.						
NG	▶	GO TO 2.						

SEF407Z

SEF327X

2	DETECT MALFUNCTIONING PART	
<p>Check the harness for open or short between ECM relay and swirl control valve.</p> <p style="text-align: right;">▶ Repair harness or connectors.</p>		

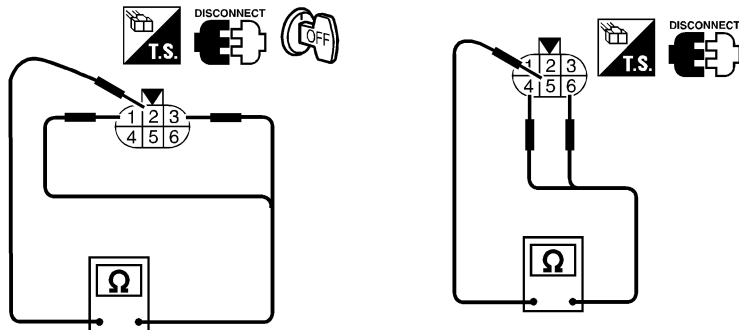
3	CHECK SWIRL CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT											
<p>1. Turn ignition switch "OFF". 2. disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and swirl control valve terminals as follows. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">Swirl volume control valve</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">24</td> <td style="padding: 5px;">1</td> </tr> <tr> <td style="padding: 5px;">25</td> <td style="padding: 5px;">4</td> </tr> <tr> <td style="padding: 5px;">26</td> <td style="padding: 5px;">3</td> </tr> <tr> <td style="padding: 5px;">27</td> <td style="padding: 5px;">6</td> </tr> </tbody> </table> <p style="color: blue; margin-top: 10px;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>			ECM terminal	Swirl volume control valve	24	1	25	4	26	3	27	6
ECM terminal	Swirl volume control valve											
24	1											
25	4											
26	3											
27	6											
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>			OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.				
OK	▶	GO TO 4.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

MTBL0541

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 EL
 IDX

4 CHECK SWIRL CONTROL VALVE

Check resistance between swirl control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.5 - 23.5 Ω [At 20°C (68°F)]

SEF540Z

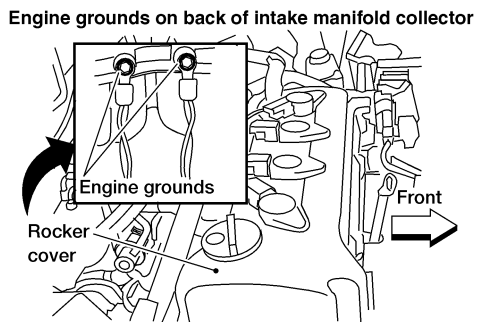
OK or NG

OK ► GO TO 5.

NG ► Replace intake manifold collector assembly.

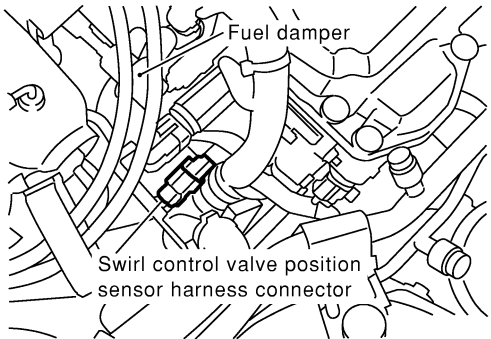
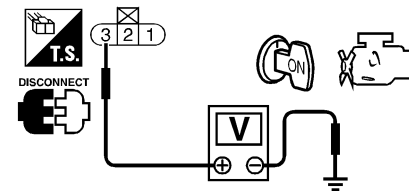
5 RETIGHTEN GROUND SCREWS

Loosen and retighten engine ground screws.



WEC249

► GO TO 6.

6	CHECK SWIRL CONTROL VALVE POSITION SENSOR POWER SUPPLY CIRCUIT	
<p>1. Disconnect swirl control valve position sensor harness connector.</p> <div style="text-align: center;">  <p>Fuel damper</p> <p>Swirl control valve position sensor harness connector</p> </div>		
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between swirl control valve position sensor terminal 3 and ground with CONSULT-II or tester.</p>		
SEF408Z		
<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>Voltage: Approximately 5V</p> </div> </div>		
SEF306X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between swirl control valve position sensor and ECM 		
▶ Repair harness or connectors.		

8	CHECK SWIRL CONTROL VALVE POSITION SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between swirl control valve position sensor terminal 1 and engine ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between swirl control valve position sensor and TCM ● Harness for open or short between swirl control valve position sensor and ECM 		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

DTC P1138 SWIRL CONTROL VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

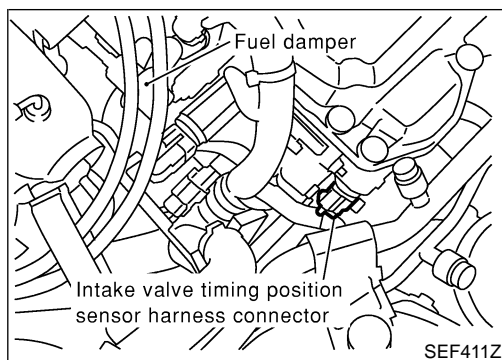
10	CHECK SWIRL CONTROL VALVE POSITION SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 90 and swirl control valve position sensor terminal 2. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK (With CONSULT-II)	▶ GO TO 11.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

11	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838. <p style="text-align: center;">OK or NG</p>	
OK	▶ Replace intake manifold assembly.
NG	▶ Repair or replace.

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1541

The intake valve timing control position sensor is located front-end of the cylinder head. This sensor detects a signal (intake valve position) generated by the protrusion of camshaft sprocket and sends it to the ECM. This sensor is not used to control the engine system. It is used only for the on board diagnosis of intake valve timing control.

GI
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EM
LC

On Board Diagnosis Logic

NIEC1542

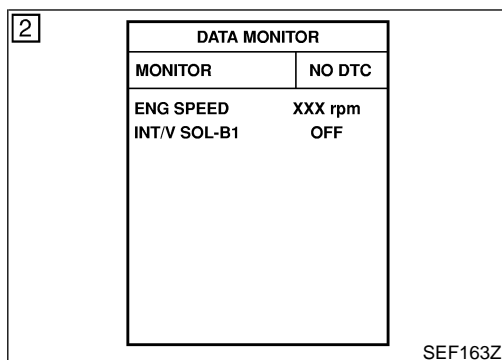
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1140	<ul style="list-style-type: none"> The proper pulse signal from the intake valve timing control position sensors is not sent to ECM while the engine is running at the specified engine speed. 	<ul style="list-style-type: none"> Harness or connectors (The intake valve timing control position sensor circuit is open.) Intake valve timing control position sensor Accumulation of debris to the signal pick-up portion of the camshaft

EC

FE

CL

MT



DTC Confirmation Procedure

NIEC1543

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and keep the engine speed at 2,000 rpm and wait at least 15 seconds.
- If 1st trip DTC is detected, go to "DIAGNOSTIC PROCEDURE", EC-1169.

AT

AX

SU

BR

ST

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

RS

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HA

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DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

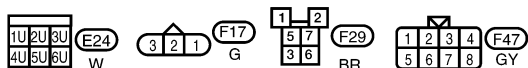
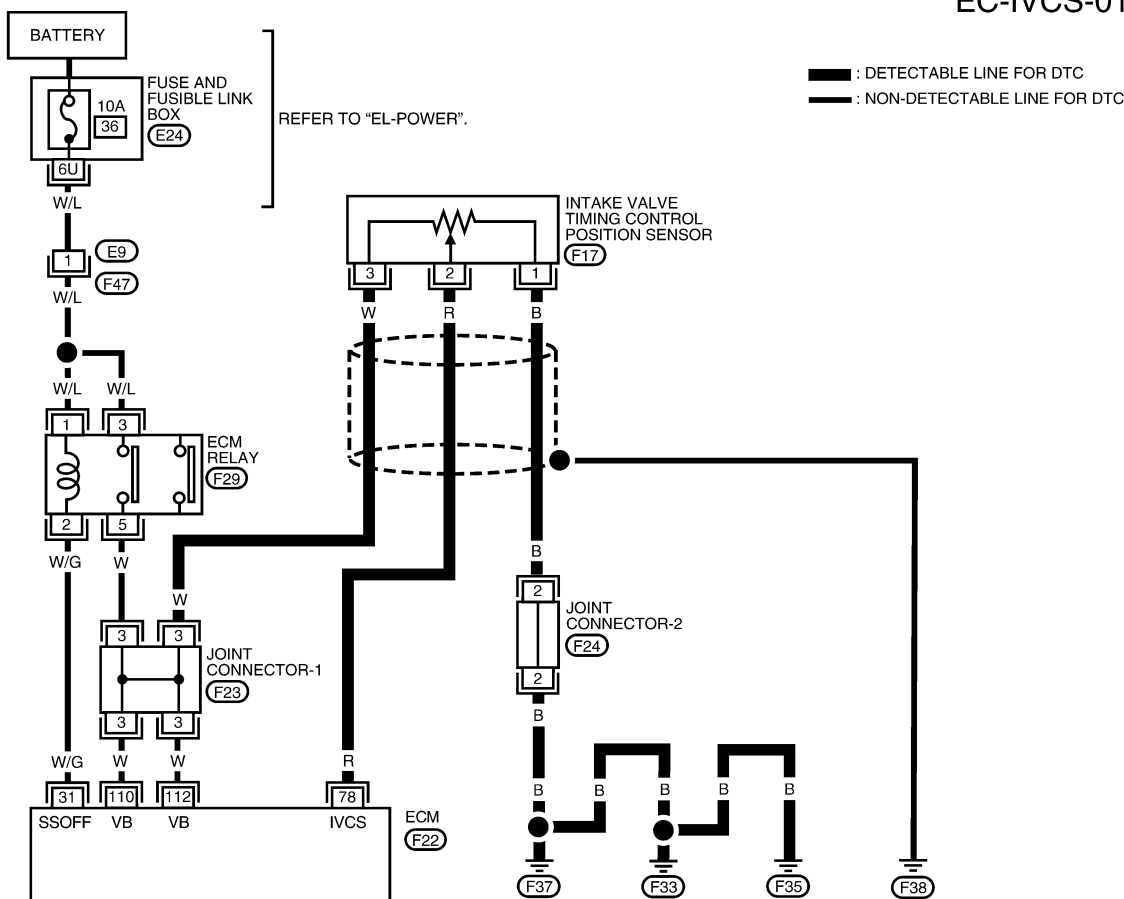
QG18DE (CALIF CA)

Wiring Diagram

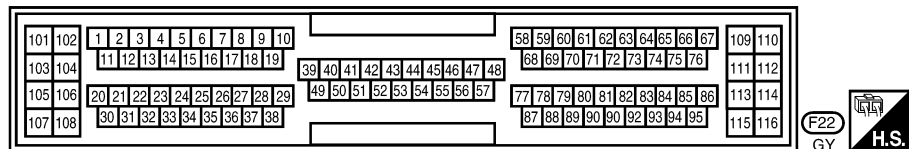
Wiring Diagram

NIEC1544

EC-IVCS-01



REFER TO THE FOLLOWING.
 (F23), (F24) -JOINT CONNECTOR



WEC922

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
78	R	INTAKE VALVE TIMING CONTROL POSITION SENSOR	ENGINE RUNNING AT IDLE UNDER WARM-UP CONDITION	APPROX. 0V
			ENGINE RUNNING AT 2,000 RPM UNDER WARM-UP CONDITION	APPROX. 0V

SEF744YA

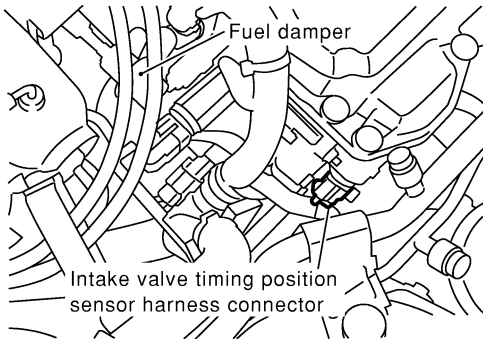
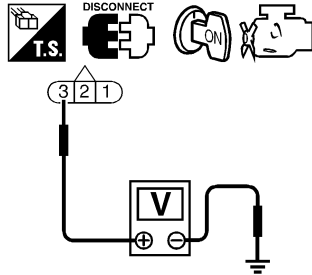
DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1545

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF". 2. Disconnect intake valve timing control position sensor harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between terminal 3 and engine ground.</p> <div style="text-align: center;">  </div> <p style="color: blue;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p>						
		<p>SEF411Z</p> <p>SEF509Y</p>							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 3.</td> </tr> <tr> <td style="text-align: center;">NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>	OK	▶	GO TO 3.	NG	▶	GO TO 2.	
OK	▶	GO TO 3.							
NG	▶	GO TO 2.							

2	DETECT MALFUNCTIONING PART	<ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between the intake valve timing control position sensor and ECM relay <p style="text-align: right;">▶ Repair harness or connectors.</p>	
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3	CHECK INPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 78 and intake valve timing control position sensor terminal 2. Refer to wiring diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>						
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; text-align: center;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td style="width: 75%;">GO TO 4.</td> </tr> <tr> <td style="text-align: center;">NG</td> <td style="text-align: center;">▶</td> <td>Repair harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair harness or connectors.	
OK	▶	GO TO 4.							
NG	▶	Repair harness or connectors.							

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4		CHECK GROUND CIRCUIT
1. Loosen and retighten engine ground screws. 2. Check harness continuity between sensor intake valve timing control position sensor terminal 1 and engine ground. Refer to wiring diagram. Continuity should exist. 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5		DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Joint connector-2● Harness for open or short between intake valve timing control position sensor and engine ground		
	▶	Repair open circuit or short to power in harness or connectors.

6		CHECK CAMSHAFT
Check accumulation of debris to the signal pick-up portion of the camshaft. Refer to EM-31 , "Components".		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Remove debris and clean the signal pick-up cutout of camshaft.

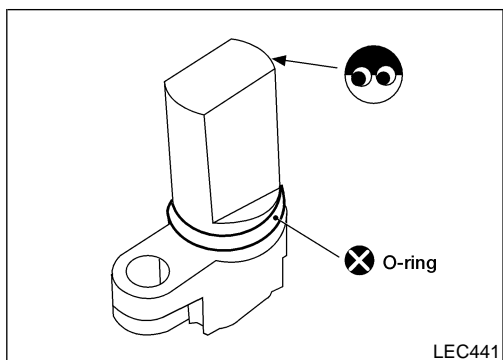
7		CHECK INTAKE VALVE TIMING CONTROL POSITION SENSOR
Refer to "Component Inspection", EC-1171.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace intake valve timing control position sensor.

8		CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
	▶	INSPECTION END

DTC P1140 INTAKE VALVE TIMING CONTROL POSITION SENSOR

QG18DE (CALIF CA)

Component Inspection



Component Inspection

INTAKE VALVE TIMING CONTROL POSITION SENSOR

NIEC1546

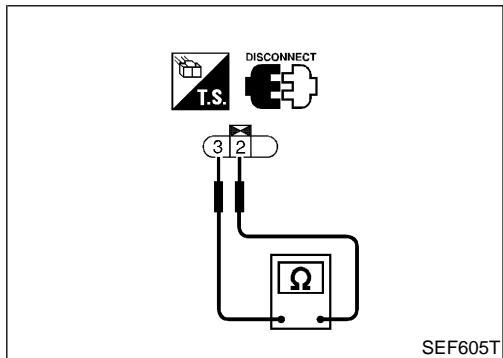
NIEC1546S01

1. Disconnect intake valve timing control position sensor harness connector.
2. Loosen fixing bolt of the sensor.
3. Visually check the sensor for chipping.
4. Check resistance between terminals 2 and 3.

Resistance:

600 - 740Ω [at 20°C (68°F)]

If NG, replace intake valve timing control position sensor.



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On Board Diagnosis Logic

NIEC1547

★ The closed loop control has the one trip detection logic.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1148	<ul style="list-style-type: none">• The closed loop control function does not operate even when vehicle is driving in the specified condition.	<ul style="list-style-type: none">• The air fuel ratio (A/F) sensor 1 circuit is open or shorted.• Air fuel ratio (A/F) sensor 1• Air fuel ratio (A/F) sensor 1 heater

DTC P1148 is displayed with another DTC for air fuel ratio (A/F) sensor 1. Perform the trouble diagnosis for the corresponding DTC.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

System Description

System Description

COOLING FAN CONTROL

NIEC1548

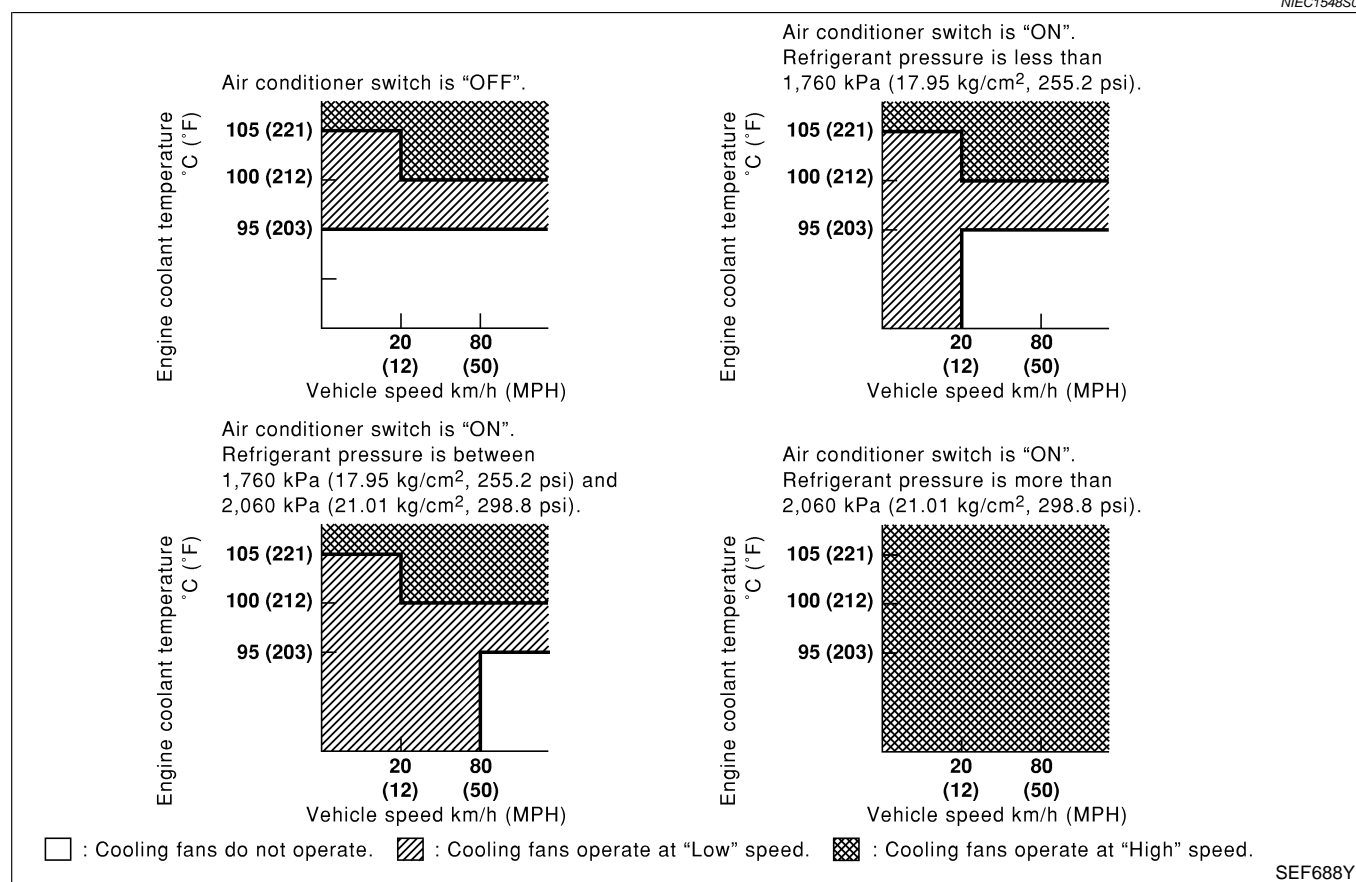
NIEC1548S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC1548S02



SEF688Y

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC1549

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF OFF
	Air conditioner switch: ON (Compressor operates)	ON

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is 94°C (201°F) or less
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)
		Engine coolant temperature is 105°C (221°F) or more

On Board Diagnosis Logic

NIEC1550

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1217	<ul style="list-style-type: none"> ● Cooling fan does not operate properly (Overheat). ● Cooling fan system does not operate properly (Overheat). ● Engine coolant was not added to the system using the proper filling method. 	<ul style="list-style-type: none"> ● Harness or connectors (The cooling fan circuit is open or shorted.) ● Cooling fan ● Radiator hose ● Radiator ● Radiator cap ● Water pump ● Thermostat <p>For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-1189.</p>

CAUTION:

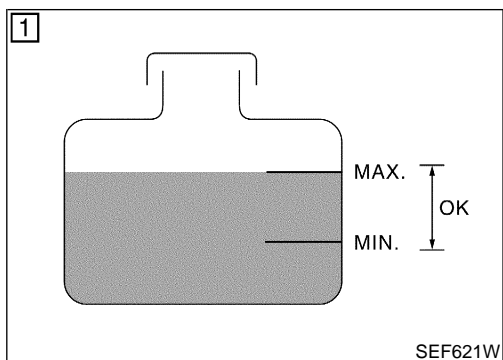
When a malfunction is indicated, be sure to replace the coolant. Refer to *MA-17*, "Changing Engine Coolant". Also, replace the engine oil. Refer to *MA-20*, "Changing Engine Oil".

- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to *MA-15*, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

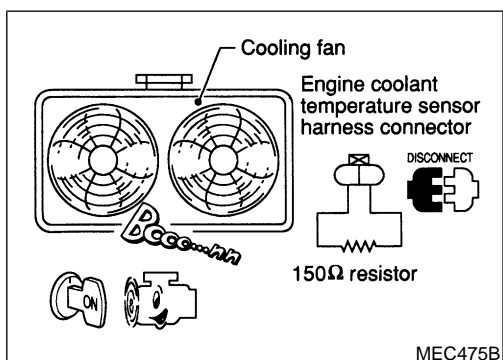
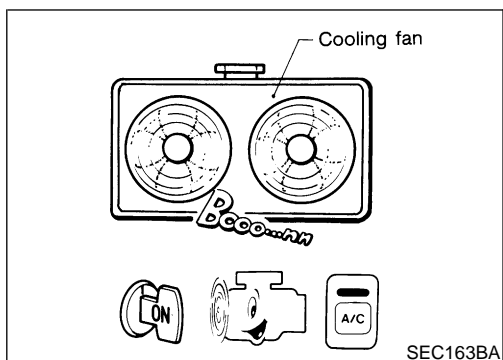
On Board Diagnosis Logic (Cont'd)



4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF646X



Overall Function Check

NIEC1551

Use this procedure to check the overall function of the cooling fan. During this check, a DTC might not be confirmed.

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

With CONSULT-II

- 1) Check the coolant level in the reservoir tank and radiator. **Allow engine to cool before checking coolant level.** If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-1178.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-1178.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-1178.

With GST

- 1) Check the coolant level in the reservoir tank and radiator. **Allow engine to cool before checking coolant level.** If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-1178.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-1178.
- 3) Start engine. **Be careful not to overheat engine.**
- 4) Set temperature control lever to full cold position.
- 5) Turn air conditioner switch "ON".
- 6) Turn blower fan switch "ON".
- 7) Run engine at idle for a few minutes with air conditioner operating. **Be careful not to overheat engine.**
- 8) Make sure that cooling fan operates at low speed. If NG, go to "Diagnostic Procedure", EC-1178. If OK, go to the following step.
- 9) Turn ignition switch "OFF".
- 10) Turn air conditioner switch and blower fan switch "OFF".
- 11) Disconnect engine coolant temperature sensor harness connector.
- 12) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
- 13) Restart engine and make sure that cooling fan operates at higher speed than low speed. **Be careful not to overheat engine.**
- 14) If NG, go to "Diagnostic Procedure", EC-1178.

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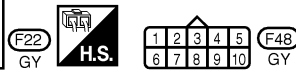
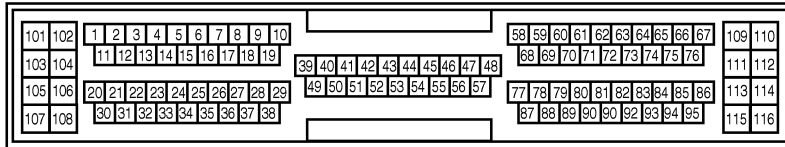
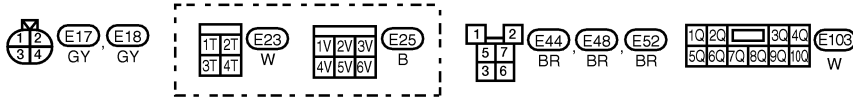
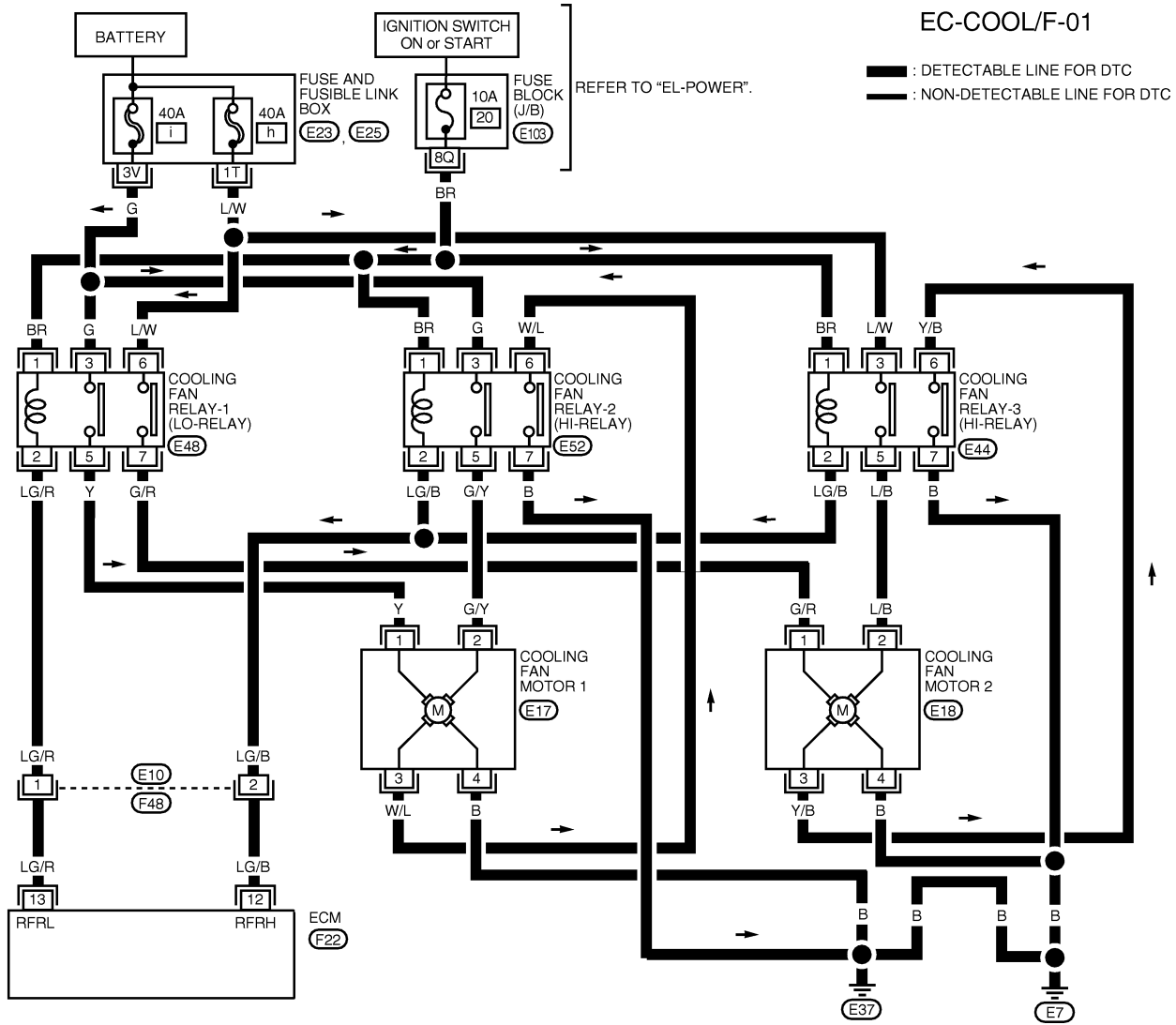
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Wiring Diagram — Early Production

Wiring Diagram — Early Production

NIEC1552



LEC222

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

SEF571Y

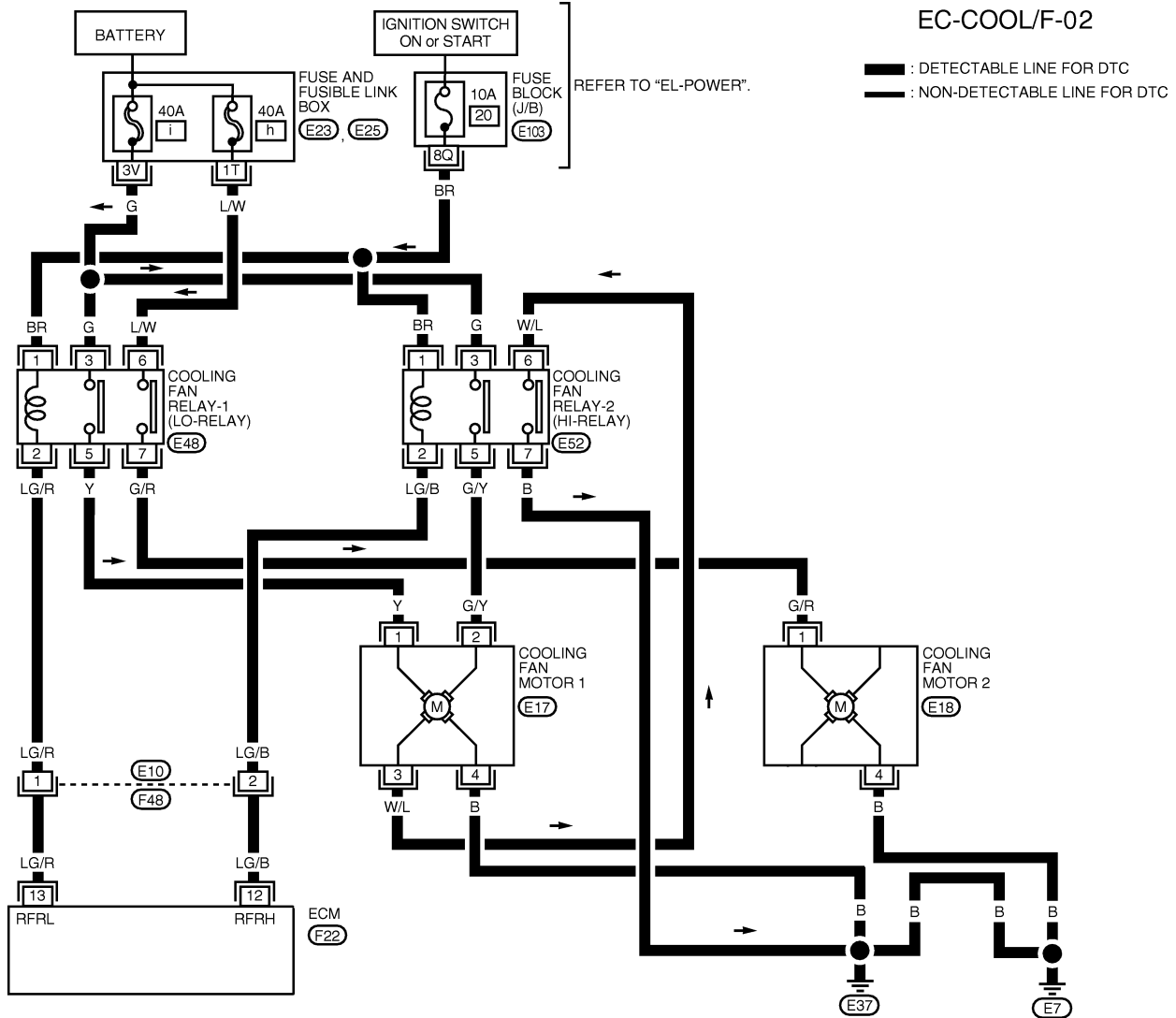
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

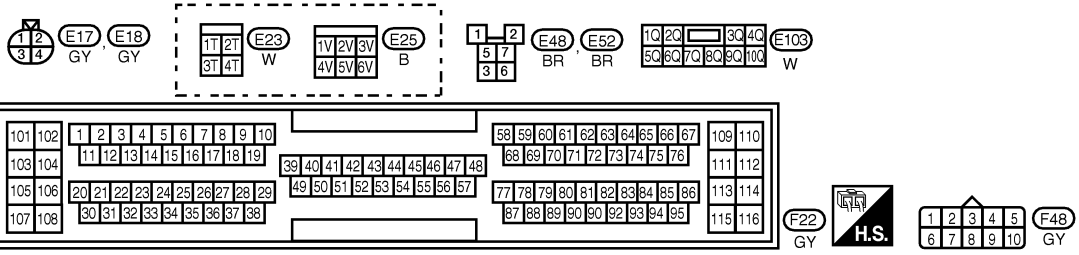
Wiring Diagram — Late Production

Wiring Diagram — Late Production

NIEC1735



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WEC129A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

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SEF571Y

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1553

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p>📖 With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3 (early production).</p> <div style="text-align: center;"> </div>																										
<p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p> <div style="text-align: center;"> <table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> </div>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLAN TEMP/S	XXX °C																
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COOLING FAN	OFF																									
MONITOR																										
COOLAN TEMP/S	XXX °C																									
<p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>																										
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1184.)																								

LEC130A

SEF646X

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																							
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Turn ignition switch "ON". 4. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLANT TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	OFF	MONITOR		COOLANT TEMP/S	XXX °C														
ACTIVE TEST																								
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MONITOR																								
COOLANT TEMP/S	XXX °C																							
SEF646X																								
<p>5. Make sure that cooling fans-1 and -2 (early production) operate at high speed.</p> <p style="text-align: center;">OK or NG</p>																								
OK	▶	GO TO 6.																						
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1187.)																						

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

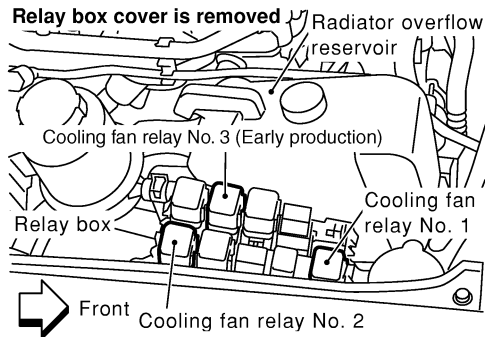
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

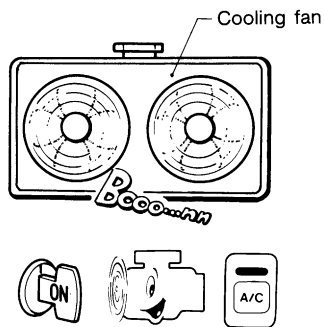
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3 (early production).



LEC130A

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



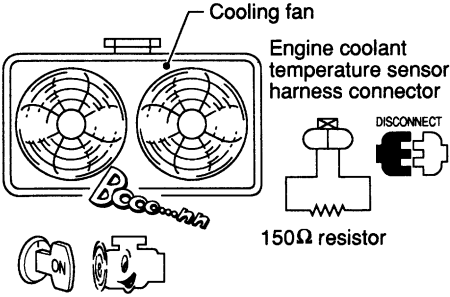
SEC163BA

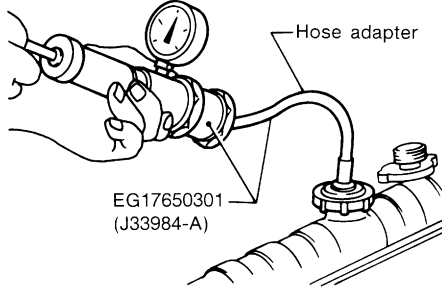
OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1184.)

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION	<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3 (early production). 3. Turn air conditioner switch and blower fan switch "OFF". 4. Disconnect engine coolant temperature sensor harness connector. 5. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 6. Restart engine and make sure that cooling fans-1 and -2 (early production) operate at high speed. <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">MEC475B</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; border-right: 1px solid black; padding: 5px;">OK</td> <td style="width: 5%; text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 5px;">GO TO 6.</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">NG</td> <td style="text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 5px;">Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1187.)</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1187.)	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 6.							
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1187.)							

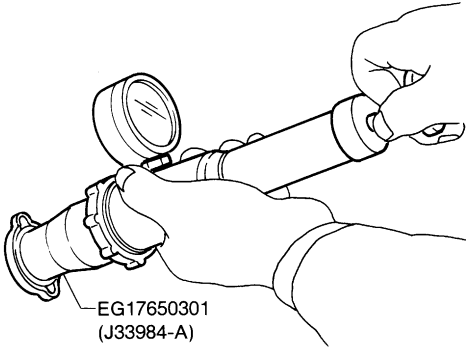
6	CHECK COOLING SYSTEM FOR LEAK	<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p style="color: red;">CAUTION: Higher than the specified pressure may cause radiator damage.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">SLC754A</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%; border-right: 1px solid black; padding: 5px;">OK</td> <td style="width: 5%; text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 5px;">GO TO 8.</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 5px;">NG</td> <td style="text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 5px;">GO TO 7.</td> </tr> </table>	OK	▶	GO TO 8.	NG	▶	GO TO 7.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 8.							
NG	▶	GO TO 7.							

7	DETECT MALFUNCTIONING PART	<p>Check the following for leak.</p> <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump (Refer to LC-12, "Water Pump".) <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <tr> <td style="width: 25%; border-right: 1px solid black; padding: 5px;"></td> <td style="width: 5%; text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 5px;">Repair or replace.</td> </tr> </table>		▶	Repair or replace.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
	▶	Repair or replace.				

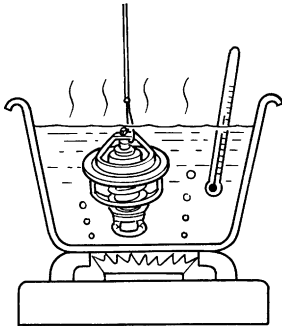
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK RADIATOR CAP		
Apply pressure to cap with a tester.			
			
<p>Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)</p>			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	Replace radiator cap.	

SLC755A

9	CHECK THERMOSTAT		
<p>1. Check valve seating condition at normal room temperatures. It should seat tightly.</p> <p>2. Check valve opening temperature and valve lift.</p>			
			
<p>Valve opening temperature: 76.5°C (170°F) [standard]</p> <p>Valve lift: More than 9 mm/90°C (0.35 in/194°F)</p>			
<p>3. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-13, "Thermostat".</p>			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Replace thermostat.	

SLC343

10	CHECK ENGINE COOLANT TEMPERATURE SENSOR		
Refer to "COMPONENT INSPECTION", EC-886.			
OK or NG			
OK	▶	GO TO 11.	
NG	▶	Replace engine coolant temperature sensor.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK MAIN 12 CAUSES
If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-1189.	
▶	INSPECTION END

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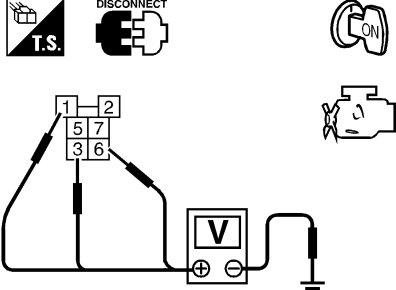
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC1553S01

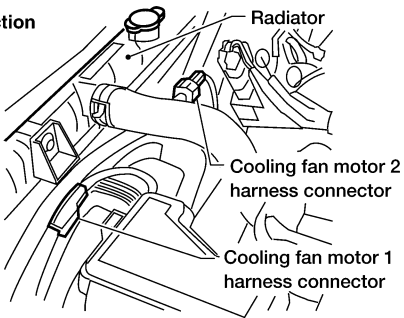
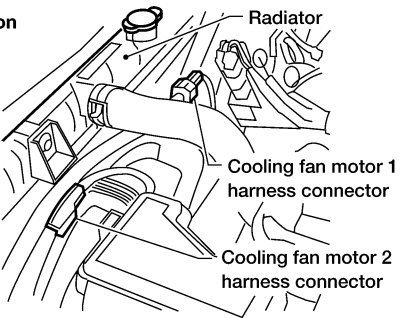
1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="color: blue; margin-top: 10px;">Voltage: Battery voltage</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>	SEF477Y
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible links ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 	
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;"> <p>Early production</p>  </div> <div style="text-align: center;"> <p>Late production</p>  </div> </div> <p style="text-align: right; margin-top: 10px;">WEC131A</p> <p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram — Early Production", EC-1176 or "Wiring Diagram — Late Production", EC-1177. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to wiring diagram. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%; padding: 2px;">OK</td> <td style="width: 10%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 4.</td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

4	CHECK OUTPUT SIGNAL CIRCUIT	<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram — Early Production", EC-1176 or "Wiring Diagram — Late Production", EC-1177. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%; padding: 2px;">OK</td> <td style="width: 10%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 6.</td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 5.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	GO TO 5.	<p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p>
OK	▶	GO TO 6.							
NG	▶	GO TO 5.							

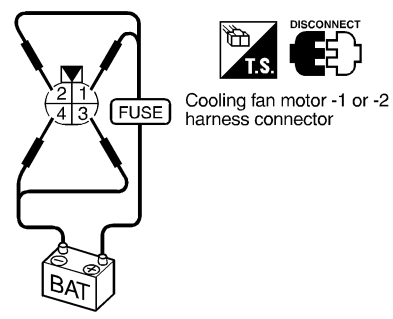
5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relay-1 and ECM <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%;"></td> <td style="width: 10%; text-align: center;">▶</td> <td style="padding: 2px;">Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>BT</p> <p>HA</p>
	▶	Repair open circuit or short to ground or short to power in harness or connectors.				

6	CHECK COOLING FAN RELAY-1	<p>Refer to "Component Inspection", EC-1189.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 15%; padding: 2px;">OK</td> <td style="width: 10%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 7.</td> </tr> <tr> <td style="padding: 2px;">NG</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Replace cooling fan relay.</td> </tr> </table>	OK	▶	GO TO 7.	NG	▶	Replace cooling fan relay.	<p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 7.							
NG	▶	Replace cooling fan relay.							

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

7	CHECK COOLING FAN MOTORS-1 AND -2																			
Supply battery voltage between the following terminals and check operation.																				
																				
Cooling fan motor -1 or -2 harness connector																				
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2 (Early production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> <tr> <td>Cooling fan motor -2 (Late production)</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2 (Early production)	Low	1	4	High	1, 2	3, 4	Cooling fan motor -2 (Late production)	Low	1	4
	Speed	Terminals																		
		(+)	(-)																	
Cooling fan motor -1 or -2 (Early production)	Low	1	4																	
	High	1, 2	3, 4																	
Cooling fan motor -2 (Late production)	Low	1	4																	
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OK or NG																				
OK	▶	GO TO 8.																		
NG	▶	Replace cooling fan motors.																		

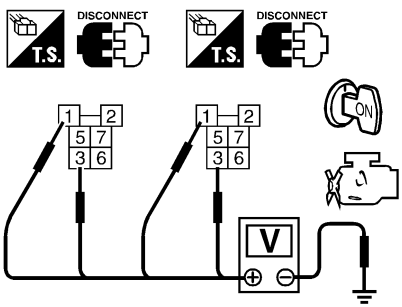
8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.			
	▶	INSPECTION END	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC1553S02

1	CHECK POWER SUPPLY	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan relays-2 and -3 (early production).</p> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between cooling fan relays-2 and -3 (early production) terminals 1, 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 200px;">Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p>	
OK		▶	GO TO 3.	
NG		▶	GO TO 2.	

SEF593X

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fuse ● Harness for open or short between cooling fan relays-2 and -3 (early production) and fusible link 	
		▶	Repair harness or connectors.

3	CHECK GROUND CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p> <p>3. Check harness continuity between cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2, cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3, cooling fan relay-2 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-1176 or "Wiring Diagram — Late Production", EC-1177.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. For early production models, check harness continuity between cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2, cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3, cooling fan relay-3 terminal 7 and body ground. Refer to "Wiring Diagram — Early Production", EC-1176.</p> <p style="color: blue;">Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>		
		▶	OK or NG	
OK		▶	GO TO 4.	
NG		▶	Repair open circuit or short to ground or short to power in harness or connectors.	

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

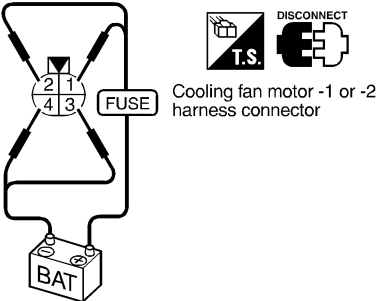
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK OUTPUT SIGNAL CIRCUIT		
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to "Wiring Diagram — Early Production", EC-1176 or "Wiring Diagram — Late Production", EC-1177. Continuity should exist. 3. Also check harness for short to ground and short to power.			
OK or NG			
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

5	DETECT MALFUNCTIONING PART		
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relays-2 and -3 (early production) and ECM 			
▶ Repair open circuit or short to ground or short to power in harness or connectors.			

6	CHECK COOLING FAN RELAYS-2 AND -3 (EARLY PRODUCTION)		
Refer to "Component Inspection", EC-1189.			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Replace cooling fan relays.	

7	CHECK COOLING FAN MOTORS		
Supply battery voltage between the following terminals and check operation.			
<div style="display: flex; align-items: center; justify-content: center;">  <div style="margin-left: 20px;"> <p>▶ Cooling fan motor -1 or -2 harness connector</p> </div> </div>			
LEC132A			
OK or NG			
OK	▶	GO TO 8.	
NG	▶	Replace cooling fan motors.	

8	CHECK INTERMITTENT INCIDENT		
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.			
▶ INSPECTION END			

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

QG18DE (CALIF CA)

Main 12 Causes of Overheating

Main 12 Causes of Overheating

NIEC1554

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	● Visual	No blocking	—
	2	● Coolant mixture	● Coolant tester	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	● Coolant level	● Visual	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	● Radiator cap	● Pressure tester	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-10 , "System Check".
ON* ²	5	● Coolant leaks	● Visual	No leaks	See LC-10 , "System Check".
ON* ²	6	● Thermostat	● Touch the upper and lower radiator hoses	Both hoses should be hot	See LC-13 , "Thermostat" and LC-15 , "Radiator".
ON* ¹	7	● Cooling fan	● CONSULT-II	Operating	See trouble diagnosis for DTC P0217 (EC-976).
OFF	8	● Combustion gas leak	● Color checker chemical tester 4 Gas analyzer	Negative	—
ON* ³	9	● Coolant temperature gauge	● Visual	Gauge less than 3/4 when driving	—
		● Coolant overflow to reservoir tank	● Visual	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF* ⁴	10	● Coolant return from reservoir tank to radiator	● Visual	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	● Cylinder head	● Straight edge, feeler gauge	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-34 , "Inspection".
	12	● Cylinder block and pistons	● Visual	No scuffing on cylinder walls or piston	See EM-55 , "Inspection".

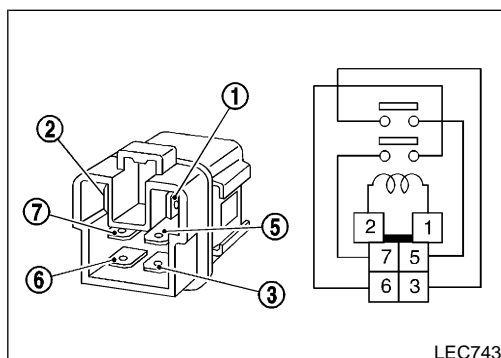
*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (56 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to **LC-19**, "Overheating Cause Analysis".



Component Inspection

NIEC1555

COOLING FAN RELAYS-1, -2 AND -3 (EARLY PRODUCTION)

NIEC1555S01

Check continuity between terminals 3 and 5, 6 and 7.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

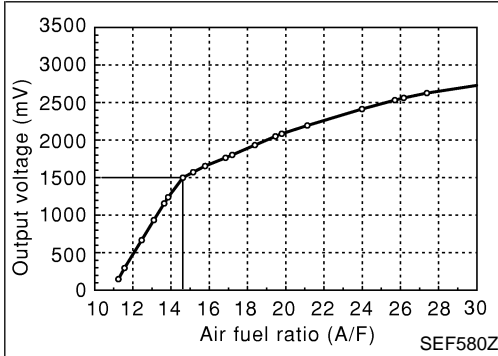
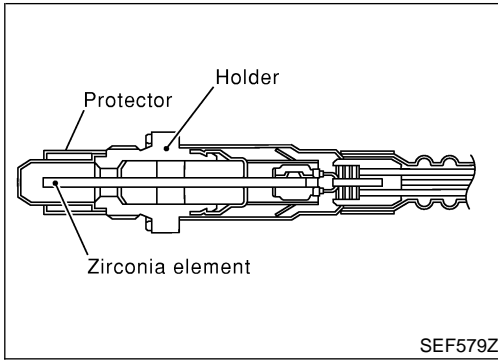
If NG, replace relay.

EC-1189

DTC P1271 AIR FUEL RATIO (A/F) SENSOR 1 (LOW VOLTAGE)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1556

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1557

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1558

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately low.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1271	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 0V.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

DTC P1271 AIR FUEL RATIO (A/F) SENSOR 1 (LOW VOLTAGE)

QG18DE (CALIF CA)

DTC Confirmation Procedure

NIEC1559

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	A/F SEN1 (B1)	XXX V

SEF581Z

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-II.
- 3) Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 0V, go to "Diagnostic Procedure", EC-1194.
If the indication is not constantly approx. 0V, go to next step.
- 4) Select "A/F SEN1 (B1) P1275" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 5) Touch "START".
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

6	A/F SEN1 (B1) P1275	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF573Z

7	A/F SEN1 (B1) P1275	
	TESTING	
	SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h	

SEF574Z

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	"D" position with "OD" ON

If "TESTING" is not displayed after 20 seconds, retry from step 2.

- 7) Following the instructions of CONSULT-II screen, set "OD" OFF and release accelerator pedal fully.
- 8) Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- 9) Touch "BACK" and "MODE", then select "SELF-DIAG RESULT" mode.
If P1271 is displayed, go to "Diagnostic Procedure", EC-1194.
If another DTC is displayed, go to the corresponding "Diagnostic Procedure".

8	A/F SEN1 (B1) P1275	
	COMPLETED	

SEF575Z

Overall Function Check

NIEC1560

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

EC-1191

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DTC P1271 AIR FUEL RATIO (A/F) SENSOR 1 (LOW VOLTAGE)

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1194.

DTC P1271 AIR FUEL RATIO (A/F) SENSOR 1 (LOW VOLTAGE)

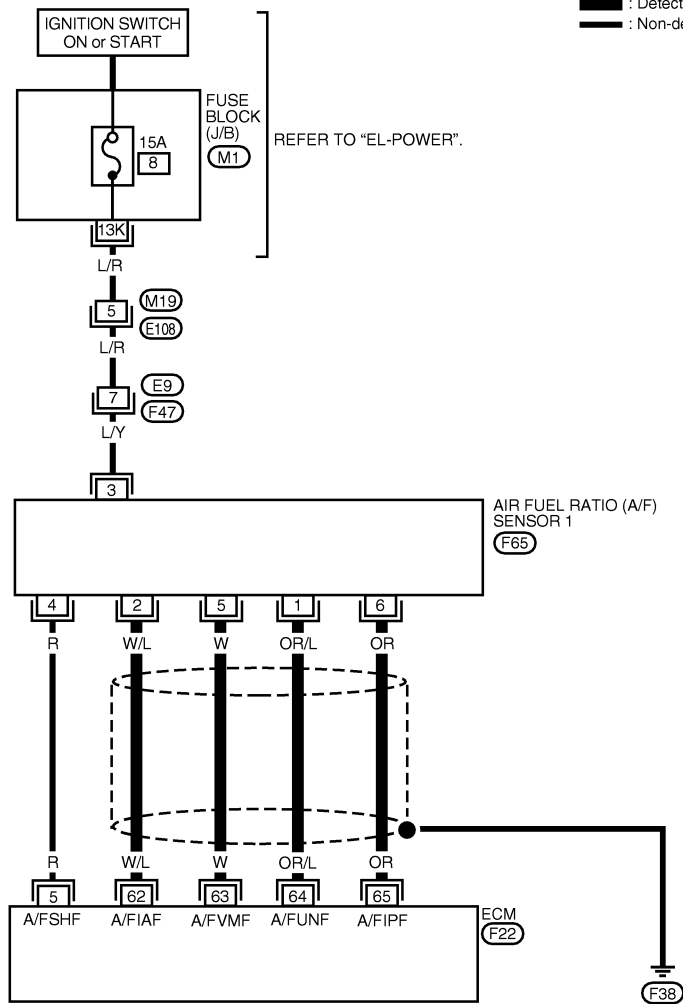
QG18DE (CALIF CA)

Wiring Diagram

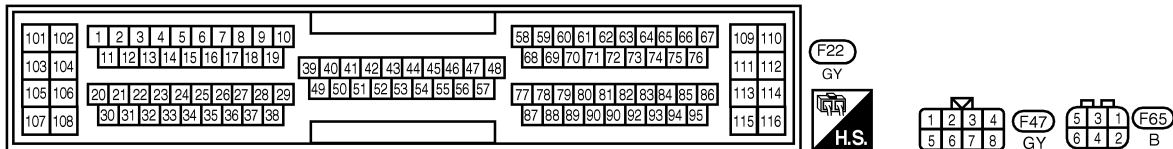
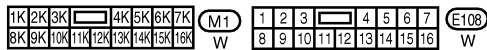
Wiring Diagram

=NIEC1561

EC-A/F-01



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WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

SEF609Z

DTC P1271 AIR FUEL RATIO (A/F) SENSOR 1 (LOW VOLTAGE)

QG18DE (CALIF CA)

Diagnostic Procedure

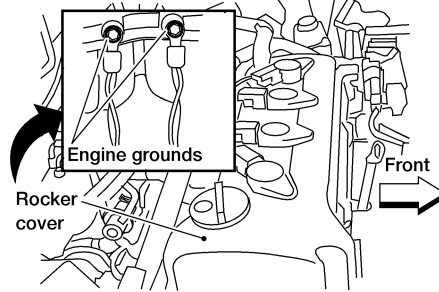
Diagnostic Procedure

NIEC1562

1 CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT

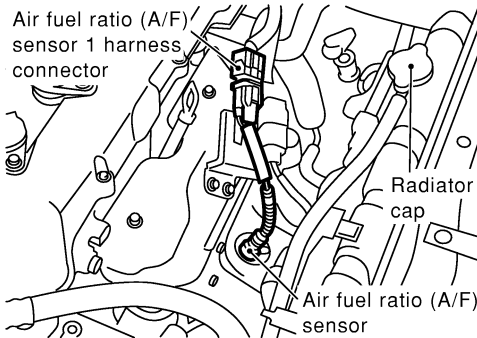
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

Engine grounds on back of intake manifold collector



WEC249

3. Disconnect ECM harness connector and A/F sensor 1 harness connector.



SEF393Z

4. Check harness continuity between the following terminals. Refer to Wiring Diagram.

ECM terminal	A/F sensor 1 terminal
62	2
63	5
64	1
65	6

MTBL0542

Continuity should exist.

5. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.

Continuity should not exist.

6. Also check harness for short to power.

OK or NG

OK	▶	GO TO 2.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

2 CHECK INTERMITTENT INCIDENT

Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.

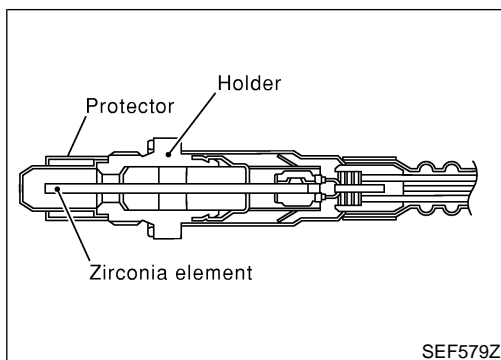
OK or NG

OK	▶	Replace A/F sensor 1.
NG	▶	Repair or replace.

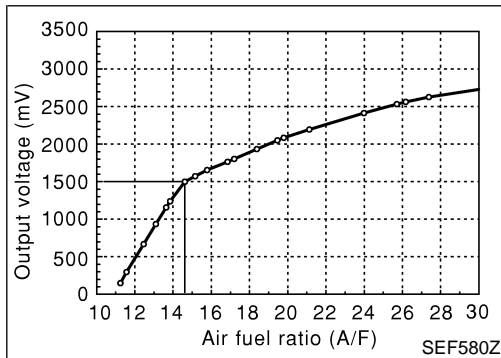
DTC P1272 AIR FUEL RATIO (A/F) SENSOR 1 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Component Description



SEF579Z



SEF580Z

Component Description

NIEC1563

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicated air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1564

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1565

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is not inordinately high.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1272	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 4.5V.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

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DTC P1272 AIR FUEL RATIO (A/F) SENSOR 1 (HIGH VOLTAGE)

QG18DE (CALIF CA)

DTC Confirmation Procedure

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	A/F SEN1 (B1)	XXX V

SEF581Z

6	A/F SEN1 (B1) P1275	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF573Z

7	A/F SEN1 (B1) P1275	
	TESTING	
	SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h	

SEF574Z

8	A/F SEN1 (B1) P1275	
	COMPLETED	

SEF575Z

DTC Confirmation Procedure

NIEC1566

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "A/F SEN1 (B1)" in "DATA MONITOR" mode with CONSULT-II.
- 3) Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 4.5V, go to "Diagnostic Procedure", EC-1199.
If the indication is not constantly approx. 4.5V, go to next step.
- 4) Select "A/F SEN1 (B1) P1275" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 5) Touch "START".
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	"D" position with "OD" ON

If "TESTING" is not displayed after 20 seconds, retry from step 2.

- 7) Following the instructions of CONSULT-II screen, set "OD" OFF and release accelerator pedal fully.
- 8) Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- 9) Touch "BACK" and "MODE", then select "SELF-DIAG RESULT" mode.
If P1272 is displayed, go to "Diagnostic Procedure", EC-1199.
If another DTC is displayed, go to the corresponding "Diagnostic Procedure".

Overall Function Check

NIEC1567

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

EC-1196

DTC P1272 AIR FUEL RATIO (A/F) SENSOR 1 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1199.

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DTC P1272 AIR FUEL RATIO (A/F) SENSOR 1 (HIGH VOLTAGE)

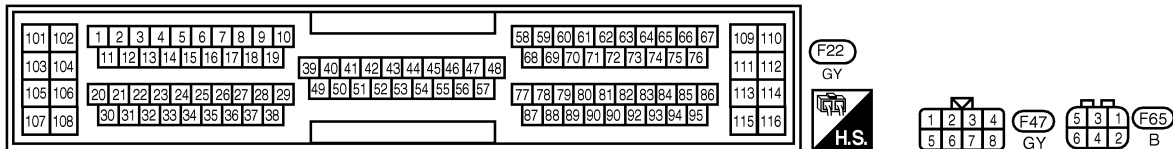
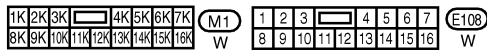
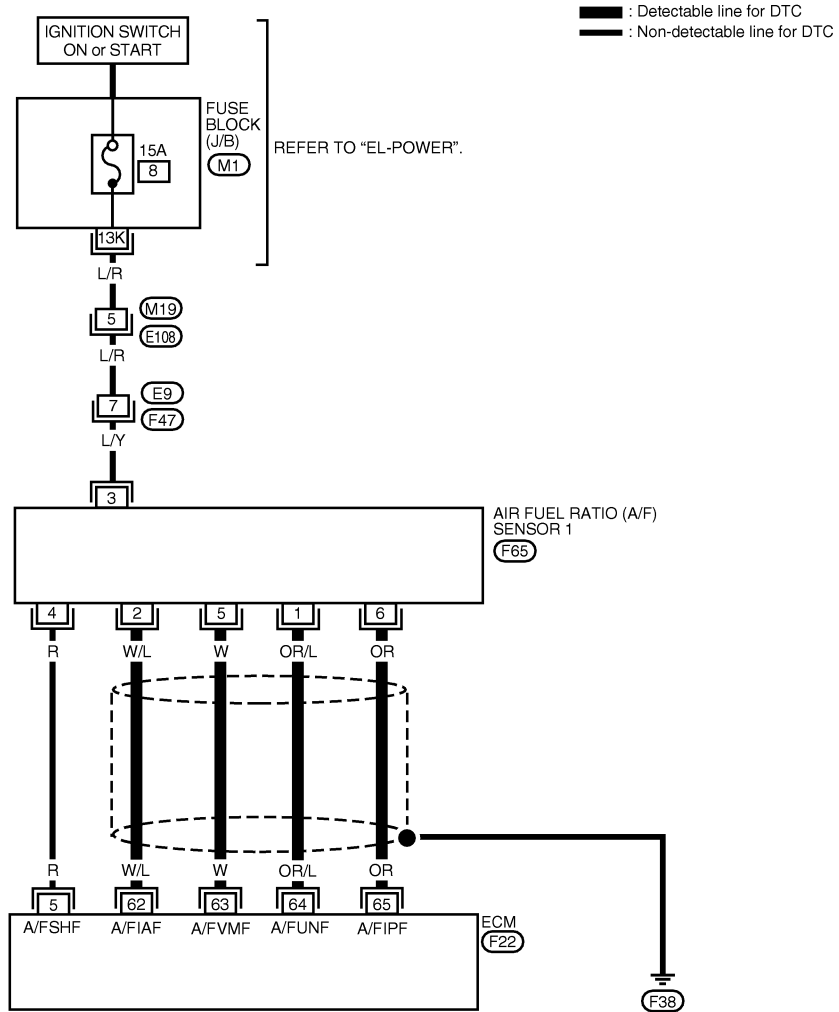
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1568

EC-A/F-01



WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

SEF609Z

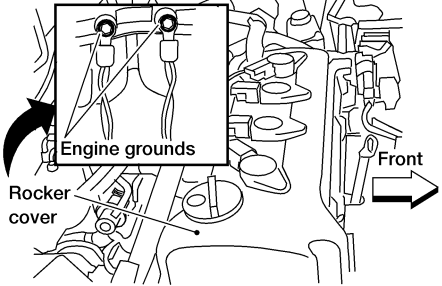
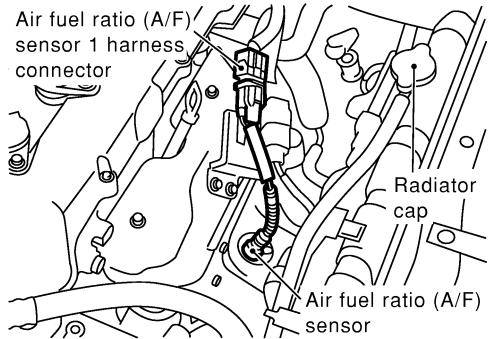
DTC P1272 AIR FUEL RATIO (A/F) SENSOR 1 (HIGH VOLTAGE)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1569

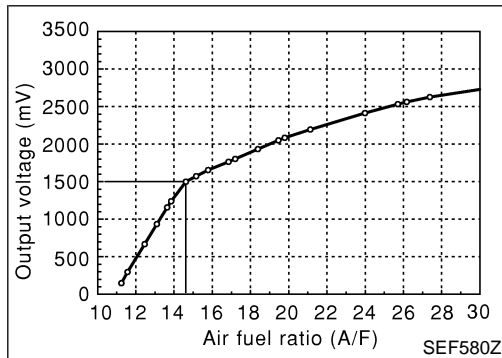
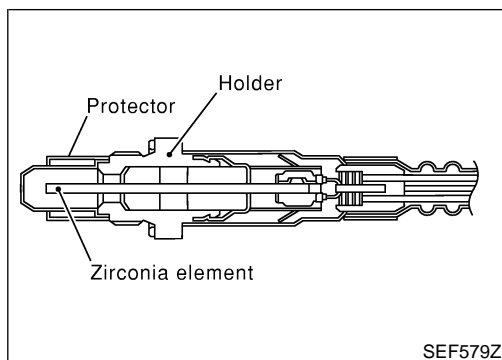
1	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT																		
		<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine grounds on back of intake manifold collector</p>  <p style="text-align: right;">WEC249</p> <p>3. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p>  <p style="text-align: right;">SEF393Z</p> <p>4. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">65</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0542</p> <p>Continuity should exist.</p> <p>5. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>6. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td style="width: 70%;">GO TO 2.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6	OK	▶	GO TO 2.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p>
ECM terminal	A/F sensor 1 terminal																		
62	2																		
63	5																		
64	1																		
65	6																		
OK	▶	GO TO 2.																	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.																	

2	CHECK INTERMITTENT INCIDENT								
		Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td style="width: 70%;">Replace A/F sensor 1.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair or replace.</td> </tr> </table>	OK	▶	Replace A/F sensor 1.	NG	▶	Repair or replace.	<p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	Replace A/F sensor 1.							
NG	▶	Repair or replace.							

DTC P1273 AIR FUEL RATIO (A/F) SENSOR 1 (LEAN SHIFT MONITORING)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1570

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicated air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1571

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1572

To judge the malfunction, the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is monitored not to be shifted "lean" side or "rich" side. When the A/F signal is shifting to the lean side, the malfunction will be detected.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1273	● The output voltage computed by ECM from the A/F sensor 1 signal is shifted to the lean side for a specified period.	<ul style="list-style-type: none"> ● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor heater 1 ● Fuel pressure ● Injectors ● Intake air leaks

DTC P1273 AIR FUEL RATIO (A/F) SENSOR 1 (LEAN SHIFT MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

4	A/F SEN1 (B1) P1273	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF567Z

4	A/F SEN1 (B1) P1273	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF568Z

4	A/F SEN1 (B1) P1273	
	COMPLETED	

SEF569Z

DTC Confirmation Procedure

NIEC1573

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "A/F SEN1 (B1) P1273" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 3) Touch "START".
- 4) Maintain the following conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 400 to 800 seconds.)

NOTE:

Keep the accelerator pedal as steady as possible.

ENG SPEED	Below 3,000 rpm
B/FUEL SCHDL	Below 9.0 msec
Selector lever	"P" or "N" position

If "TESTING" is not displayed after 20 minutes, retry from step 2.

- 5) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, go to "Diagnostic Procedure", EC-1203.

Overall Function Check

NIEC1574

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

NOTE:

Keep accelerator pedal as steady as possible during the cruising.

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1203.

EC-1201

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DTC P1273 AIR FUEL RATIO (A/F) SENSOR 1 (LEAN SHIFT MONITORING)

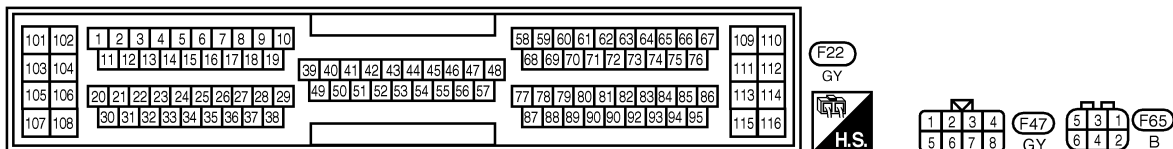
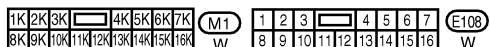
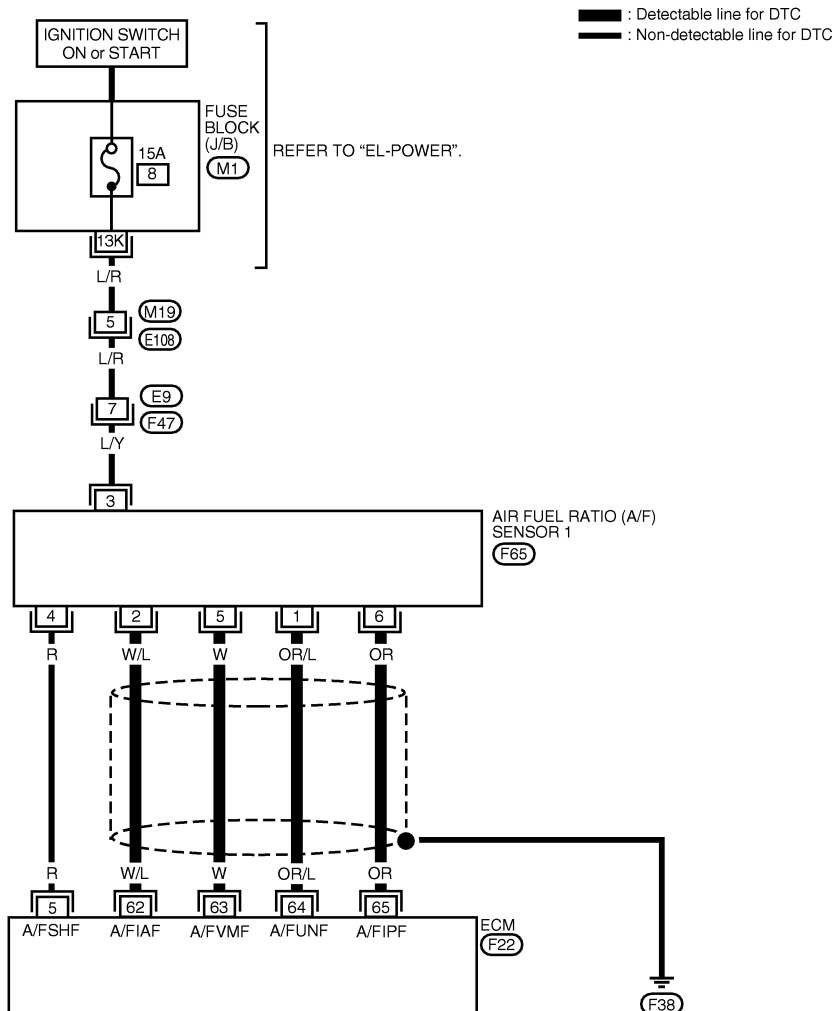
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1575

EC-A/F-01



WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

SEF609Z

DTC P1273 AIR FUEL RATIO (A/F) SENSOR 1 (LEAN SHIFT MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC1576

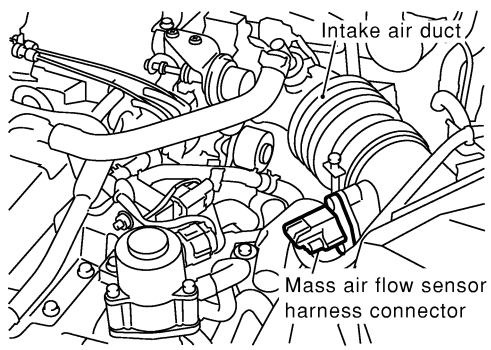
1	RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten the air fuel ratio (A/F) sensor 1. <div style="margin-left: 20px; color: blue;"> Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb) </div> 	
▶	GO TO 2.

GI
MA
EM
LC

2	CLEAR THE SELF-LEARNING DATA.								
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">B1 100%</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">B2 100%</td> </tr> <tr> <td colspan="2" style="padding: 2px; text-align: center;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%		B2 100%	CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
	B2 100%								
CLEAR									
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>									

EC
FE
CL
MT
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AX

SEF652Y

<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 	
	
<p>4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>	
Yes or No	
Yes	▶ Perform trouble diagnosis for DTC P0171. Refer to EC-957.
No	▶ GO TO 3.

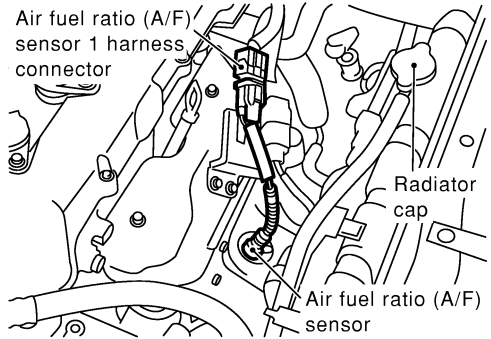
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SEF388Z

DTC P1273 AIR FUEL RATIO (A/F) SENSOR 1 (LEAN SHIFT MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT										
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p>											
											
<p>3. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">62</td> <td style="text-align: center; padding: 5px;">2</td> </tr> <tr> <td style="text-align: center; padding: 5px;">63</td> <td style="text-align: center; padding: 5px;">5</td> </tr> <tr> <td style="text-align: center; padding: 5px;">64</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">65</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>		ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6
ECM terminal	A/F sensor 1 terminal										
62	2										
63	5										
64	1										
65	6										
SEF393Z											
<p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>5. Also check harness for short to power.</p>											
OK or NG											
OK	▶ GO TO 4.										
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.										

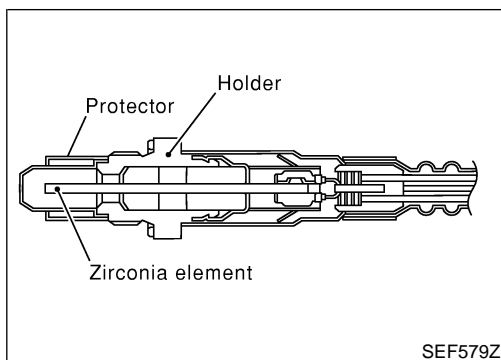
4	CHECK A/F SENSOR 1 HEATER
<p>Refer to "Component Inspection", EC-1227.</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace A/F sensor 1.

5	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	
OK or NG	
OK	▶ Replace A/F sensor 1.
NG	▶ Repair or replace.

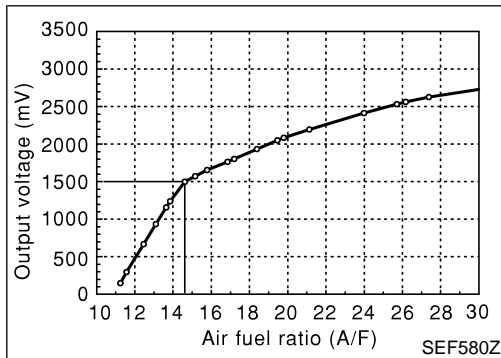
DTC P1274 AIR FUEL RATIO (A/F) SENSOR 1 (RICH SHIFT MONITORING)

QG18DE (CALIF CA)

Component Description



SEF579Z



SEF580Z

Component Description

NIEC1577

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicated air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1578

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1579

To judge the malfunction, the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal is monitored not to be shifted to the "lean" side or "rich" side. When the A/F signal is shifting to the rich side, the malfunction will be detected.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1274	● The A/F signal computed by ECM from the A/F sensor 1 signal is shifted to the rich side for a specified period.	<ul style="list-style-type: none"> ● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor heater 1 ● Fuel pressure ● Injectors

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DTC P1274 AIR FUEL RATIO (A/F) SENSOR 1 (RICH SHIFT MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

6	A/F SEN1 (B1) P1274	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF570Z

6	A/F SEN1 (B1) P1274	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF571Z

6	A/F SEN1 (B1) P1274	
	COMPLETED	

SEF572Z

DTC Confirmation Procedure

NIEC1580

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "A/F SEN1 (B1) P1274" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 3) Touch "START".
- 4) Maintain the following conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 400 to 800 seconds.)

NOTE:

Keep the accelerator pedal as steady as possible.

ENG SPEED	Below 3,000 rpm
B/FUEL SCHDL	Below 9.0 msec
Selector lever	"P" or "N" position

If "TESTING" is not displayed after 20 minutes, retry from step 2.

- 5) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".
If "NG" is displayed, go to "Diagnostic Procedure", EC-1208.

Overall Function Check

NIEC1581

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

NOTE:

Keep accelerator pedal as steady as possible during the cruising.

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1208.

EC-1206

DTC P1274 AIR FUEL RATIO (A/F) SENSOR 1 (RICH SHIFT MONITORING)

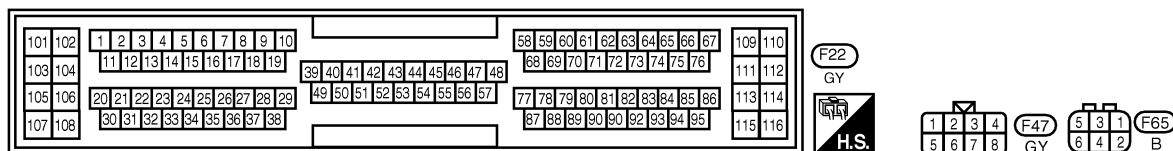
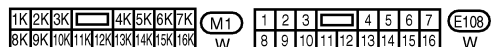
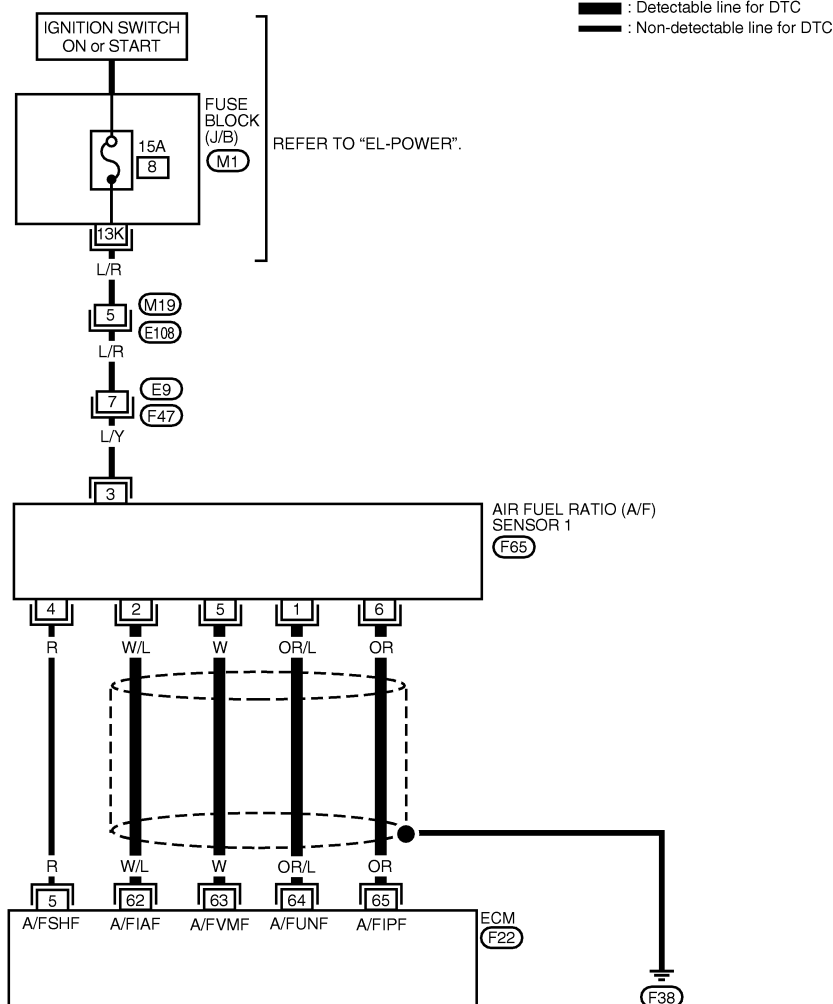
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1582

EC-A/F-01



WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

SEF609Z

DTC P1274 AIR FUEL RATIO (A/F) SENSOR 1 (RICH SHIFT MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

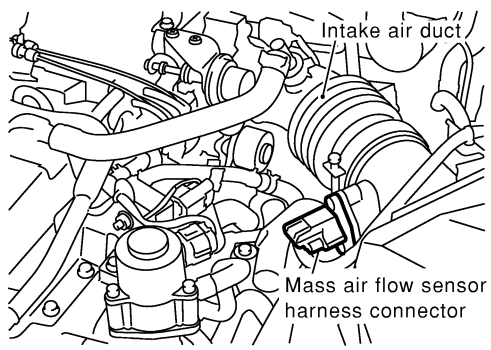
Diagnostic Procedure

=NIEC1583

1	RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten the air fuel ratio (A/F) sensor 1. <div style="margin-left: 20px; color: blue;"> Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb) </div> 	
▶	GO TO 2.

2	CLEAR THE SELF-LEARNING DATA								
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">B1 100%</td> </tr> <tr> <td style="padding: 2px;"></td> <td style="padding: 2px;">B2 100%</td> </tr> <tr> <td colspan="2" style="padding: 2px; text-align: center;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%		B2 100%	CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
	B2 100%								
CLEAR									
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p>									

SEF652Y

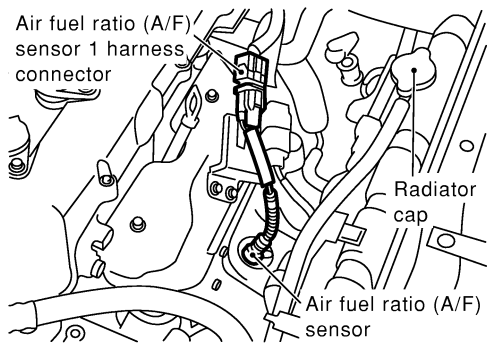
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 	
	
<p>4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p>	
Yes or No	
Yes	▶ Perform trouble diagnosis for DTC P0172. Refer to EC-964.
No	▶ GO TO 3.

SEF388Z

DTC P1274 AIR FUEL RATIO (A/F) SENSOR 1 (RICH SHIFT MONITORING)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK HARNESS CONNECTOR	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect A/F sensor 1 harness connector.</p> <p>3. Check harness connector for water. Water should not exit.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Repair or replace harness connector.

4	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT											
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Air fuel ratio (A/F) sensor 1 harness connector</p> <p style="margin-left: 550px;">Radiator cap</p> <p style="margin-left: 500px;">Air fuel ratio (A/F) sensor</p> </div> <p>3. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">62</td> <td style="text-align: center;">2</td> </tr> <tr> <td style="text-align: center;">63</td> <td style="text-align: center;">5</td> </tr> <tr> <td style="text-align: center;">64</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">65</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 50px;">SEF393Z</p> <p style="text-align: right; margin-right: 50px;">MTBL0542</p> <p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>5. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>			ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6
ECM terminal	A/F sensor 1 terminal											
62	2											
63	5											
64	1											
65	6											
OK	▶	GO TO 5.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

5	CHECK A/F SENSOR 1 HEATER	
<p>Refer to "Component Inspection", EC-1227.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Replace A/F sensor 1.

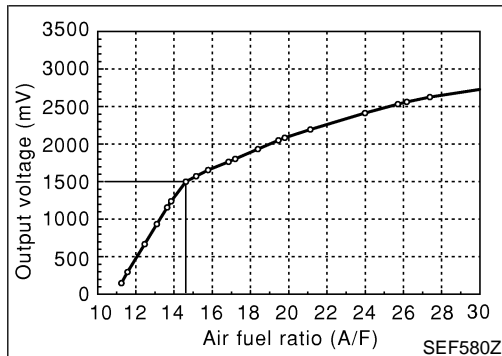
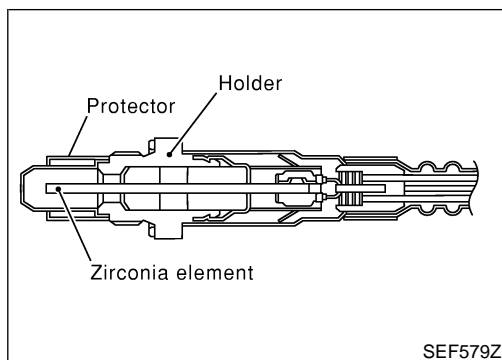
6	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	Replace A/F sensor 1.
NG	▶	Repair or replace.

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DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1584

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicate air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1585

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1586

To judge the malfunction of air fuel ratio (A/F) sensor 1, this diagnosis measures response time of the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and the air fuel ratio (A/F) sensor 1 temperature index. Judgment is based on whether the compensated time (the A/F signal cycling time index) is inordinately long or not.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1275	<ul style="list-style-type: none"> ● The response of the A/F signal computed by ECM from A/F sensor 1 signal takes more than the specified time. 	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1 ● Air fuel ratio (A/F) sensor heater 1 ● Fuel pressure ● Injectors ● Intake air leaks ● Exhaust gas leaks ● PCV ● Mass air flow sensor

DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

NIEC1587

4	A/F SEN1 (B1) P1275	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF573Z

5	A/F SEN1 (B1) P1275	
	TESTING	
	SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h	

SEF574Z

6	A/F SEN1 (B1) P1275	
	COMPLETED	

SEF575Z

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

Ⓜ With CONSULT-II

- 1) Perform "Idle Air Volume Learning", EC-755. Make sure that "CMPLT" is displayed on CONSULT-II screen. If "INCMP" is displayed, follow the instruction for "Idle Air Volume Learning".
- 2) Select "A/F SEN1 (B1) P1275" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 3) Touch "START".
- 4) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	"D" position with "OD" ON

If "TESTING" is not displayed after 20 seconds, retry from step 2.

- 5) Following the instructions of CONSULT-II screen, set "OD" OFF and release accelerator pedal fully.
- 6) Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".
If "NG" is displayed, go to "Diagnostic Procedure", EC-1214

Overall Function Check

NIEC1588

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

Ⓜ With GST

- 1) Perform "Idle Air Volume Learning", EC-755. Make sure the result is OK. If NG, follow the instruction for "Idle Air Volume Learning".
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

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DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1214.

DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

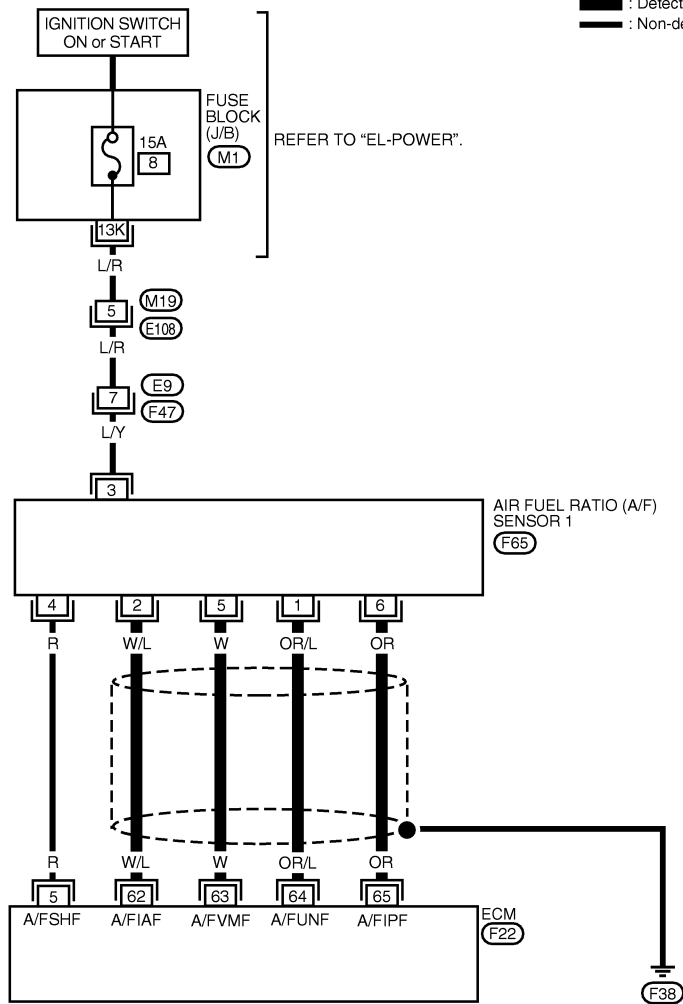
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1589

EC-A/F-01



— : Detectable line for DTC
 — : Non-detectable line for DTC

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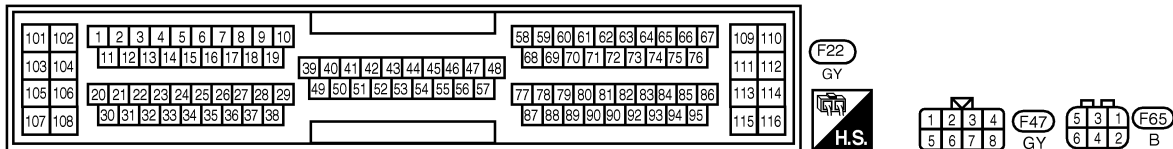
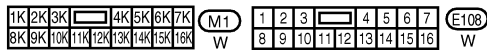
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WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

SEF609Z

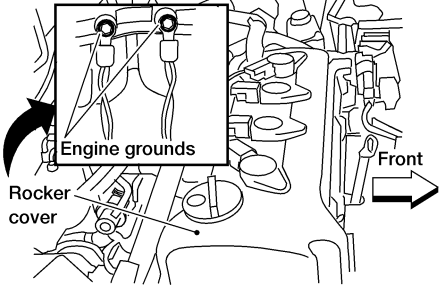
DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

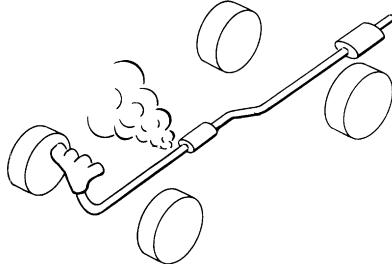
Diagnostic Procedure

Diagnostic Procedure

NIEC1590

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
<p>Engine grounds on back of intake manifold collector</p>  <p>WEC249</p>	
<p>▶ GO TO 2.</p>	

2	RETIGHTEN AIR FUEL RATIO (A/F) SENSOR 1
<p>Loosen and retighten the air fuel ratio (A/F) sensor 1.</p> <p>Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
<p>▶ GO TO 3.</p>	

3	CHECK EXHAUST AIR LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before TWC (Manifold three way catalyst).</p>	
 <p>SEF099P</p> <p>OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Repair or replace.

4	CHECK FOR INTAKE AIR LEAK
<p>Listen for an intake air leak after the mass air flow sensor.</p> <p>OK or NG</p>	
OK	▶ GO TO 5.
NG	▶ Repair or replace.

DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

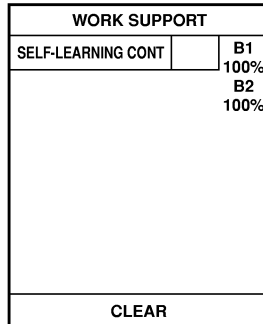
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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5 CLEAR THE SELF-LEARNING DATA

Ⓜ With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR" or "START".

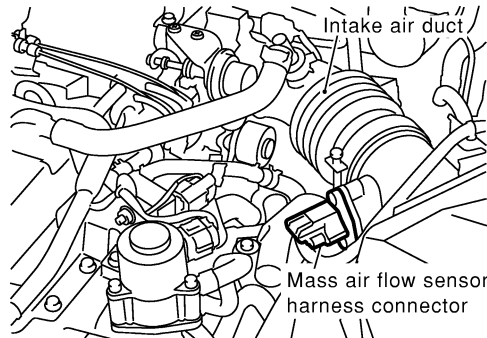


SEF652Y

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

ⓧ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



SEF388Z

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-769.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine?

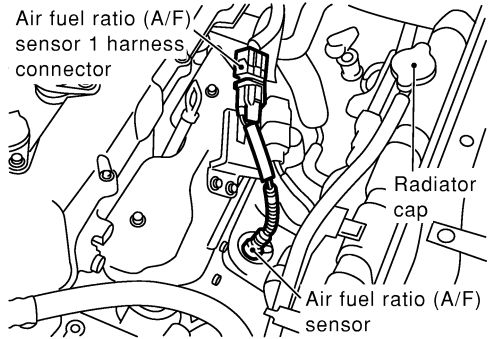
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-957, 964.
No	▶	GO TO 6.

DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT											
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p>												
												
<p>3. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p>												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center; padding: 5px;">62</td> <td style="text-align: center; padding: 5px;">2</td> </tr> <tr> <td style="text-align: center; padding: 5px;">63</td> <td style="text-align: center; padding: 5px;">5</td> </tr> <tr> <td style="text-align: center; padding: 5px;">64</td> <td style="text-align: center; padding: 5px;">1</td> </tr> <tr> <td style="text-align: center; padding: 5px;">65</td> <td style="text-align: center; padding: 5px;">6</td> </tr> </tbody> </table>			ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6
ECM terminal	A/F sensor 1 terminal											
62	2											
63	5											
64	1											
65	6											
SEF393Z												
<p>Continuity should exist.</p> <p>4. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should exist.</p> <p>5. Also check harness for short to power.</p>												
OK or NG												
OK	▶	GO TO 7.										
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.										

7	CHECK AIR FUEL RATIO (A/F) SENSOR 1 HEATER	
<p>Refer to "Component Inspection", EC-1227.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace A/F sensor 1.

8	CHECK MASS AIR FLOW SENSOR	
<p>Refer to "Component Inspection", EC-854.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Replace mass air flow sensor.

9	CHECK PCV VALVE	
<p>Refer to "Positive Crankcase Ventilation", EC-742.</p>		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair or replace PCV valve.

DTC P1275 AIR FUEL RATIO (A/F) SENSOR 1 (RESPONSE MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
OK or NG	
OK	▶ Replace A/F sensor 1.
NG	▶ Repair or replace.

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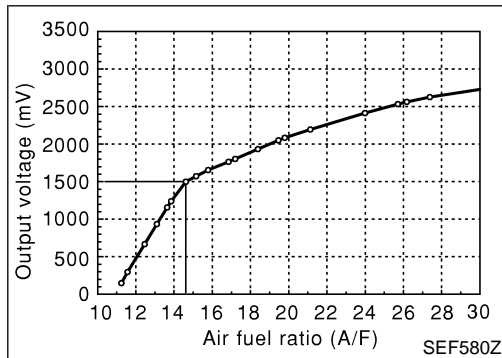
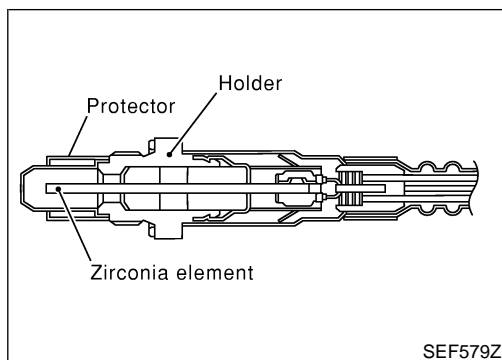
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DTC P1276 AIR FUEL RATIO (A/F) SENSOR 1 (ACTIVITY MONITORING)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1591

The A/F sensor is a planar dual-cell limit current sensor. The sensor element of the A/F sensor is the combination of a Nernst concentration cell (sensor cell) with an oxygen-pump cell, which transports ions. It has a heater in the element.

The sensor is capable of precise measurement $\lambda = 1$, but also in the lean and rich range. Together with its control electronics, the sensor outputs a clear, continuous signal throughout a wide λ range ($0.7 < \lambda < \text{air}$).

The exhaust gas components diffuse through the diffusion gap at the electrode of the oxygen pump and Nernst concentration cell, where they are brought to thermodynamic balance.

An electronic circuit controls the pump current through the oxygen-pump cell so that the composition of the exhaust gas in the diffusion gap remains constant at $\lambda = 1$. Therefore, the A/F sensor is able to indicated air/fuel ratio by this pumping of current. In addition, a heater is integrated in the sensor to ensure the required operating temperature of 700 - 800°C (1,292 - 1,472°F).

CONSULT-II Reference Value in Data Monitor Mode

NIEC1592

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F SEN1 (B1)	● Engine: Idle speed after warming up	Fluctuates around 1.5V.

On Board Diagnosis Logic

NIEC1593

To judge the malfunction, the diagnosis checks that the A/F signal computed by ECM from the air fuel ratio (A/F) sensor 1 signal fluctuates according to fuel feedback control.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1276	● The A/F signal computed by ECM from the A/F sensor 1 signal is constantly approx. 1.5V.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Air fuel ratio (A/F) sensor 1

DTC P1276 AIR FUEL RATIO (A/F) SENSOR 1 (ACTIVITY MONITORING)

QG18DE (CALIF CA)

DTC Confirmation Procedure

NIEC1594

6	A/F SEN1 (B1) P1276	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h

SEF576Z

7	A/F SEN1 (B1) P1276	
	TESTING	
	SELECT 3RD GEAR AND THEN RELEASE ACCELERATOR PEDAL OFF	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	VHCL SPEED SE	XXX km/h

SEF577Z

8	A/F SEN1 (B1) P1276	
	COMPLETED	

SEF578Z

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "A/F SEN1 (B1)" of "DATA MONITOR" mode with CONSULT-II.
- 3) Check "A/F SEN1 (B1)" indication.
If the indication is constantly approx. 1.5V and does not fluctuates, go to "Diagnostic Procedure", EC-1222.
If the indication fluctuates around 1.5V, go to next step.
- 4) Select "A/F SEN1 (B1) P1276" of "A/F SEN1" in "DTC WORK SUPPORT" mode.
- 5) Touch "START".
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen.

ENG SPEED	1,500 - 3,000 rpm
Vehicle speed	70 - 120 km/h (43 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.0 msec
Selector lever	"D" position with "OD" ON

If "TESTING" is not displayed after 20 seconds, retry from step 2.

- 7) Following the instructions of CONSULT-II screen, set "OD" OFF and release accelerator pedal fully.
- 8) Make sure that "TESTING" changes to "COMPLETED".
If "TESTING" changed to "OUT OF CONDITION", retry from step 6.
- 9) Make sure that "OK" is displayed after touching "SELF-DIAG RESULT".
If "NG" is displayed, go to "Diagnostic Procedure", EC-1222

Overall Function Check

NIEC1595

Use this procedure to check the overall function of the front heated oxygen sensor circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Drive the vehicle at a speed of 80 km/h (50 MPH) for a few minutes in "D" position with "OD" OFF.

NOTE:

Keep the accelerator pedal as steady as possible during the cruising.

EC-1219

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DTC P1276 AIR FUEL RATIO (A/F) SENSOR 1 (ACTIVITY MONITORING)

QG18DE (CALIF CA)

Overall Function Check (Cont'd)

- 3) Set "OD" on, then release the accelerator pedal fully until the vehicle speed decreases to 50 km/h (30 MPH).

NOTE:

Never apply brake during releasing the accelerator pedal.

- 4) Repeat steps 2 to 3 five times.
- 5) Stop the vehicle and turn ignition switch "OFF".
- 6) Wait at least 10 seconds and restart engine.
- 7) Repeat steps 2 to 3 five times.
- 8) Stop the vehicle and connect GST to the vehicle.
- 9) Make sure that no DTC is displayed.
If the DTC is displayed, go to "Diagnostic Procedure", EC-1222.

DTC P1276 AIR FUEL RATIO (A/F) SENSOR 1 (ACTIVITY MONITORING)

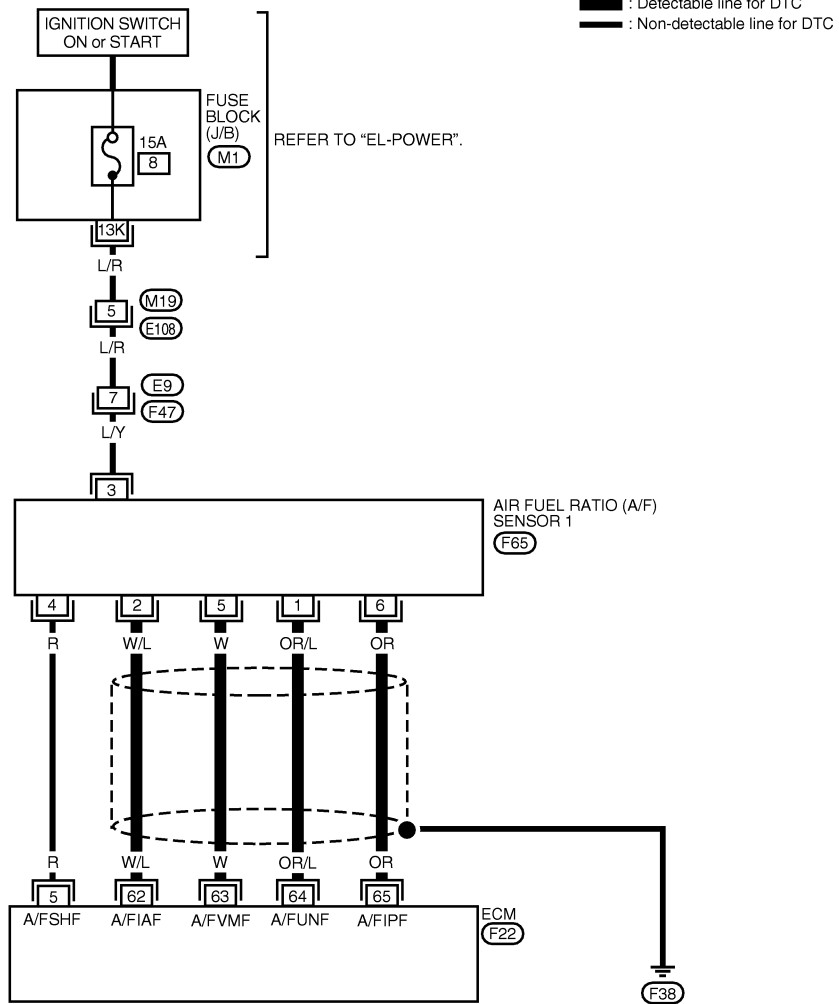
QG18DE (CALIF CA)

Wiring Diagram

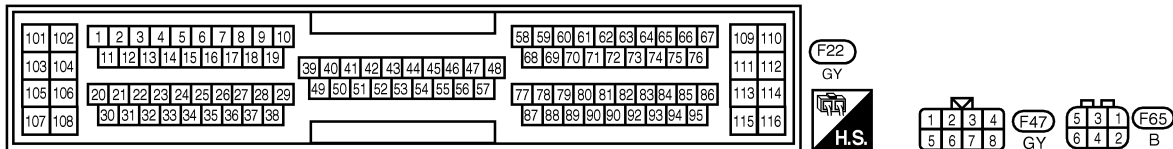
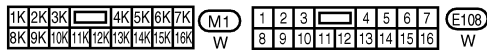
Wiring Diagram

=NIEC1596

EC-A/F-01



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WEC388

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W/L	A/F SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	2.0 - 3.5V
63	W			2.0 - 3.0V
64	OR/L			2.5 - 3.5V
65	OR			2.0 - 3.5V

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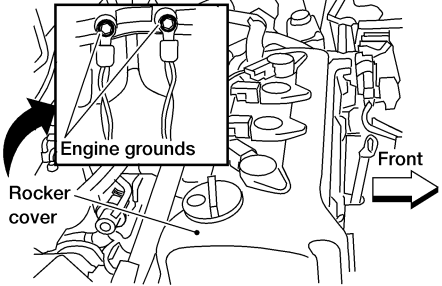
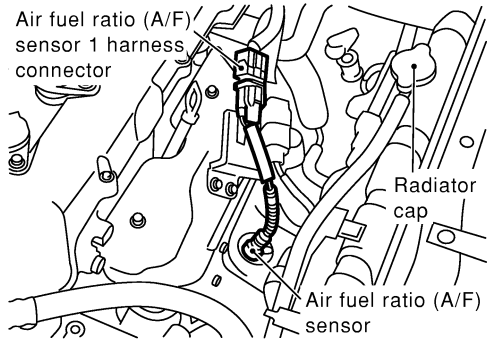
DTC P1276 AIR FUEL RATIO (A/F) SENSOR 1 (ACTIVITY MONITORING)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1597

1	CHECK A/F SENSOR 1 INPUT SIGNAL CIRCUIT																
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center; margin: 10px 0;"> <p>Engine grounds on back of intake manifold collector</p>  </div> <p style="text-align: right; margin-right: 20px;">WEC249</p> <p>3. Disconnect ECM harness connector and A/F sensor 1 harness connector.</p> <div style="text-align: center; margin: 10px 0;">  </div> <p style="text-align: right; margin-right: 20px;">SEF393Z</p> <p>4. Check harness continuity between the following terminals. Refer to Wiring Diagram.</p> <table border="1" style="margin: 10px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">ECM terminal</th> <th style="padding: 5px;">A/F sensor 1 terminal</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">62</td> <td style="padding: 5px;">2</td> </tr> <tr> <td style="padding: 5px;">63</td> <td style="padding: 5px;">5</td> </tr> <tr> <td style="padding: 5px;">64</td> <td style="padding: 5px;">1</td> </tr> <tr> <td style="padding: 5px;">65</td> <td style="padding: 5px;">6</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 20px;">MTBL0542</p> <p>Continuity should exist.</p> <p>5. Check harness continuity between ECM terminals 62, 63, 64, 65 or A/F sensor 1 terminals 1, 2, 5, 6 and ground. Refer to Wiring Diagram.</p> <p>Continuity should not exist.</p> <p>6. Also check harness for short to power.</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 5px;">OK</td> <td style="width: 5%; text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">GO TO 2.</td> </tr> <tr> <td style="padding: 5px;">NG</td> <td style="text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	A/F sensor 1 terminal	62	2	63	5	64	1	65	6	OK	▶	GO TO 2.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	A/F sensor 1 terminal																
62	2																
63	5																
64	1																
65	6																
OK	▶	GO TO 2.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

2	CHECK INTERMITTENT INCIDENT						
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 5px;">OK</td> <td style="width: 5%; text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">Replace A/F sensor 1.</td> </tr> <tr> <td style="padding: 5px;">NG</td> <td style="text-align: center; padding: 5px;">▶</td> <td style="padding: 5px;">Repair or replace.</td> </tr> </table>		OK	▶	Replace A/F sensor 1.	NG	▶	Repair or replace.
OK	▶	Replace A/F sensor 1.					
NG	▶	Repair or replace.					

DTC P1277 AIR FUEL RATIO (A/F) SENSOR 1 HEATER

QG18DE (CALIF CA)

Description

Description

NIEC1598

SYSTEM DESCRIPTION

NIEC1598S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor (PHASE) Crankshaft position sensor (POS)	Engine speed	Air fuel ratio (A/F) sensor 1 heater control	Air fuel ratio (A/F) sensor 1 heater
Mass air flow sensor	Amount of intake air		

The ECM performs ON/OFF duty control of the A/F sensor 1 heater corresponding to the engine operating condition to keep the temperature of A/F sensor 1 element at the specified range.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1599

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
A/F S1 HTR (B1)	● Engine speed: Idle	Approx. 70%

On Board Diagnosis Logic

NIEC1600

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1277	<ul style="list-style-type: none"> The current amperage in the A/F sensor 1 heater circuit is out of the normal range. (An improper voltage drop signal is sent to ECM through the A/F sensor 1 heater.) 	<ul style="list-style-type: none"> Harness or connectors (The A/F sensor 1 heater circuit is open or shorted.) A/F sensor 1 heater

DTC Confirmation Procedure

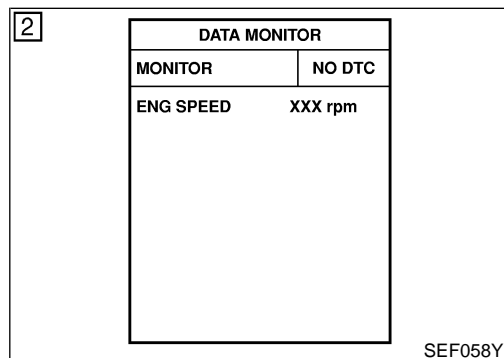
NIEC1601

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.



Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 10 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1226.

Ⓜ With GST

- 1) Start engine and run it for at least 10 seconds at idle speed.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and run it for at least 10 seconds at idle speed.

DTC P1277 AIR FUEL RATIO (A/F) SENSOR 1 HEATER

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 4) Select "MODE 3" with GST.
- 5) If DTC is detected, go to "Diagnostic Procedure", EC-1226.
 - **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

DTC P1277 AIR FUEL RATIO (A/F) SENSOR 1 HEATER

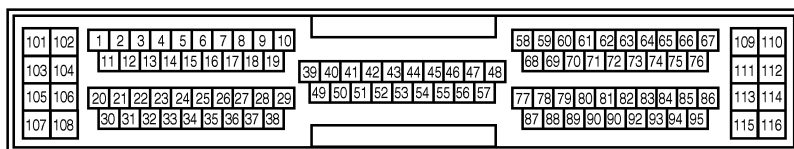
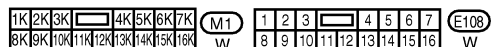
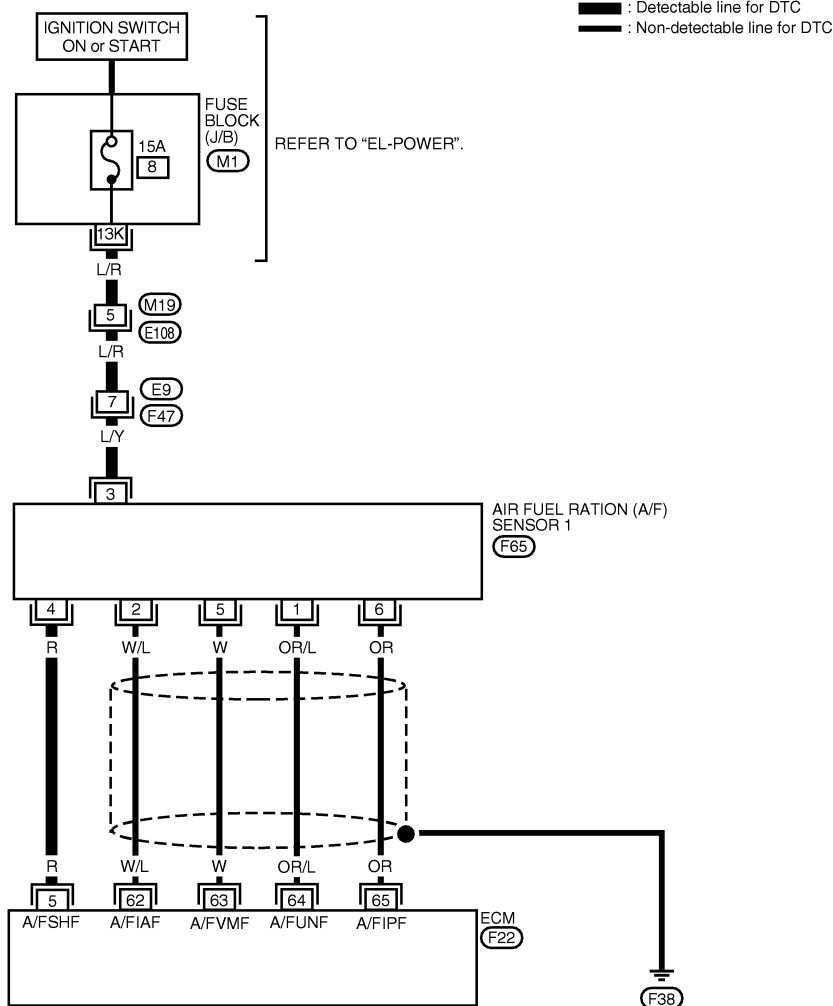
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

=NIEC1602

EC-A/FH-01



F22

GY

H.S.

1 2 3 4

5 6 7 8

F47

GY

5 3 1

6 4 2

F65

B

WEC389

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
5	R	A/F SENSOR 1 HEATER	ENGINE RUNNING AT IDLE SPEED AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	APPROX. 5V

SEF610Z

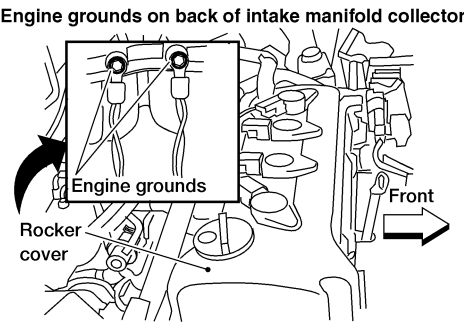
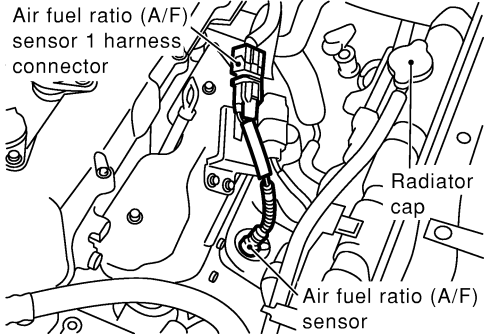
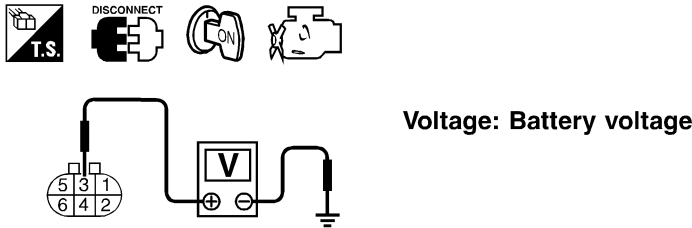
DTC P1277 AIR FUEL RATIO (A/F) SENSOR 1 HEATER

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1603

1	CHECK AIR FUEL RATIO (A/F) SENSOR 1 POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;">  </div> <p>3. Disconnect air fuel ratio (A/F) sensor 1 harness connector.</p> <div style="text-align: center;">  </div> <p>4. Turn ignition switch "ON". 5. Check voltage between A/F sensor 1 terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

WEC249

SEF393Z

SEF741Z

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M19, E109 ● Harness connectors E9, F47 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between A/F sensor 1 and fuse 	
▶	Repair or replace harness or connectors.

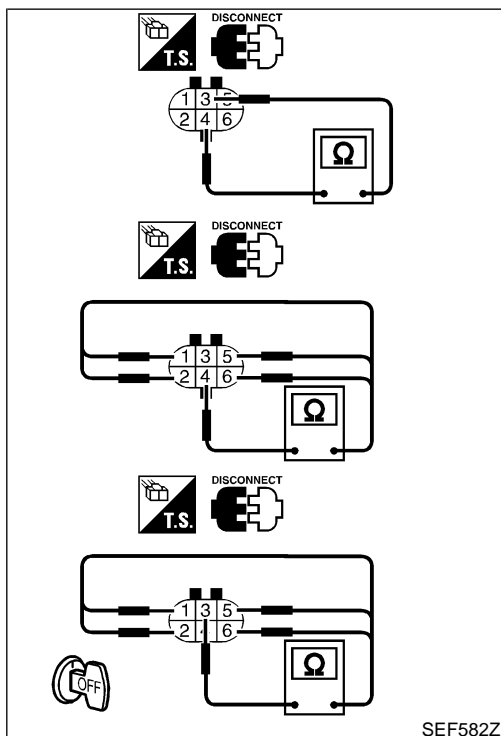
DTC P1277 AIR FUEL RATIO (A/F) SENSOR 1 HEATER

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK A/F SENSOR 1 OUTPUT SIGNAL CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 5 and A/F sensor 1 terminal 4. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4	CHECK A/F SENSOR 1 HEATER	
Refer to "Component Inspection", EC-1227.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace A/F sensor 1.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
OK or NG		
OK	▶	Replace A/F sensor 1.
NG	▶	Repair or replace.



Component Inspection

AIR FUEL RATIO (A/F) SENSOR 1 HEATER

NIEC1604
NIEC1604S01

Check resistance between terminals 3 and 4.

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

Check continuity between terminals 3 and 1, 2, 5, 6, terminals 4 and 1, 2, 5, 6.

Continuity should not exist.

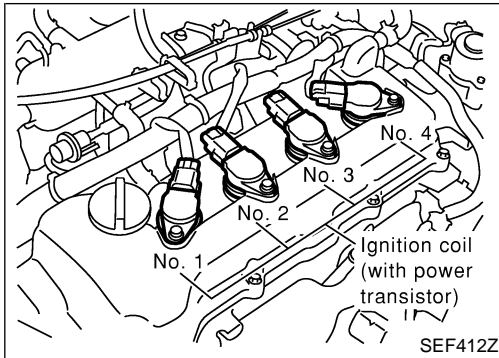
If NG, replace the A/F sensor 1.

CAUTION:

- Discard any A/F sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new A/F sensor, clean exhaust system threads using Heated Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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Component Description



Component Description

IGNITION COIL & POWER TRANSISTOR

NIEC1605

NIEC1605S01

The ignition signal from the ECM is sent to and amplified by the power transistor. The power transistor turns on and off the ignition coil primary circuit. This on-off operation induces the proper high voltage in the coil secondary circuit.

On Board Diagnosis Logic

NIEC1606

Malfunction is detected when the ignition signal in the primary circuit is not sent to ECM during engine cranking or running.

Possible Cause

NIEC1607

- Harness or connectors (The ignition primary circuit is open or shorted.)
- Power transistor unit built into ignition coil
- Condenser
- Crankshaft position sensor (POS)
- Crankshaft position sensor (POS) circuit
- Camshaft position sensor (PHASE)
- Camshaft position sensor (PHASE) circuit

DTC Confirmation Procedure

NIEC1608

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- If DTC P1320 is displayed with DTC P0335, P0340 perform trouble diagnosis for DTC P0335, P0340 first. Refer to EC-1006, EC-1011.

WITH CONSULT-II

NIEC1608S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine. (If engine does not run, turn ignition switch to "START" for at least 5 seconds.)
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1232.

WITH GST

NIEC1608S02

Follow the procedure "WITH CONSULT-II" above.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

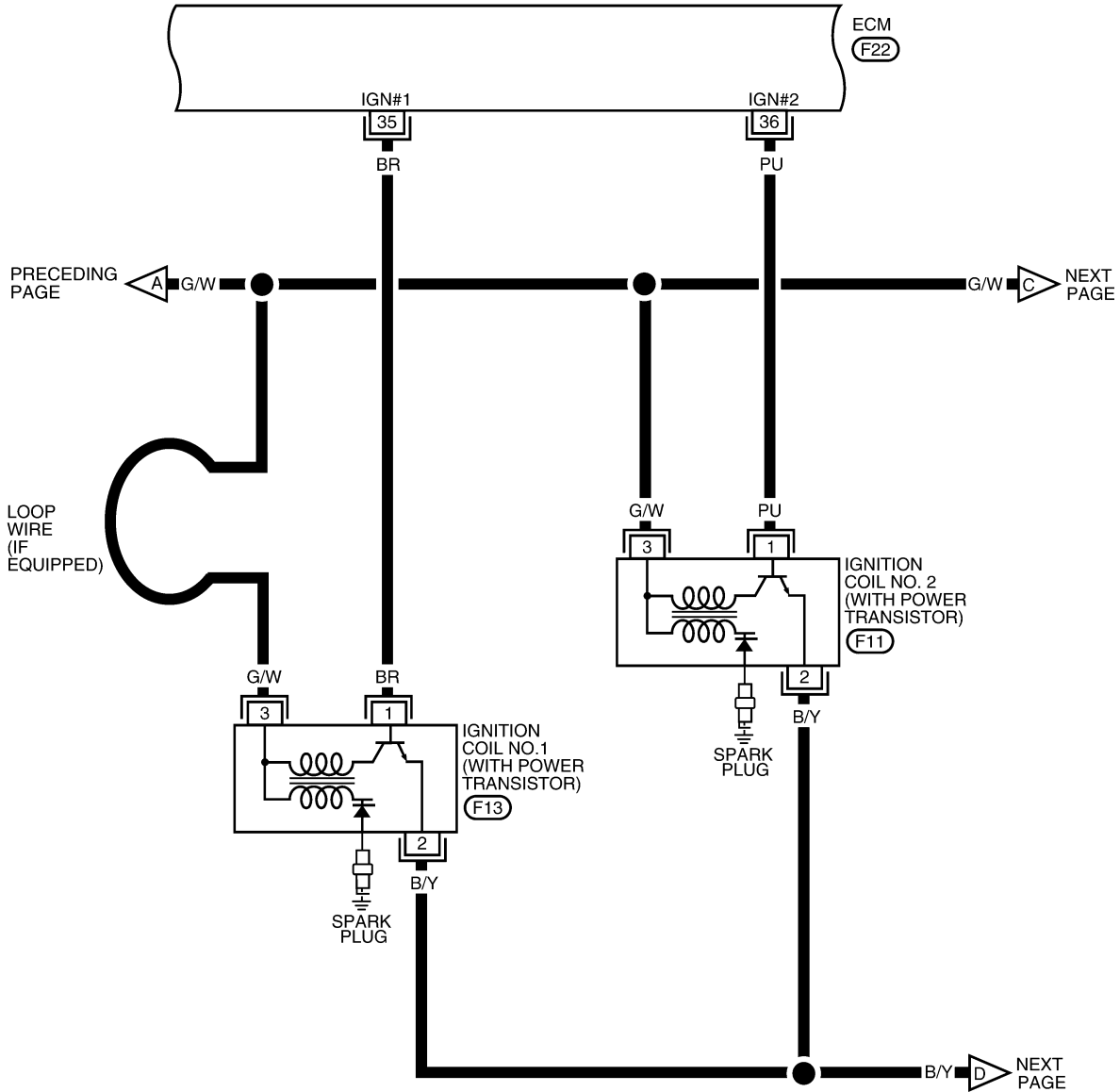
DTC P1320 IGNITION SIGNAL

QG18DE (CALIF CA)

Wiring Diagram (Cont'd)

EC-IGN/SG-02

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DT



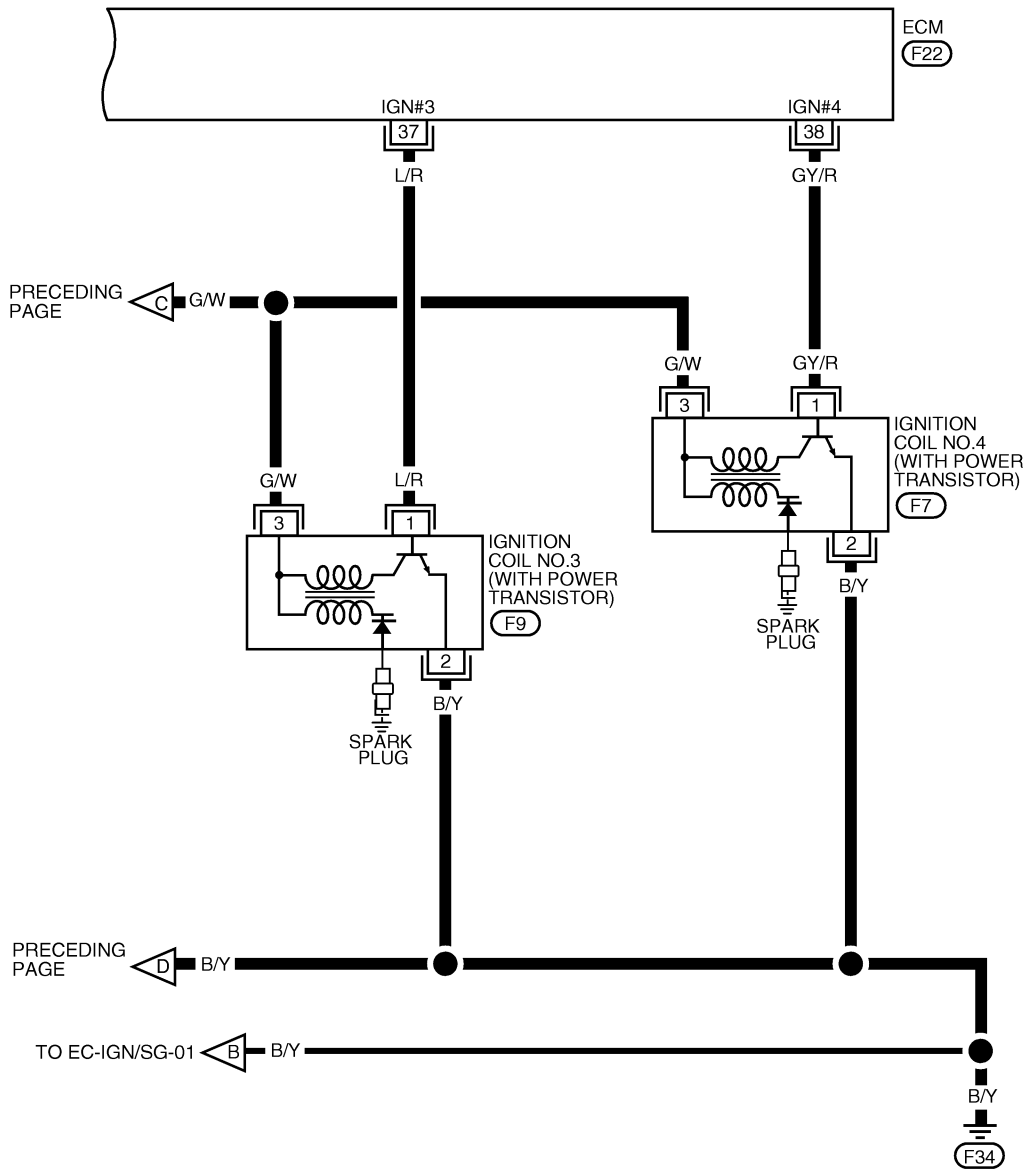
101	102	1	2	3	4	5	6	7	8	9	10	58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																						115	116



WEC133A

EC-IGN/SG-03

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



PRECEDING PAGE C G/W

PRECEDING PAGE D B/Y

TO EC-IGN/SG-01 B B/Y



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110									
103	104	11	12	13	14	15	16	17	18	19			39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57			77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38													87	88	89	90	91	92	93	94	95	115	116	

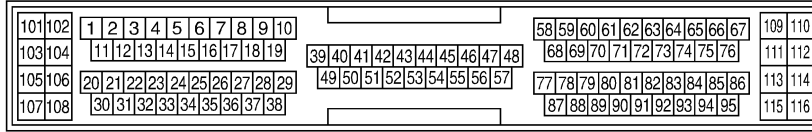


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DTC P1320 IGNITION SIGNAL

QG18DE (CALIF CA)

Wiring Diagram (Cont'd)



SEF970W

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
35	B/R	IGNITION SIGNAL NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	Approximately 0.3V ★
36	PU	IGNITION SIGNAL NO. 2		
37	L/R	IGNITION SIGNAL NO. 3	ENGINE RUNNING AT 2,000 RPM	Approximately 0.5V ★
38	GY/R	IGNITION SIGNAL NO. 4		

★ : AVERAGE VOLTAGE FOR PULSE SIGNAL (ACTUAL PULSE SIGNAL CAN BE CONFIRMED BY OSCILLOSCOPE.)

SEF746YA

Diagnostic Procedure

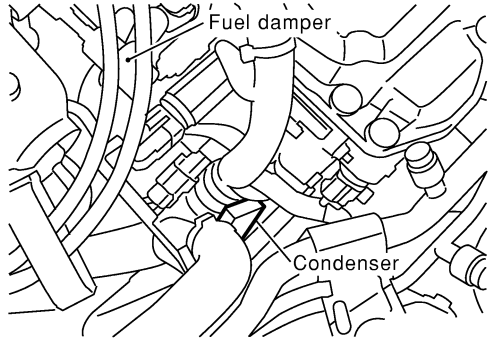
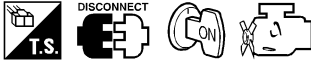
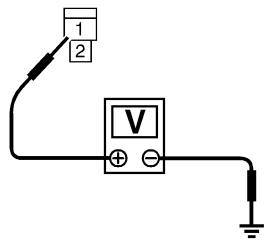
NIEC1610

1	CHECK ENGINE START	
Turn ignition switch "OFF", and restart engine.		
Is engine running?		
Yes or No		
Yes (With CONSULT-II)	▶	GO TO 2.
Yes (Without CONSULT-II)	▶	GO TO 12.
No	▶	GO TO 3.

2	SEARCH FOR MALFUNCTIONING CIRCUIT																
<p>With CONSULT-II</p> <ol style="list-style-type: none"> Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. Search for circuit which does not produce a momentary engine speed drop. 																	
<table border="1" style="margin: auto;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
SEF190Y																	
▶	GO TO 12.																

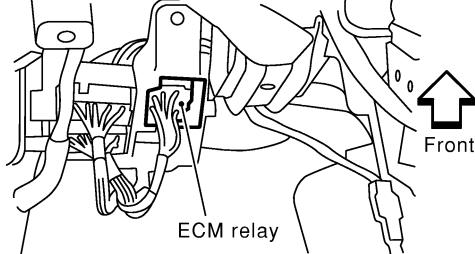
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3	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-I
<ol style="list-style-type: none"> Turn ignition switch ON. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester. 	
SEF528Z	
OK	▶ GO TO 4.
NG	▶ Go to TROUBLE DIAGNOSIS FOR POWER SUPPLY, EC-839.

4	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-II
1. Turn ignition switch OFF. 2. Disconnect condenser harness connector.	
	
3. Turn ignition switch ON. 4. Check voltage between condenser terminal 1 and ground with CONSULT-II or tester.	
	
 <p style="text-align: right; margin-right: 100px;">Voltage: Battery voltage</p>	
OK or NG	
OK	▶ GO TO 10.
NG	▶ GO TO 5.

SEF413Z

SEF367X

5	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-III
1. Turn ignition switch OFF. 2. Disconnect ECM relay.	
<p>Passenger side view with instrument panel removed for clarity</p> 	
3. Check harness continuity between ECM relay terminal 7 and condenser terminal 1. Refer to Wiring Diagram. Continuity should exist.	
4. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

SEF387Z

6	DETECT MALFUNCTIONING PART
Check the harness for open or short between ECM relay and condenser.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.


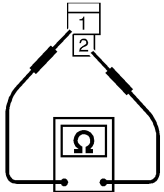
7	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-IV
Check voltage between ECM relay terminal 6 and ground with CONSULT-II or tester.	
SEF368X	
OK	▶ GO TO 9.
NG	▶ GO TO 8.

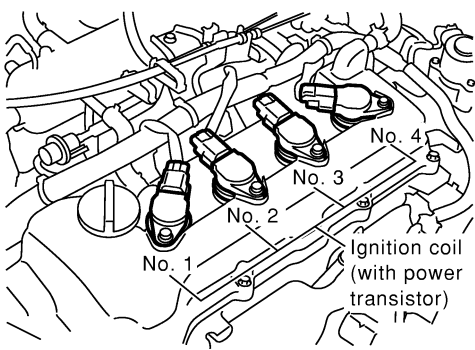
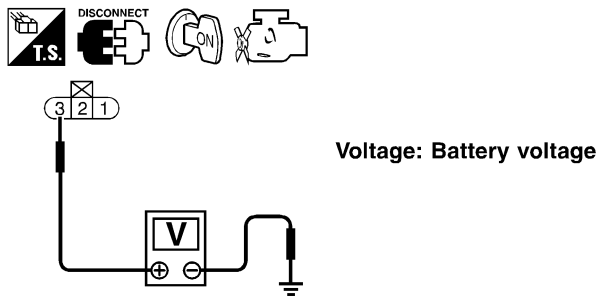
8	DETECT MALFUNCTIONING PART
Check the following.	
<ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 15A fuse ● Harness for open and short between ECM relay and fuse 	
▶	Repair or replace harness or connectors.

9	CHECK ECM RELAY
<ol style="list-style-type: none"> 1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7. 	
SEF296X	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace ECM relay.

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10	CHECK CONDENSER GROUND CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch OFF. 2. Check harness continuity between condenser terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

11	CHECK CONDENSER	
Check resistance between condenser terminals 1 and 2.		
		
		
Resistance: Above 1MΩ at 25°C (77°F)		
SEF369X		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace condenser.

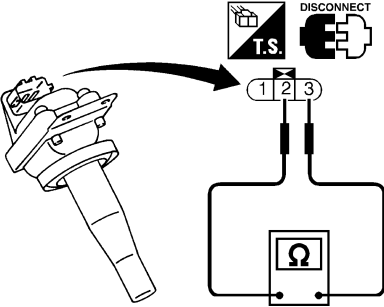
12	CHECK IGNITION COIL POWER SUPPLY CIRCUIT-V
<p>1. Turn ignition switch OFF. 2. Reconnect harness connectors disconnected. 3. Disconnect ignition coil harness connector.</p>	
	
<p>4. Turn ignition switch ON. 5. Check voltage between ignition coil terminal 3 and ground with CONSULT-II or tester.</p>	
 <p style="text-align: center;">Voltage: Battery voltage</p>	
<p>OK or NG</p>	
OK	▶ GO TO 14.
NG	▶ GO TO 13.

13	DETECT MALFUNCTIONING PART
<p>Check the harness for open or short between ignition coil and ECM relay.</p>	
▶	Repair or replace harness or connectors.

14	CHECK IGNITION COIL GROUND CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch OFF. 2. Check harness continuity between ignition coil terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.</p>	
<p>OK or NG</p>	
OK	▶ GO TO 15.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

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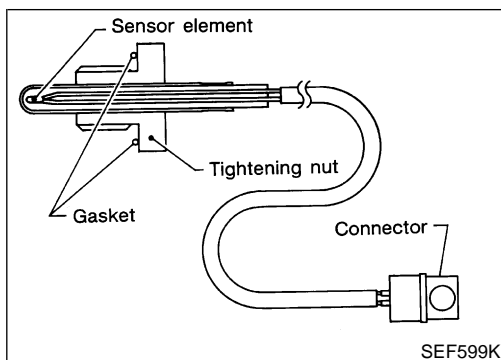
15	CHECK IGNITION COIL OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminals 35, 36, 37, 38 and ignition coil terminal 1. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 16.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

16	CHECK IGNITION COIL WITH POWER TRANSISTOR	
Check resistance between ignition coil terminals 2 and 3.		
		
SEF371X		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Replace ignition coil with power transistor.

17	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P1401 EGR TEMPERATURE SENSOR QG18DE (CALIF CA)

Component Description

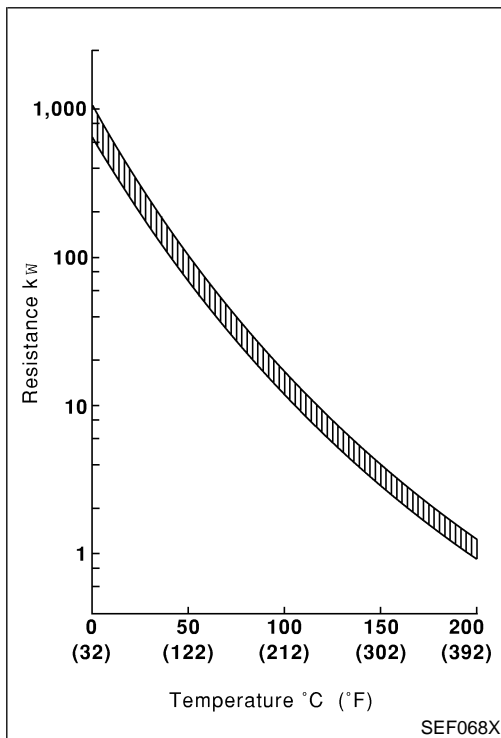


Component Description

The EGR temperature sensor detects temperature changes in the EGR passage way. When the EGR volume control valve opens, hot exhaust gases flow, and the temperature in the passage way changes. The EGR temperature sensor is a thermistor that modifies a voltage signal sent from the ECM. This modified signal then returns to the ECM as an input signal. As the temperature increases, EGR temperature sensor resistance decreases. This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

NIEC1611

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<Reference data>

EGR temperature °C (°F)	Voltage* V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

*: These data are reference values and are measured between ECM terminal 72 (EGR temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may damage the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

When EGR system is operating.
Voltage: 0 - 1.5V

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On Board Diagnosis Logic

NIEC1612

Malfunction is detected when

(Malfunction A) an excessively low voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is low.

(Malfunction B) an excessively high voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is high.

ST

RS

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Possible Cause

NIEC1613

MALFUNCTION A

- Harness or connectors (The EGR temperature sensor circuit is shorted.)
- EGR temperature sensor
- Malfunction of EGR function

NIEC1613S01

EL

IDX

MALFUNCTION B

- Harness or connectors (The EGR temperature sensor circuit is open.)
- EGR temperature sensor

NIEC1613S02

- Malfunction of EGR function

DTC Confirmation Procedure

Perform “PROCEDURE FOR MALFUNCTION A” first. If 1st trip DTC cannot be confirmed, perform “PROCEDURE FOR MALFUNCTION B”.

NIEC1614

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION A

NIEC1614S01

With CONSULT-II

NIEC1614S0101

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Verify that “COOLAN TEMP/S” is less than 50°C (122°F).
If the engine coolant temperature is above the range, cool the engine down.
- 4) Start engine and let it idle for at least 8 seconds.
- 5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1243.

With GST

NIEC1614S0102

Follow the procedure “With CONSULT-II” above.

DTC P1401 EGR TEMPERATURE SENSOR **QG18DE (CALIF CA)**

DTC Confirmation Procedure (Cont'd)

ACTIVE TEST	
EGR VOL CONT/V	50 step
MONITOR	
ENG SPEED	XXX rpm
EGR TEMP SEN	XXX V

SEF200Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF201Y

PROCEDURE FOR MALFUNCTION B

NIEC1614S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

Always perform the test at a temperature above **-10°C (14°F)**.

Ⓜ With CONSULT-II

NIEC1614S0201

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- 3) Hold engine speed at 1,500 rpm.
- 4) Touch "Qu" and set the EGR volume control valve opening to 50 step and check EGR TEMP SEN.
EGR TEMP SEN should decrease to less than 1.0V.
If the check result is NG, go to "Diagnostic Procedure", EC-1243.
If the check result is OK, go to the following step.
- 5) Turn ignition switch "OFF" and wait at least 5 seconds then turn "ON".
- 6) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 7) Start engine and maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,200 - 3,600 rpm
VHCL SPEED SE	10 km/h (6 MPH) or more
B/FUEL SCHDL	4.5 - 8.0 msec
Selector lever	Suitable position

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1243.

Ⓜ With GST

NIEC1614S0202

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 3) Select "MODE 1" with GST and maintain the following conditions for at least 5 consecutive seconds.

Engine speed	1,200 - 3,600 rpm
Vehicle speed	10 km/h (6 MPH) or more
Selector lever	Suitable position

- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1243.

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DTC P1401 EGR TEMPERATURE SENSOR QG18DE (CALIF CA)

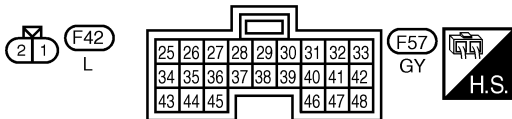
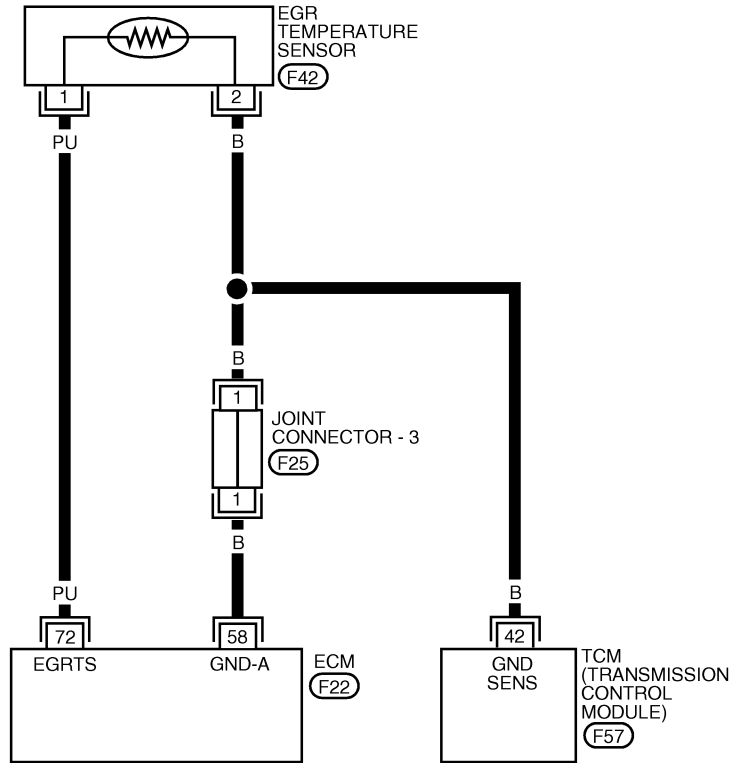
Wiring Diagram

Wiring Diagram

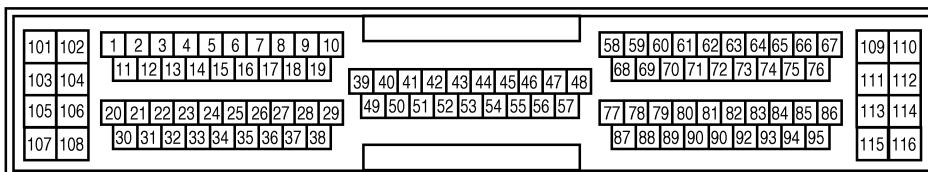
NIEC1615

EC-EGR/TS-01

 : DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



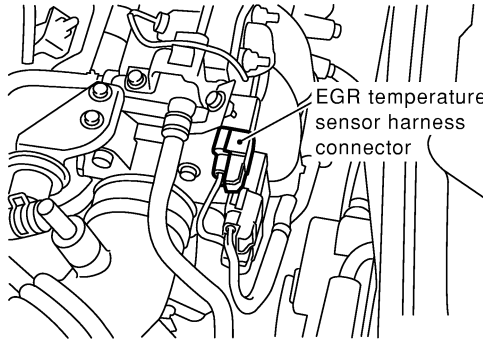
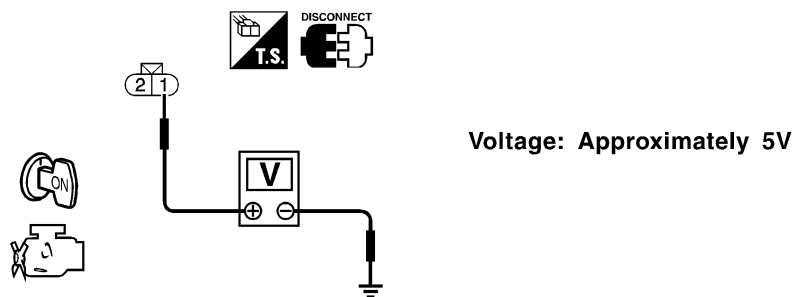
REFER TO THE FOLLOWING.
 - JOINT CONNECTOR



WEC399

Diagnostic Procedure

NIEC1616

1	CHECK EGR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EGR temperature sensor harness connector.</p> <div style="text-align: center;">  <p>EGR temperature sensor harness connector</p> </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EGR temperature sensor terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 2.
NG		▶ Repair or replace harness or connectors.

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2	CHECK EGR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EGR temperature sensor terminal 2 and engine ground. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground or short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 4.
NG		▶ GO TO 3.

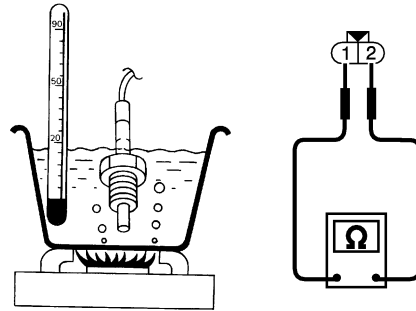
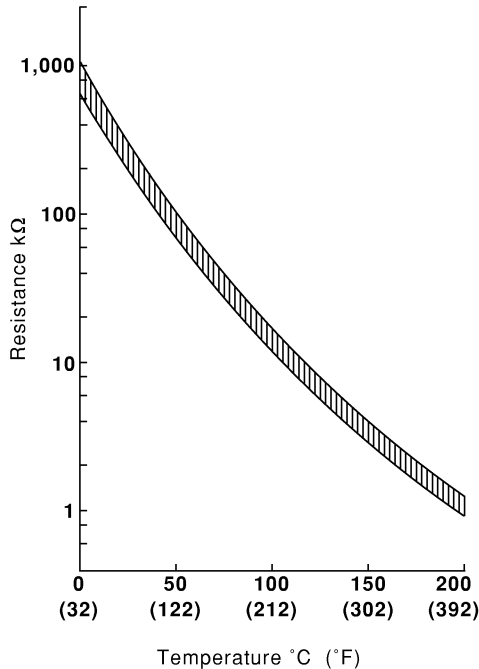
3	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between TCM and EGR temperature sensor ● Harness for open or short between ECM and EGR temperature sensor 		
		▶ Repair open circuit or short to ground or short to power in harness or connector.

DTC P1401 EGR TEMPERATURE SENSOR QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

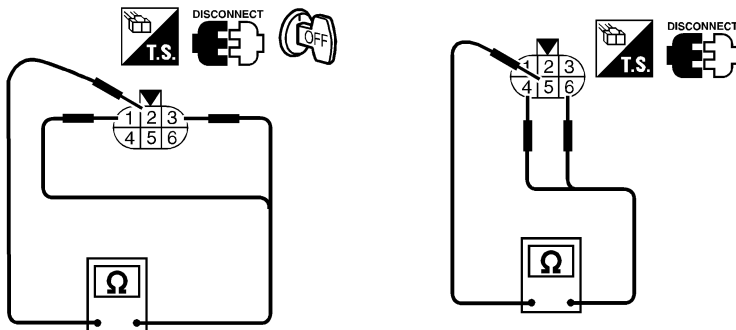
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

5 CHECK EGR VOLUME CONTROL VALVE-I

1. Disconnect EGR volume control valve.
2. Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 6. |
| OK (Without CONSULT-II) | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P1401 EGR TEMPERATURE SENSOR QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	CHECK EGR VOLUME CONTROL VALVE-II																									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON. 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;"> </td> </tr> </tbody> </table>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
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<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 8.</td> </tr> <tr> <td style="border-right: 1px solid black;">NG</td> <td style="text-align: center;">▶</td> <td>Replace EGR volume control valve.</td> </tr> </table>			OK	▶	GO TO 8.	NG	▶	Replace EGR volume control valve.																		
OK	▶	GO TO 8.																								
NG	▶	Replace EGR volume control valve.																								

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7	CHECK EGR VOLUME CONTROL VALVE-II							
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON and OFF. 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 								
<table style="margin-right: 20px;"> <tr> <td style="text-align: center;"> </td> <td style="text-align: center;"> </td> </tr> </table>								
<p>OK or NG</p>								
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 8.</td> </tr> <tr> <td style="border-right: 1px solid black;">NG</td> <td style="text-align: center;">▶</td> <td>Replace EGR volume control valve.</td> </tr> </table>			OK	▶	GO TO 8.	NG	▶	Replace EGR volume control valve.
OK	▶	GO TO 8.						
NG	▶	Replace EGR volume control valve.						

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

Description
SYSTEM DESCRIPTION

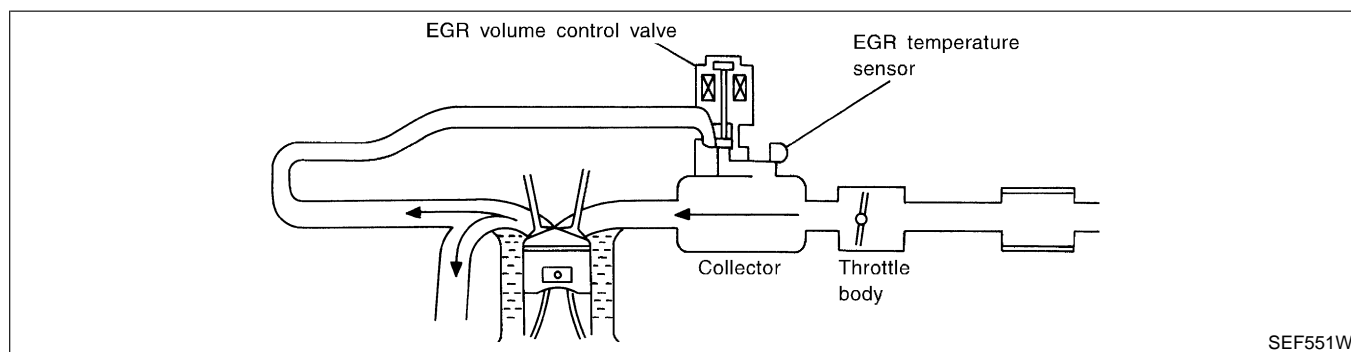
NIEC1617

NIEC1617S01

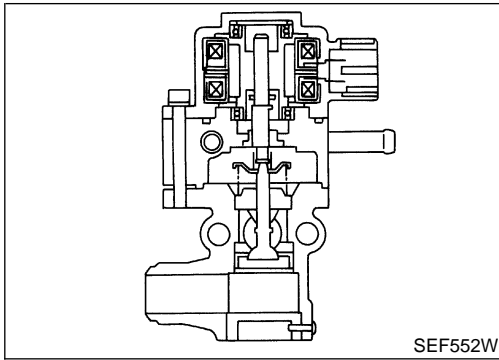
Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	EGR volume control	EGR volume control valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
Park/Neutral position switch	Park/Neutral position		
ECM	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



SEF551W



SEF552W

COMPONENT DESCRIPTION

EGR Volume Control Valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC1617S02

NIEC1617S0201

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CONSULT-II Reference Value in Data Monitor Mode

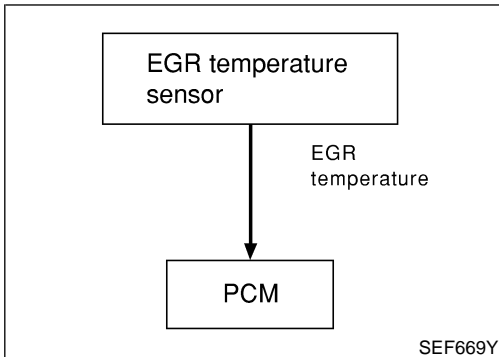
NIEC1618

EC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 step

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SEF669Y

On Board Diagnosis Logic

NIEC1619

If the EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Malfunction is detected when EGR flow is detected under condition that does not call for EGR.

NOTE:

Diagnosis for this DTC will occur when engine coolant temperature is below 50 to 60°C (122 to 140°F). Therefore, it will be better to turn ignition switch "ON" (start engine) at the engine coolant temperature below 30°C (86°F) when starting DTC confirmation procedure.

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Possible Cause

NIEC1620

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve leaking or stuck open
- EGR temperature sensor

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DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
EGR TEMP SEN	XXX V

SEF202Y

4

EGR SYSTEM P1402	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF203Y

4

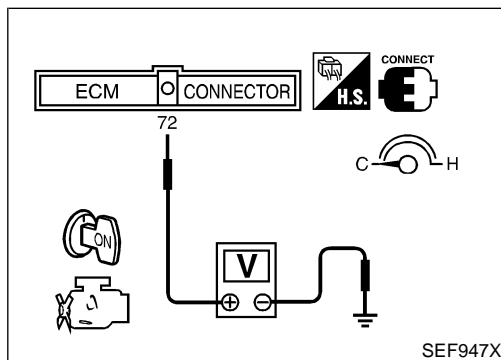
EGR SYSTEM P1402	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF204Y

4

EGR SYSTEM P1402	
COMPLETED	

SEF236Y



DTC Confirmation Procedure

NIEC1621

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform the test at a temperature above -10°C (14°F).
- Engine coolant temperature and EGR temperature must be verified in “DATA MONITOR” mode with CONSULT-II before starting DTC WORK SUPPORT test. If it is out of range below, the test cannot be conducted.

COOLAN TEMP/S: -10 to 50°C (14 to 122°F)*

EGR TEMP SEN: Less than 4.8V

If the values are out of the ranges indicated above, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to reduce the engine coolant temperature or EGR temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

*: Although CONSULT-II screen displays “ -10 to 40°C (14 to 104°F)” as a range of engine coolant temperature, ignore it.

WITH CONSULT-II

NIEC1621S01

- 1) Turn ignition switch “OFF”, and wait at least 5 seconds, and then turn “ON”.
- 2) Select “EGR SYSTEM P1402” of “EGR SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 3) Touch “START”.
- 4) Start engine and let it idle until “TESTING” on CONSULT-II screen is turned to “COMPLETED”. (It will take 80 seconds or more.)

If “TESTING” is not displayed after 5 minutes, turn ignition “OFF” and cool the engine coolant temperature to the range of -10 to 50°C (14 to 122°F). Retry from step 1.

- 5) Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to “Diagnostic Procedure”, EC-1250.

WITH GST

NIEC1621S02

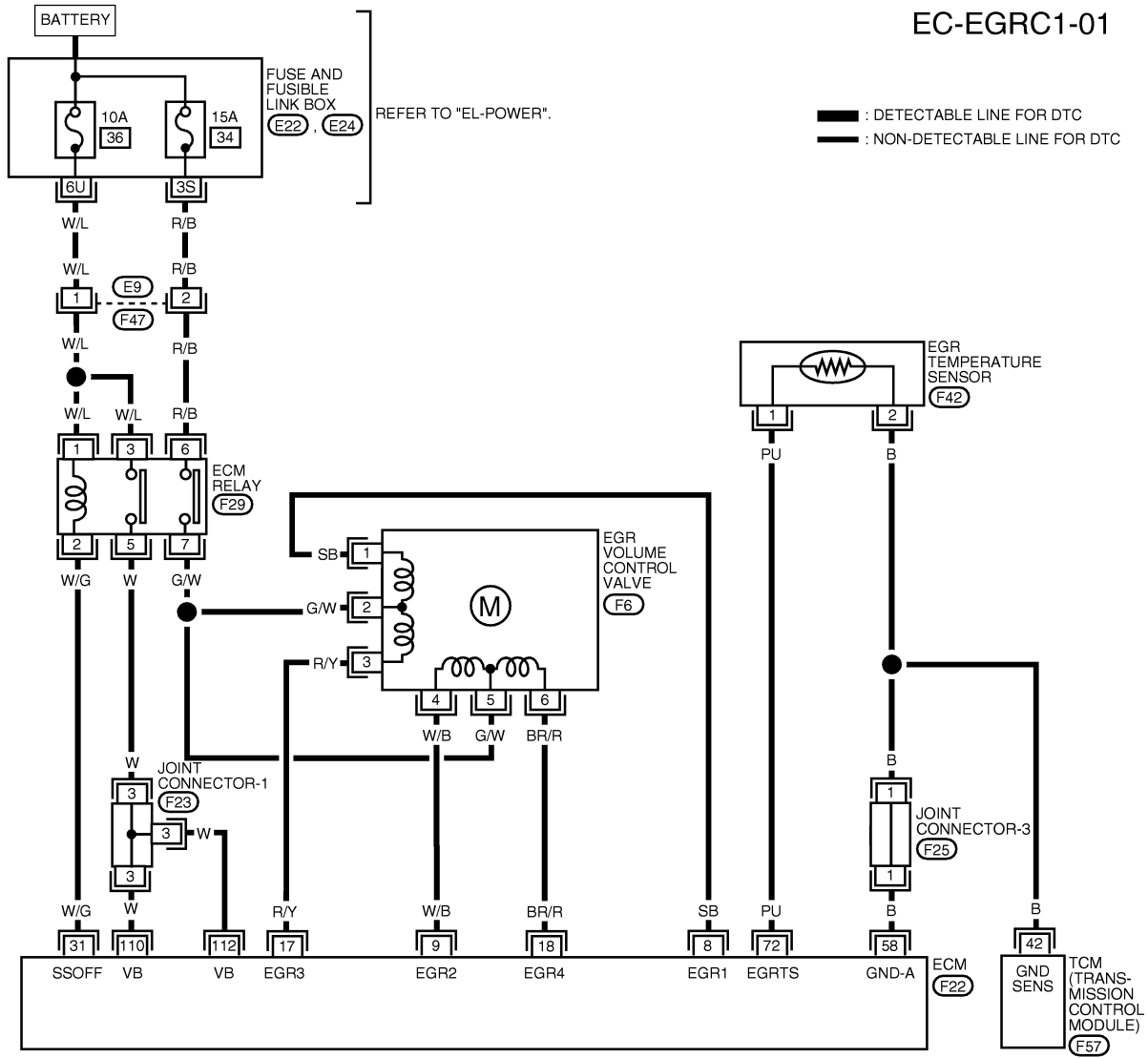
- 1) Turn ignition switch “ON” and select “MODE 1” with GST.
- 2) Check that engine coolant temperature is within the range of -10 to 50°C (14 to 122°F).
- 3) Check that voltage between ECM terminal 72 (EGR temperature sensor signal) and ground is less than 4.8V.
- 4) Start engine and let it idle for at least 80 seconds.
- 5) Stop engine.
- 6) Perform from step 1 to 4.
- 7) Select “MODE 3” with GST.
- 8) If DTC is detected, go to “Diagnostic Procedure”, EC-1250.

- When using GST, “DTC Confirmation Procedure” should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

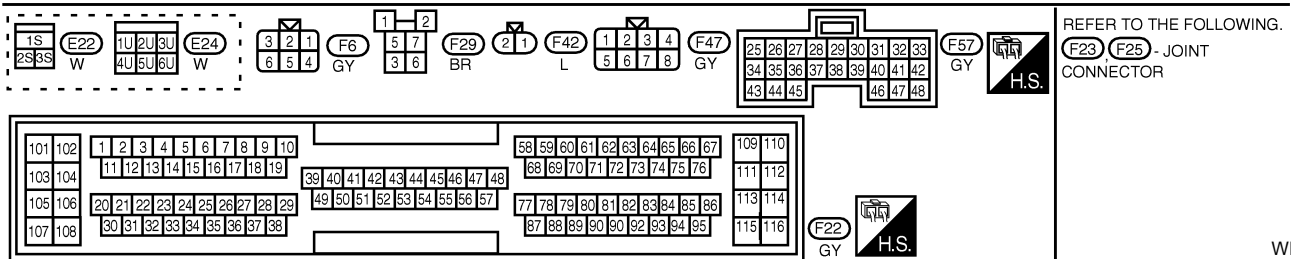
Wiring Diagram

NIEC1622

EC-EGRC1-01



— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



REFER TO THE FOLLOWING.
 F23, F25 - JOINT CONNECTOR

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

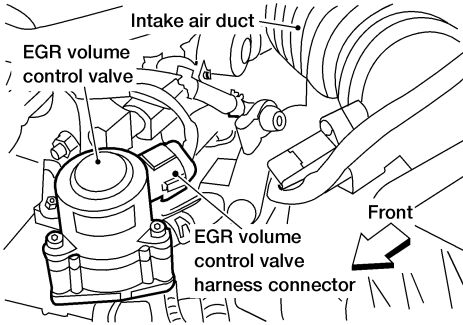
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	BR/R			

Diagnostic Procedure

NIEC1623

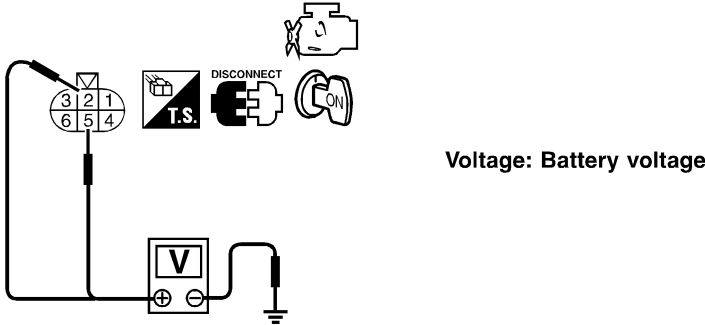
1 CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT

1. Disconnect EGR volume control valve harness connector.



2. Turn ignition switch ON.

3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.



Voltage: Battery voltage

OK or NG

OK	▶	GO TO 3.
NG	▶	GO TO 2.

LEC333

SEF327X

2 DETECT MALFUNCTIONING PART

Check harness for open or short between ECM relay and EGR volume control valve.

▶ Repair harness or connectors.

3 CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.

2. Disconnect ECM harness connector.

3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to Wiring Diagram.

ECM terminal	EGR volume control valve
8	1
9	4
17	3
18	6

Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

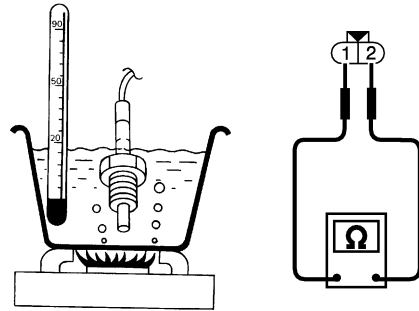
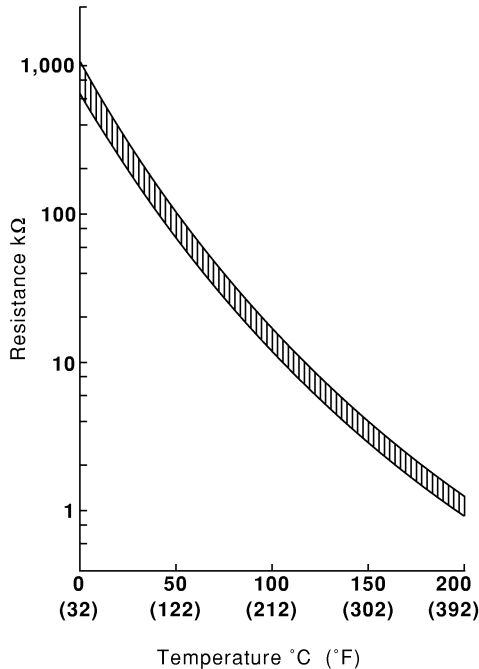
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

MTBL0543

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4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

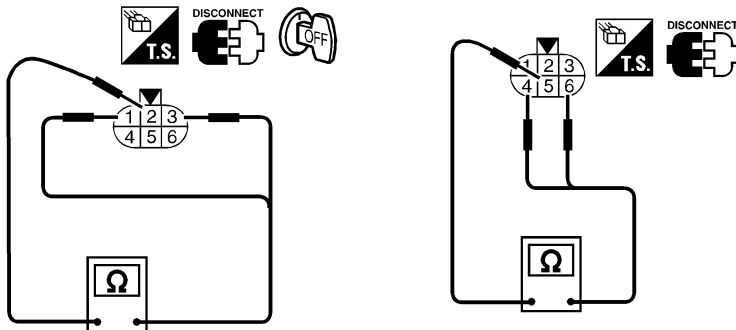
SEF483Y

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

5 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.

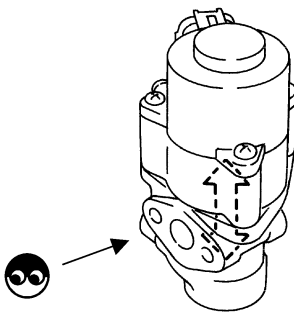


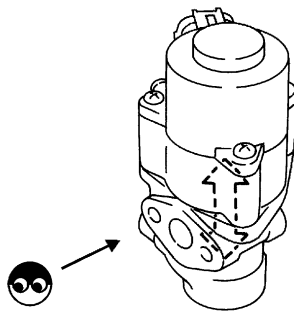
Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 6. |
| OK (Without CONSULT-II) | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR volume control valve. |

6	CHECK EGR VOLUME CONTROL VALVE-II																									
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																										
<table border="1" style="display: inline-table; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>EGR TEMP SEN</th> <th>XXX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm	EGR TEMP SEN	XXX V														
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EGR VOL CONT/V	20 step																									
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EGR TEMP SEN	XXX V																									
																										
SEF491Y																										
OK or NG																										
OK	▶	GO TO 8.																								
NG	▶	Replace EGR volume control valve.																								

7	CHECK EGR VOLUME CONTROL VALVE-II	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON and OFF. 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
		
SEF560W		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EGR volume control valve.

8	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
▶		INSPECTION END

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

QG18DE (CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC1624

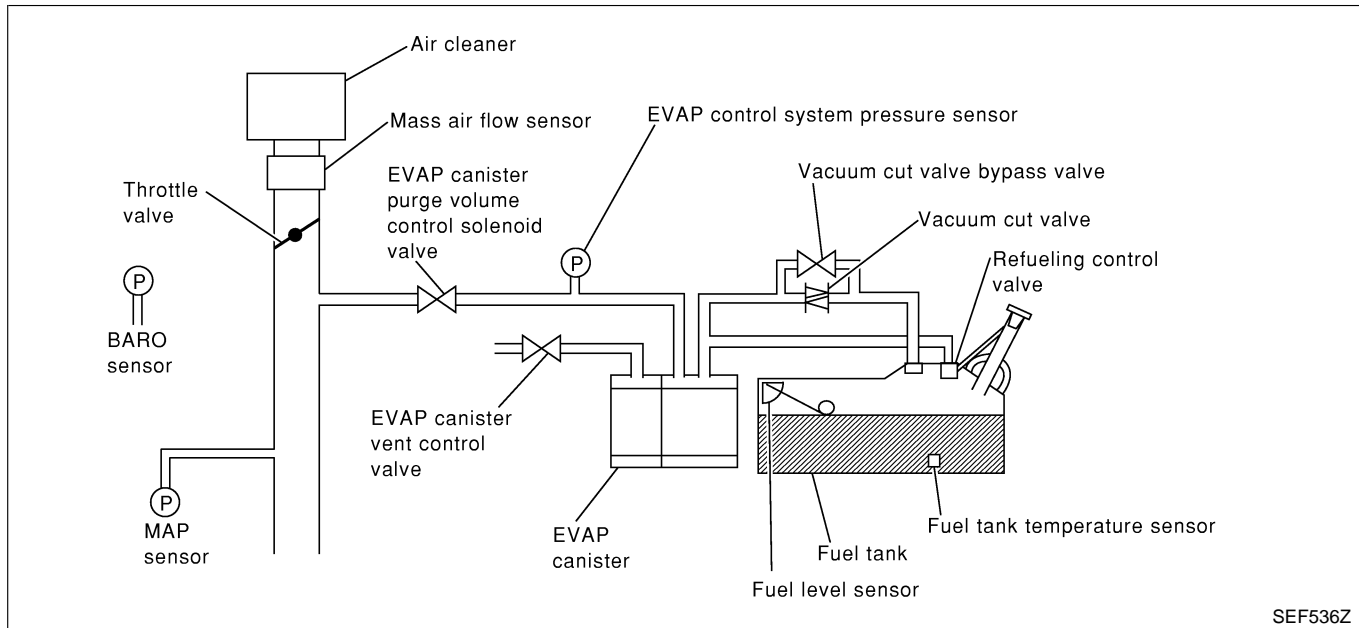
NOTE:

If DTC P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1287.)

This diagnosis detects leaks in the EVAP purge line using of vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



SEF536Z

Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC1625

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister
- EVAP purge line (pipe and rubber tube) leaks

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

QG18DE (CALIF CA)

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve
- Manifold absolute pressure (MAP) sensor
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- Fuel level sensor and the circuit
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks
- Foreign matter caught in EVAP canister purge volume control solenoid valve

DTC Confirmation Procedure

Refer to "P0440 EVAP CONTROL SYSTEM (SMALL LEAK)
(NEGATIVE PRESSURE)", EC-1037. ^{NIEC1626}

Diagnostic Procedure

Refer to "P0440 EVAP CONTROL SYSTEM (SMALL LEAK)
(NEGATIVE PRESSURE)", EC-1037. ^{NIEC1627}

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Description

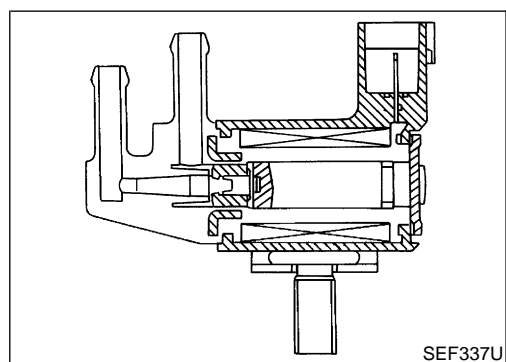
Description SYSTEM DESCRIPTION

NIEC1628

NIEC1628S01

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Camshaft position sensor (PHASE)	Engine speed and cylinder position		
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Throttle position switch	Closed throttle position		
Air fuel ratio (A/F) sensors 1	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor by-pass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



COMPONENT DESCRIPTION

NIEC1628S02

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1629

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load	Idle (Vehicle stopped)
	2,000 rpm	0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

On Board Diagnosis Logic

On Board Diagnosis Logic

Malfunction is detected when the canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed. NIEC1630

Possible Cause

- EVAP control system pressure sensor NIEC1631
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses
(Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NIEC1632

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or more.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

6	PURG VOL CN/V P1444	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	THRTL POS SEN	XXX V

SEF747Y

6	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	B/FUEL SCHDL	XXX msec
	PW/ST SIGNAL	OFF
	VHCL SPEED SE	XXX km/h

SEF196Y

6	PURG VOL CN/V P1444	
	COMPLETED	

SEF237Y

WITH CONSULT-II

NIEC1632S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 5) Touch "START".
- 6) Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1259.

WITH GST

NIEC1632S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 20 seconds.
- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1259.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

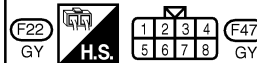
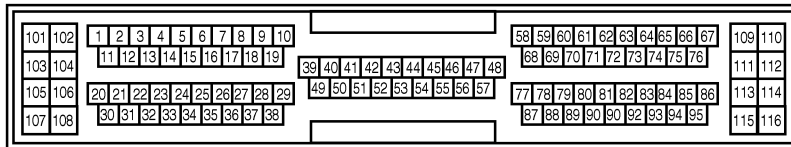
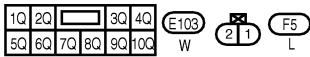
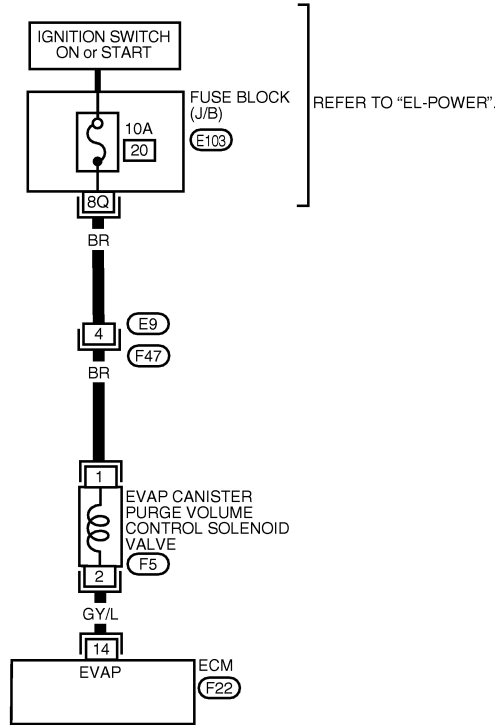
Wiring Diagram

Wiring Diagram

NIEC1633

EC-PGC/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC401

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	GY/L	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE (V)
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE (V)

SEF576Y

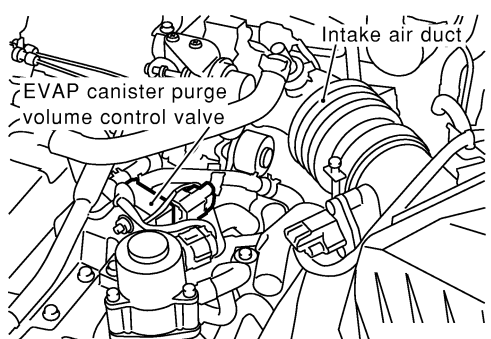
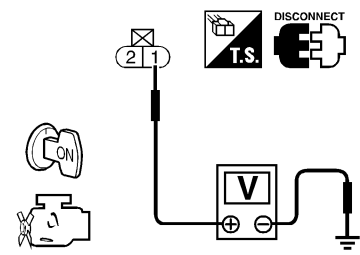
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1634

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

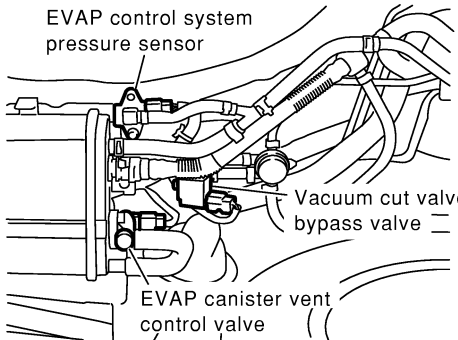
3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the harness for open or short between EVAP canister purge volume control solenoid valve and ECM.	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
 <p style="text-align: right; margin-right: 50px;">SEF403Z</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair it.

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector. 2. Check connectors for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

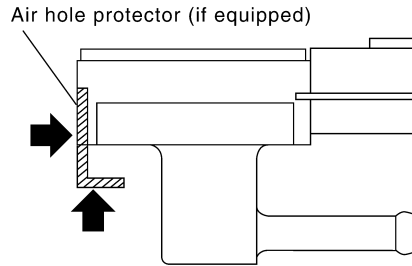
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7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

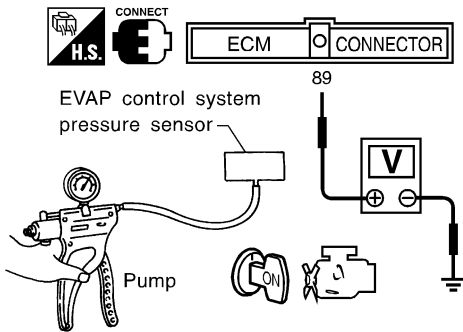
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 89 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF543Z

CAUTION:

- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

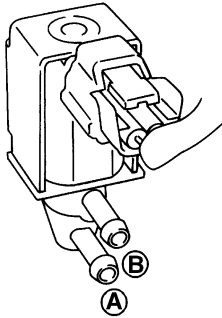
OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	Replace EVAP control system pressure sensor.

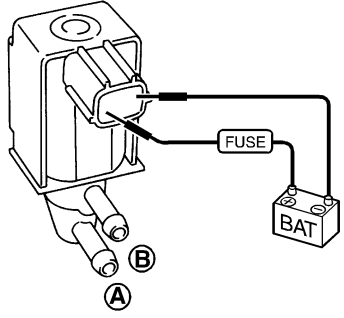
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																									
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect harness connectors disconnected. 3. Start engine. 4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>A/F ALPHA-B1</th> <th>XX %</th> </tr> <tr> <th>THRTL POS SEN</th> <th>X. XX V</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X. XX V												
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OK or NG																										
OK	▶	GO TO 10.																								
NG	▶	GO TO 9.																								

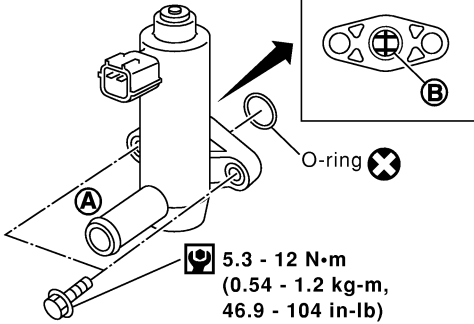
9	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE							
<p>④ With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
SEF334X								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition PURG VOL CONT/V value</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td>Yes</td> </tr> <tr> <td>0.0%</td> <td>No</td> </tr> </tbody> </table>			Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B							
100.0%	Yes							
0.0%	No							

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>								
								
SEF335X								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>Yes</td> </tr> <tr> <td>No supply</td> <td>No</td> </tr> </tbody> </table>			Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B							
12V direct current supply between terminals 1 and 2	Yes							
No supply	No							
OK or NG								
OK	▶	GO TO 10.						
NG	▶	Replace EVAP canister purge volume control solenoid valve.						

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

10	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Clean the rubber tube using an air blower.

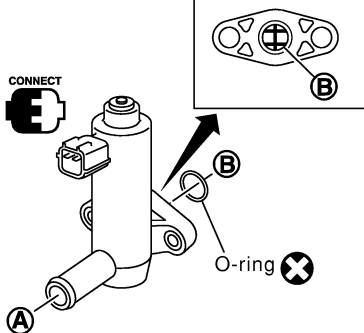
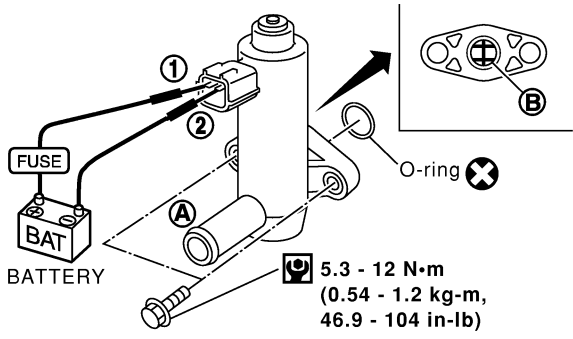
11	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
		
SEF376Z		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister vent control valve.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

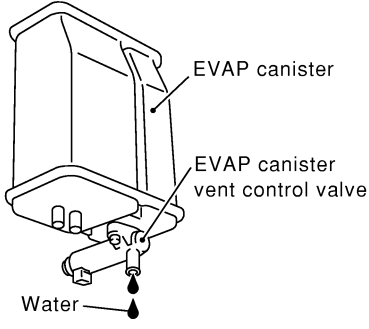
Diagnostic Procedure (Cont'd)

12	CHECK EVAP CANISTER VENT CONTROL VALVE-II																						
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th colspan="2" style="text-align: center;">ACTIVE TEST</th></tr> <tr><td style="text-align: center;">VENT CONTROL/V</td><td style="text-align: center;">OFF</td></tr> <tr><th colspan="2" style="text-align: center;">MONITOR</th></tr> <tr><td style="text-align: center;">ENG SPEED</td><td style="text-align: center;">XXX rpm</td></tr> <tr><td style="text-align: center;">A/F ALPHA-B1</td><td style="text-align: center;">XXX %</td></tr> <tr><td style="text-align: center;">A/F SEN1 (B1)</td><td style="text-align: center;">XXX V</td></tr> <tr><td style="text-align: center;">THRTL POS SEN</td><td style="text-align: center;">XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	XXX V								
ACTIVE TEST																							
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Condition	Air passage continuity between A and B																						
VENT CONTROL/V																							
ON	No																						
OFF	Yes																						
SEF544Z																							
<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><th style="width: 50%;">Condition</th><th style="width: 50%;">Air passage continuity between A and B</th></tr> <tr><td style="text-align: center;">12V direct current supply between terminals 1 and 2</td><td style="text-align: center;">No</td></tr> <tr><td style="text-align: center;">OFF</td><td style="text-align: center;">Yes</td></tr> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes														
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12V direct current supply between terminals 1 and 2	No																						
OFF	Yes																						
SEF378Z																							
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																							
OK	▶	GO TO 14.																					
NG	▶	GO TO 13.																					

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III		
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform procedure 10 again. 			
OK or NG			
OK	▶	GO TO 14.	
NG	▶	Replace EVAP canister vent control valve.	

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p>		
		
SEF504Z		
Yes or No		
Yes	▶	GO TO 15.
No	▶	GO TO 18.

GI
MA
EM
LC
EC

FE

15	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

CL

MT

AT

AX

16	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶		Repair hose or replace EVAP canister.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

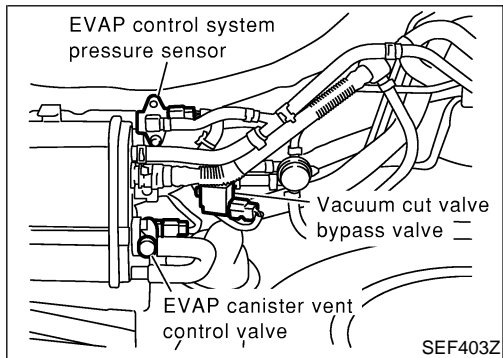
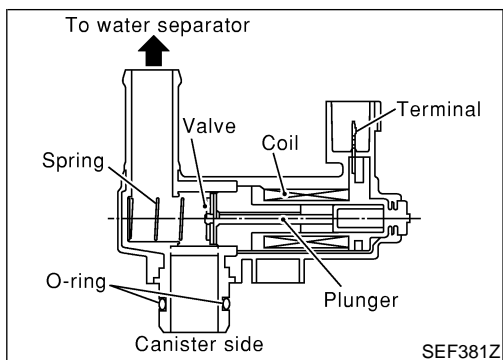
17	CHECK WATER SEPARATOR
<p>1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;"> <p style="margin-left: 100px;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts. NOTE: ● Do not disassemble water separator.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

Component Description



Component Description

NIEC1635

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1636

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

NIEC1637

Malfunction is detected when EVAP canister vent control valve remains closed under specified driving conditions.

ST

RS

BT

HA

Possible Cause

NIEC1638

- EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.

SC

EL

IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

DTC Confirmation Procedure

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h
	THRTL POS SEN	XXX V
	B/FUEL SCHDL	XXX msec

SEF201Y

DTC Confirmation Procedure

NIEC1639

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-II

NIEC1639S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1270.

Ⓜ WITH GST

NIEC1639S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

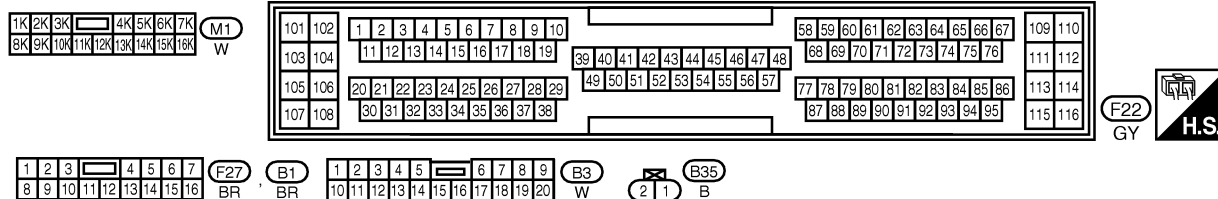
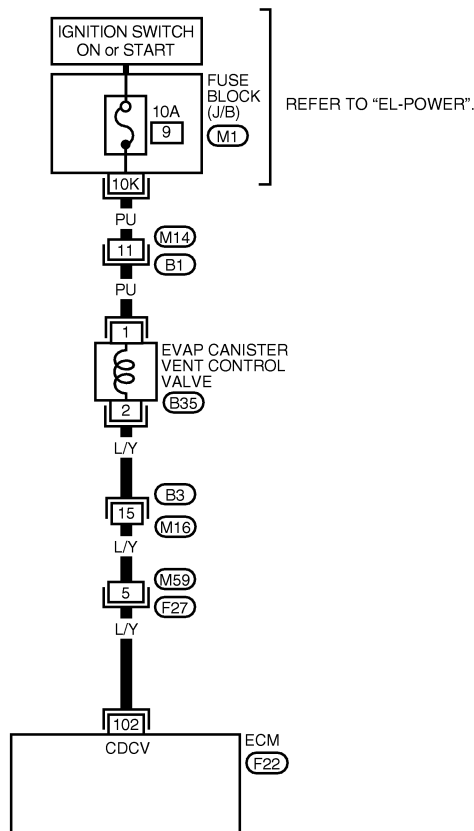
Wiring Diagram

Wiring Diagram

NIEC1640

EC-VENT/V-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

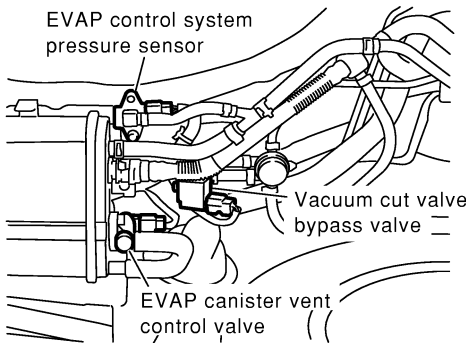
DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

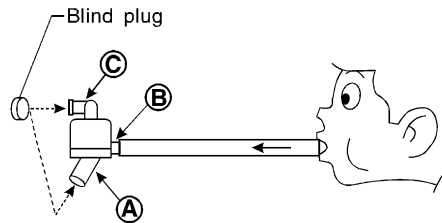
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1641

1	CHECK RUBBER TUBE	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. 		
		
SEF403Z		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
<ul style="list-style-type: none"> ● Do not disassemble water separator. 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Clean or replace water separator.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3 CHECK EVAP CANISTER VENT CONTROL VALVE-I

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

OK or NG

OK	▶	GO TO 4.
NG	▶	Replace EVAP canister vent control valve.

4 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

- Turn ignition switch ON.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	XXX V

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

Make sure new O-ring is installed properly.

OK or NG

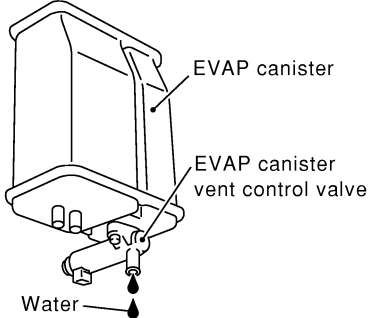
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace EVAP canister vent control valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.		
		
SEF504Z		
Yes or No		
Yes	▶	GO TO 7.
No	▶	GO TO 9.

7	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

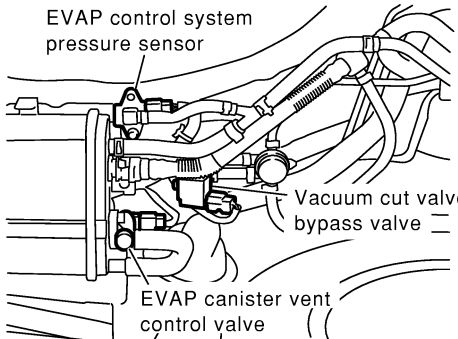
8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶ Repair hose or replace EVAP canister.		

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair it.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;">  <p>EVAP control system pressure sensor</p> <p>Vacuum cut valve bypass valve</p> <p>EVAP canister vent control valve</p> </div>		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

SEF403Z

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DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 		
SEF799W		
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 89 and ground.</p>		
SEF543Z		
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶ INSPECTION END	

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

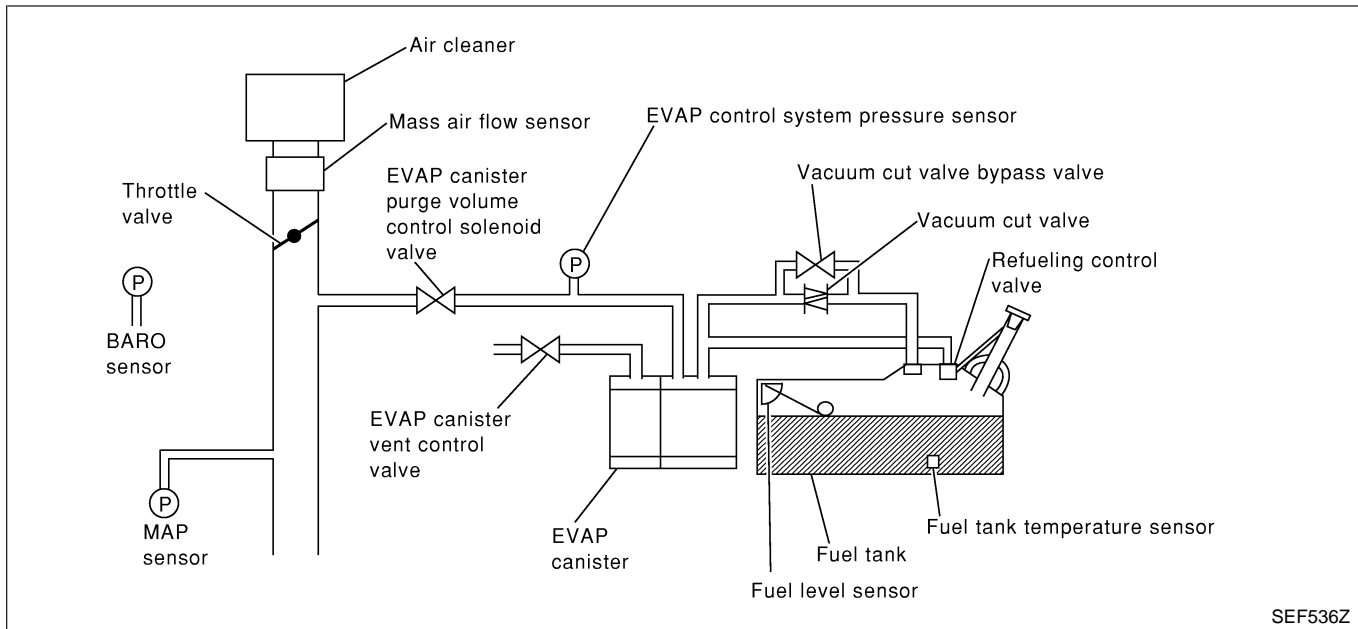
System Description

System Description

NIEC1642

NOTE:

If DTC P1447 is displayed with P0510, perform trouble diagnosis for DTC P0510 first. (See EC-1114.)



In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

NIEC1643

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Malfunction is detected when EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.

Possible Cause

NIEC1644

- EVAP canister purge volume control solenoid valve stuck closed
- EVAP control system pressure sensor and the circuit
- Loose, disconnected or improper connection of rubber tube
- Blocked rubber tube
- Cracked EVAP canister
- EVAP canister purge volume control solenoid valve circuit
- Closed throttle position switch
- Blocked purge port

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

Possible Cause (Cont'd)

- EVAP canister vent control valve

5	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">PURG FLOW P1447</td></tr> <tr><td style="text-align: center;">OUT OF CONDITION</td></tr> <tr><td style="text-align: center;">MONITOR</td></tr> <tr><td>ENG SPEED XXX rpm</td></tr> <tr><td>THRTL POS SEN XXX V</td></tr> <tr><td>B/FUEL SCHDL XXX msec</td></tr> </table>	PURG FLOW P1447	OUT OF CONDITION	MONITOR	ENG SPEED XXX rpm	THRTL POS SEN XXX V	B/FUEL SCHDL XXX msec	SEF207Y
PURG FLOW P1447								
OUT OF CONDITION								
MONITOR								
ENG SPEED XXX rpm								
THRTL POS SEN XXX V								
B/FUEL SCHDL XXX msec								

6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">PURG FLOW P1447</td></tr> <tr><td style="text-align: center;">TESTING</td></tr> <tr><td style="text-align: center;">MONITOR</td></tr> <tr><td>ENG SPEED XXX rpm</td></tr> <tr><td>THRTL POS SEN XXX V</td></tr> <tr><td>B/FUEL SCHDL XXX msec</td></tr> </table>	PURG FLOW P1447	TESTING	MONITOR	ENG SPEED XXX rpm	THRTL POS SEN XXX V	B/FUEL SCHDL XXX msec	SEF208Y
PURG FLOW P1447								
TESTING								
MONITOR								
ENG SPEED XXX rpm								
THRTL POS SEN XXX V								
B/FUEL SCHDL XXX msec								

6	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td style="text-align: center;">PURG FLOW P1447</td></tr> <tr><td style="text-align: center;">COMPLETED</td></tr> </table>	PURG FLOW P1447	COMPLETED	SEF238Y
PURG FLOW P1447				
COMPLETED				

DTC Confirmation Procedure

NIEC1645

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or more.

WITH CONSULT-II

NIEC1645S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 70 seconds.
- 4) Select "PURG FLOW P1447" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
- 5) Touch "START".
If "COMPLETED" is displayed, go to step 7.
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,800 rpm
B/FUEL SCHDL	1.0 - 8.2 msec
Engine coolant temperature	More than 70°C (158°F)

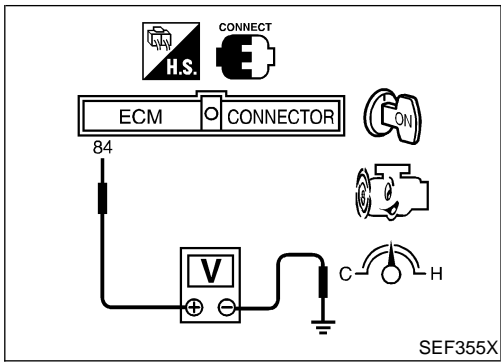
If "TESTING" is not changed for a long time, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1278.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

- 1) Lift up drive wheels.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Start engine and wait at least 70 seconds.
- 5) Set voltmeter probes to ECM terminals 84 (EVAP control system pressure sensor signal) and ground.
- 6) Check EVAP control system pressure sensor value at idle speed and note it.
- 7) Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON
Steering wheel	Fully turned
Headlamp switch	ON
Rear window defogger switch	ON
Engine speed	Approx. 3,000 rpm
Gear position	Any position other than "P", "N" or "R"

- 8) Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
- 9) If NG, go to "Diagnostic Procedure", EC-1278.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

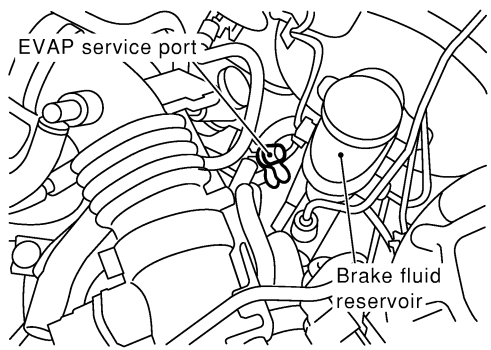
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

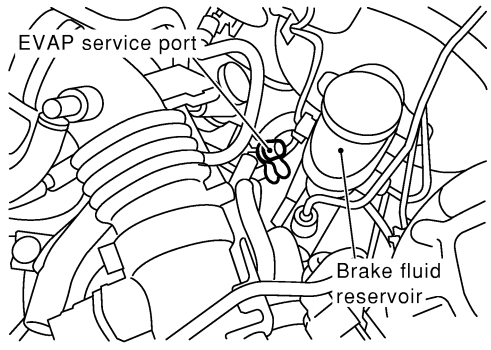
=NIEC1647

1	CHECK EVAP CANISTER	
1. Turn ignition switch "OFF". 2. Check EVAP canister for cracks.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 2.
OK (Without CONSULT-II)	▶	GO TO 3.
NG	▶	Replace EVAP canister.

2	CHECK PURGE FLOW																											
④ With CONSULT-II 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.																												
																												
SEF400Z																												
2. Start engine and let it idle. 3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 4. Rev engine up to 2,000 rpm. 5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.																												
<table border="1" style="display: inline-table; margin-right: 20px;"> <thead> <tr><th colspan="2">ACTIVE TEST</th></tr> </thead> <tbody> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>A/F SEN1 (B1)</td><td>XXX V</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <table border="1" style="display: inline-table;"> <thead> <tr><th>PURG VOL CONT/V</th><th>VACUUM</th></tr> </thead> <tbody> <tr><td>100.0%</td><td>Should exist</td></tr> <tr><td>0.0%</td><td>Should not exist</td></tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	XXX V							PURG VOL CONT/V	VACUUM	100.0%	Should exist	0.0%	Should not exist
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100.0%	Should exist																											
0.0%	Should not exist																											
SEF562Z																												
OK or NG																												
OK	▶	GO TO 7.																										
NG	▶	GO TO 4.																										

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK PURGE FLOW	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. 		
		
SEF400Z		
<ol style="list-style-type: none"> 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum gauge indication when revving engine up to 2,000 rpm. Vacuum should exist. 6. Release the accelerator pedal fully and let idle. Vacuum should not exist. 		
OK or NG		
OK	▶	GO TO 7.
NG	▶	GO TO 4.

4	CHECK EVAP PURGE LINE	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check EVAP purge line for improper connection or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair it.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)


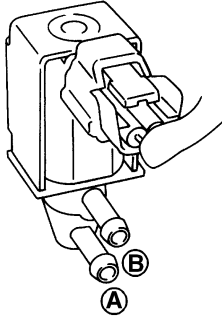

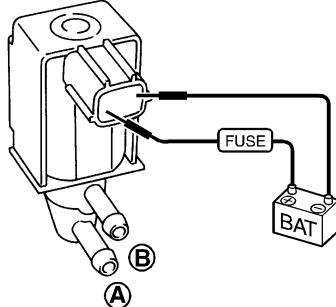
5	CHECK EVAP PURGE HOSE AND PURGE PORT
<p>1. Disconnect purge hoses connected to EVAP service port A and EVAP canister purge volume control solenoid valve B.</p> <div style="text-align: center;"> </div>	
<p>2. Blow air into each hose and EVAP purge port C.</p> <p>3. Check that air flows freely.</p> <div style="text-align: center;"> </div>	
SEF367U	
OK or NG	

OK (With CONSULT-II)	▶	GO TO 6.
OK (Without CONSULT-II)	▶	GO TO 7.
NG	▶	Repair or clean hoses and/or purge port.

6	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="font-size: small;">PURG VOL CONT/V</td> <td style="font-size: small;">XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="font-size: small;">ENG SPEED</td> <td style="font-size: small;">XXX rpm</td> </tr> <tr> <td style="font-size: small;">A/F ALPHA-B1</td> <td style="font-size: small;">XX %</td> </tr> <tr> <td style="font-size: small;">THRTL POS SEN</td> <td style="font-size: small;">X. XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XX %	THRTL POS SEN	X. XX V								
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PURG VOL CONT/V	XXX %																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XX %																				
THRTL POS SEN	X. XX V																				
SEF538Z																					
OK or NG																					
OK	▶	GO TO 8.																			
NG	▶	GO TO 7.																			

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
<p> With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF334X		
<p> Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF335X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

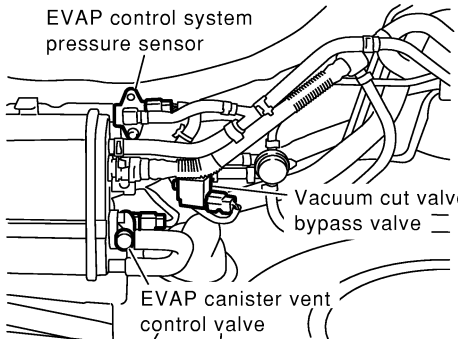
8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Repair it.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

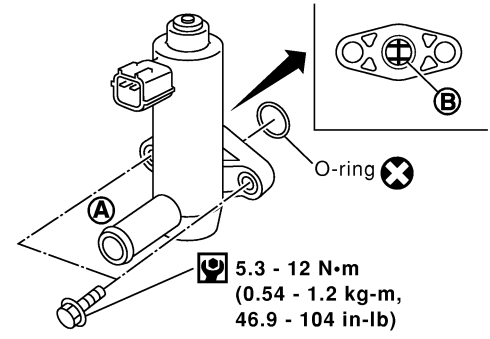
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;">  </div>		
SEF403Z		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
<p>Refer to "DTC Confirmation Procedure" for DTC P0450, EC-1066.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

11	CHECK RUBBER TUBE FOR CLOGGING	
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG	▶	Clean the rubber tube using an air blower.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="text-align: center;">  </div>		
SEF376Z		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

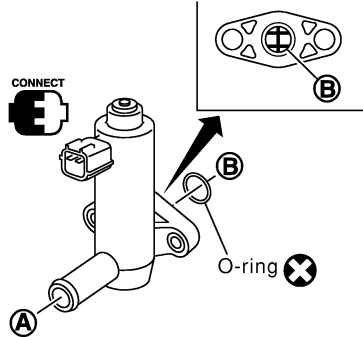
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

13 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	XXX V



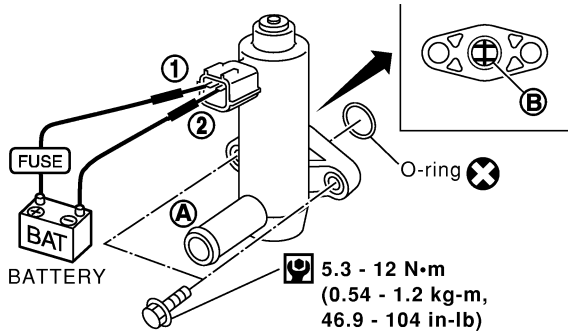
Condition	Air passage continuity between A and B
VENT CONTROL/V	
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF544Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	GO TO 14.

14 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 13 again.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

15	CHECK THROTTLE POSITION SWITCH	<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Install all removed parts. 2. Start engine and warm it up to normal operating temperature. 3. Turn ignition switch "OFF". 4. Remove vacuum hose connected to throttle opener. 5. Connect suitable vacuum hose to vacuum pump and the throttle opener. 6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. <div style="text-align: center; margin: 20px 0;"> </div> <p style="text-align: right; margin-right: 50px;">SEF793W</p> <ol style="list-style-type: none"> 7. Turn ignition switch "ON". 8. Select "A/T" then select "DATA MONITOR" mode with CONSULT-II. 9. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. <table border="1" style="margin: 20px auto; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="padding: 5px;">Throttle valve conditions</th> <th style="padding: 5px;">CLSD THL/P SW</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Completely closed</td> <td style="padding: 5px;">ON</td> </tr> <tr> <td style="padding: 5px;">Partially open or completely open</td> <td style="padding: 5px;">OFF</td> </tr> </tbody> </table> <p style="text-align: right; margin-right: 50px;">MTBL0355</p> <p style="text-align: center; margin: 10px 0;">OK or NG</p>	Throttle valve conditions	CLSD THL/P SW	Completely closed	ON	Partially open or completely open	OFF
Throttle valve conditions	CLSD THL/P SW							
Completely closed	ON							
Partially open or completely open	OFF							
OK	▶	GO TO 18.						
NG	▶	GO TO 17.						

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

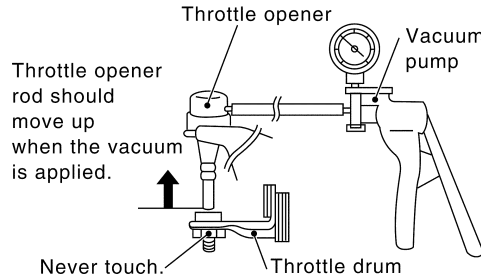
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

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16 CHECK THROTTLE POSITION SWITCH

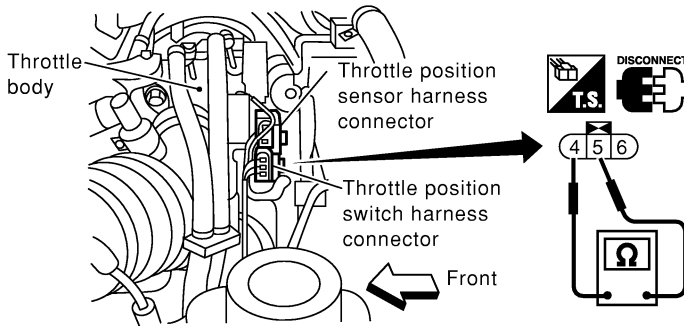
⊗ Without CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Disconnect closed throttle position switch harness connector.
8. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

SEF770Y

OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 17.

17 ADJUST THROTTLE POSITION SWITCH

Check the following items. Refer to "Basic Inspection", EC-798.

Items	Specifications
Ignition timing	9°±5° BTDC
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF
Target idle speed	800±50 rpm (in "P" or "N" position)

MTBL0584

Is it possible to adjust closed throttle position switch?

Yes or No

Yes	▶	GO TO 18.
No	▶	Replace throttle position switch.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

18	CHECK EVAP PURGE LINE
Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-729.	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace it.

19	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 20.

20	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

Component Description

Component Description

NIEC1648

NOTE:

If DTC P1448 is displayed with P0440, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System" diagnoses.

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1649

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

NIEC1650

Malfunction is detected when EVAP canister vent control valve remains opened under specified driving conditions.

ST

RS

BT

HA

Possible Cause

NIEC1651

- EVAP canister vent control valve
- EVAP control system pressure sensor and circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water.
- Vacuum cut valve

SC

EL

IDX

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC1652

NOTE:

- If DTC P1448 is displayed with P0440 or P1440, perform trouble diagnosis for DTC P1448 first.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
 -FUEL LEVEL: 1/4-3/4
 -AMBIENT TEMP: 0-30 C(32-86F)
 -OPEN ENGINE HOOD.
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
 3)TOUCH START.

SEF565X

5

EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

SEF566X

6

EVAP SML LEAK P0440/P1440

OK

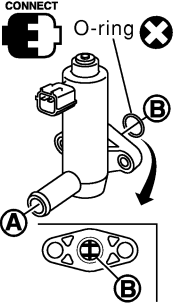
SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING MAY BE REQUIRED.

SEF567X

11

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	XXX V

CONNECT 

O-ring

A

B

SEF563Z

WITH CONSULT-II

NIEC1652S01

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting following procedure.
 - 1) Turn ignition switch “ON”.
 - 2) Turn ignition switch “OFF” and wait at least 10 seconds.
 - 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
 - 4) Make sure that the following conditions are met.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- 5) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-798.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, go to the following step.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- 7) Stop engine and wait at least 5 seconds, then turn “ON”.
- 8) Disconnect hose from water separator.
- 9) Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10) Touch “ON” and “OFF” alternately.

- 11) Make sure the following.

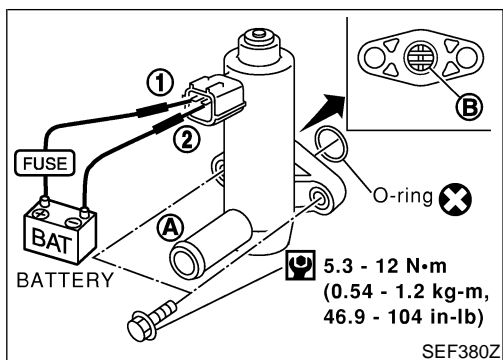
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to “Diagnostic Procedure”, EC-1291.
If the result is OK, go to “Diagnostic Procedure” for DTC P0440, EC-1039.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

- 1) Disconnect hose from water separator.
- 2) Disconnect EVAP canister vent control valve harness connector.
- 3) Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to "Diagnostic Procedure", EC-1291.
 If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-1039.

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DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

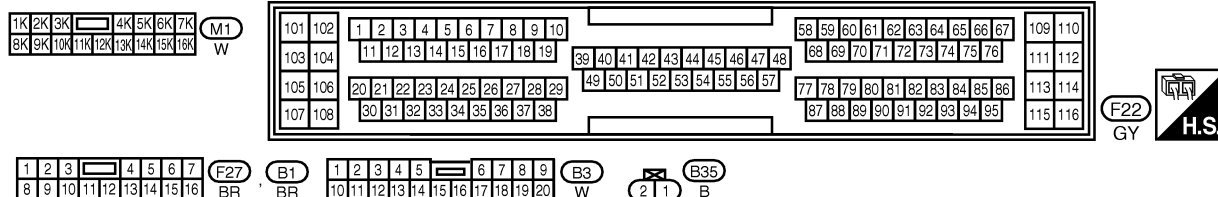
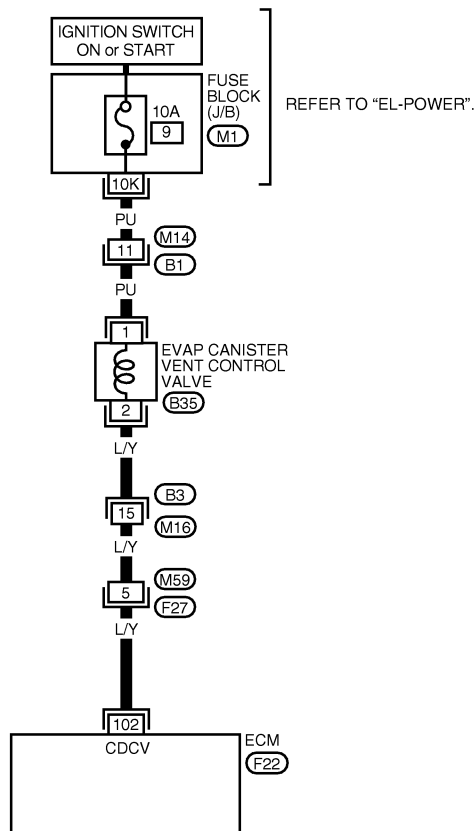
Wiring Diagram

Wiring Diagram

NIEC1654

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF577Y

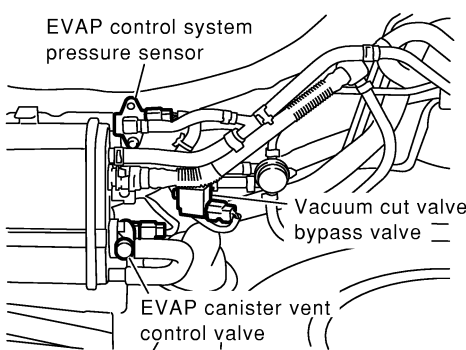
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

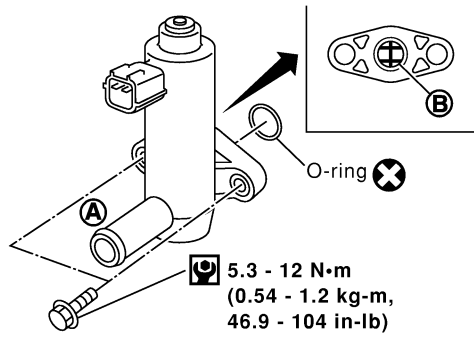
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1655

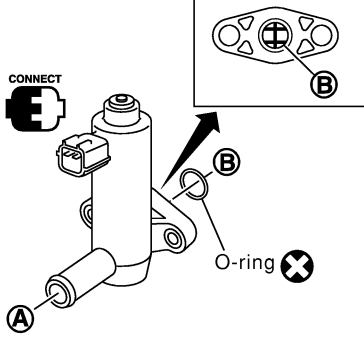
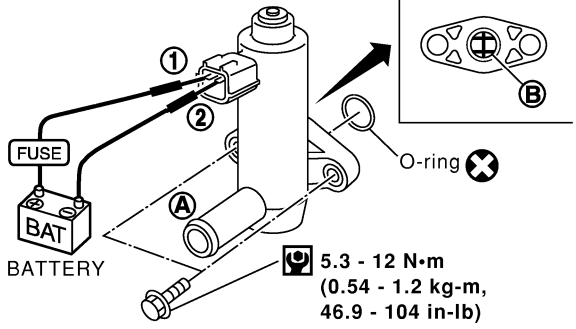
1	CHECK RUBBER TUBE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. <div style="text-align: center; margin: 10px 0;">  <p>EVAP control system pressure sensor</p> <p>Vacuum cut valve bypass valve</p> <p>EVAP canister vent control valve</p> </div> <p style="text-align: right;">SEF403Z</p>	GI MA EM LC EC FE
		OK or NG	
OK	▶	GO TO 2.	CL
NG	▶	Clean rubber tube using an air blower.	MT

2	CHECK EVAP CANISTER VENT CONTROL VALVE-I	<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. <div style="text-align: center; margin: 10px 0;">  <p>O-ring ✗</p> <p>A</p> <p>B</p> <p>5.3 - 12 N·m (0.54 - 1.2 kg-m, 46.9 - 104 in-lb)</p> </div> <p style="text-align: right;">SEF376Z</p>	AT AX SU BR ST RS BT HA SC EL IDX
		OK or NG	
OK	▶	GO TO 3.	RS
NG	▶	Replace EVAP canister vent control valve.	BT

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

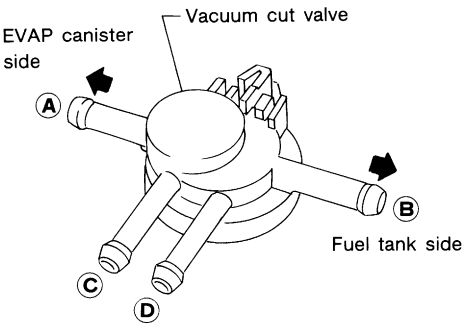
Diagnostic Procedure (Cont'd)

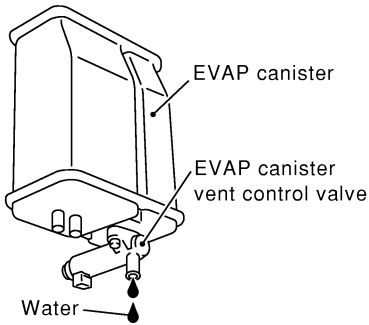
3	CHECK EVAP CANISTER VENT CONTROL VALVE-II																				
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> Turn ignition switch ON. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. Check air passage continuity and operation delay time. 																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2" style="text-align: center;">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td style="width: 60%;">VENT CONTROL/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2" style="text-align: center;">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td>A/F SEN1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	XXX V						
ACTIVE TEST																					
VENT CONTROL/V	OFF																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
A/F SEN1 (B1)	XXX V																				
THRTL POS SEN	XXX V																				
																					
<table border="1" style="width: 80%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Condition</th> <th style="width: 50%;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">VENT CONTROL/V ON</td> <td style="text-align: center;">No</td> </tr> <tr> <td style="text-align: center;">VENT CONTROL/V OFF</td> <td style="text-align: center;">Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p>		Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes														
Condition	Air passage continuity between A and B																				
VENT CONTROL/V ON	No																				
VENT CONTROL/V OFF	Yes																				
SEF544Z																					
<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																					
																					
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Condition	Air passage continuity between A and B																				
12V direct current supply between terminals 1 and 2	No																				
OFF	Yes																				
SEF378Z																					
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																					
OK	▶	GO TO 5.																			
NG	▶	GO TO 4.																			

4	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. Perform Test No. 3 again. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace EVAP canister vent control valve.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE	<p>1. Turn ignition switch OFF. 2. Remove vacuum cut valve. 3. Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div> <p>a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D.</p> <p style="text-align: right;">SEF379Q</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace vacuum cut valve.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>
OK	▶	GO TO 6.							
NG	▶	Replace vacuum cut valve.							

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF504Z</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 9.</td> </tr> </table>	Yes	▶	GO TO 7.	No	▶	GO TO 9.	<p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p>
Yes	▶	GO TO 7.							
No	▶	GO TO 9.							

7	CHECK EVAP CANISTER	<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 9.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 8.</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	GO TO 8.	<p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 9.							
NG	▶	GO TO 8.							

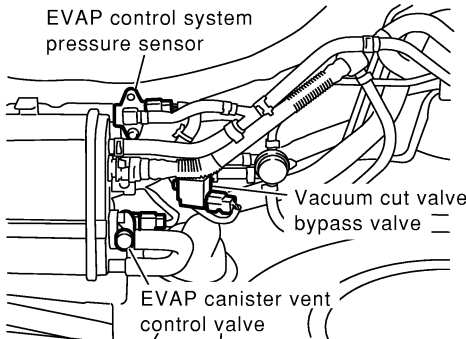
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶	Repair hose or replace EVAP canister.	

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair it.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
1. Disconnect EVAP control system pressure sensor harness connector.		
		
2. Check connectors for water. <b style="color: blue;">Water should not exist.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

SEF403Z

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

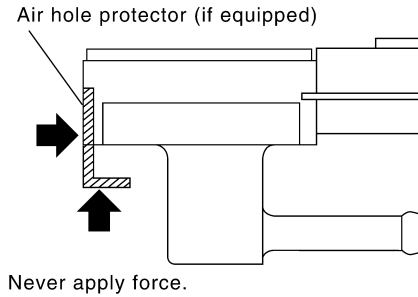
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IDX

11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

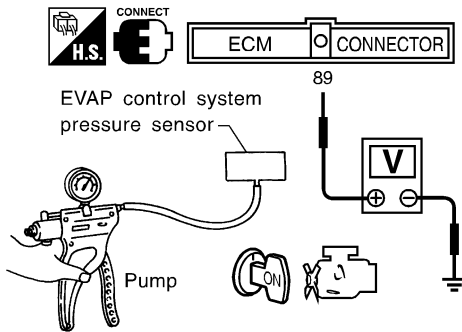
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 89 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF543Z

CAUTION:

- Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12 CHECK INTERMITTENT INCIDENT

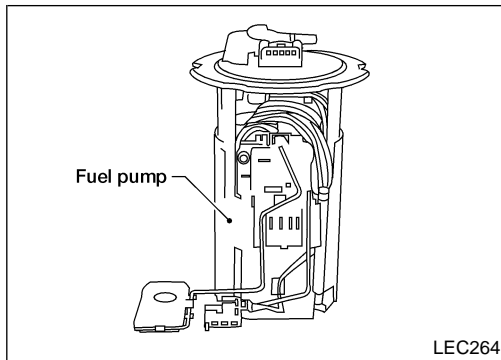
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.

▶ **INSPECTION END**

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

QG18DE (CALIF CA)

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC1656} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor. ^{NIEC1657}

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction. Malfunction is detected when a high voltage from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.) ^{NIEC1658}

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC1659}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓟ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC1659S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1298.

Ⓞ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC1659S02}

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

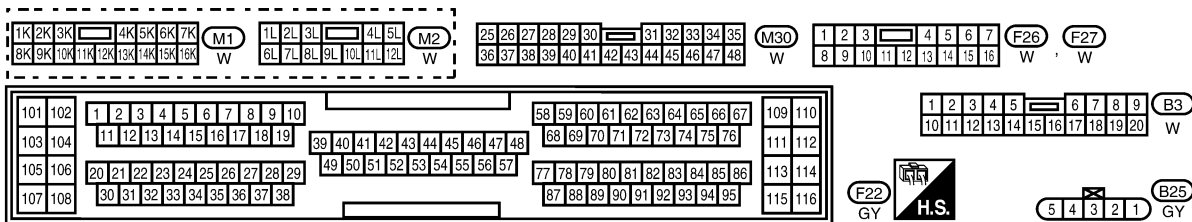
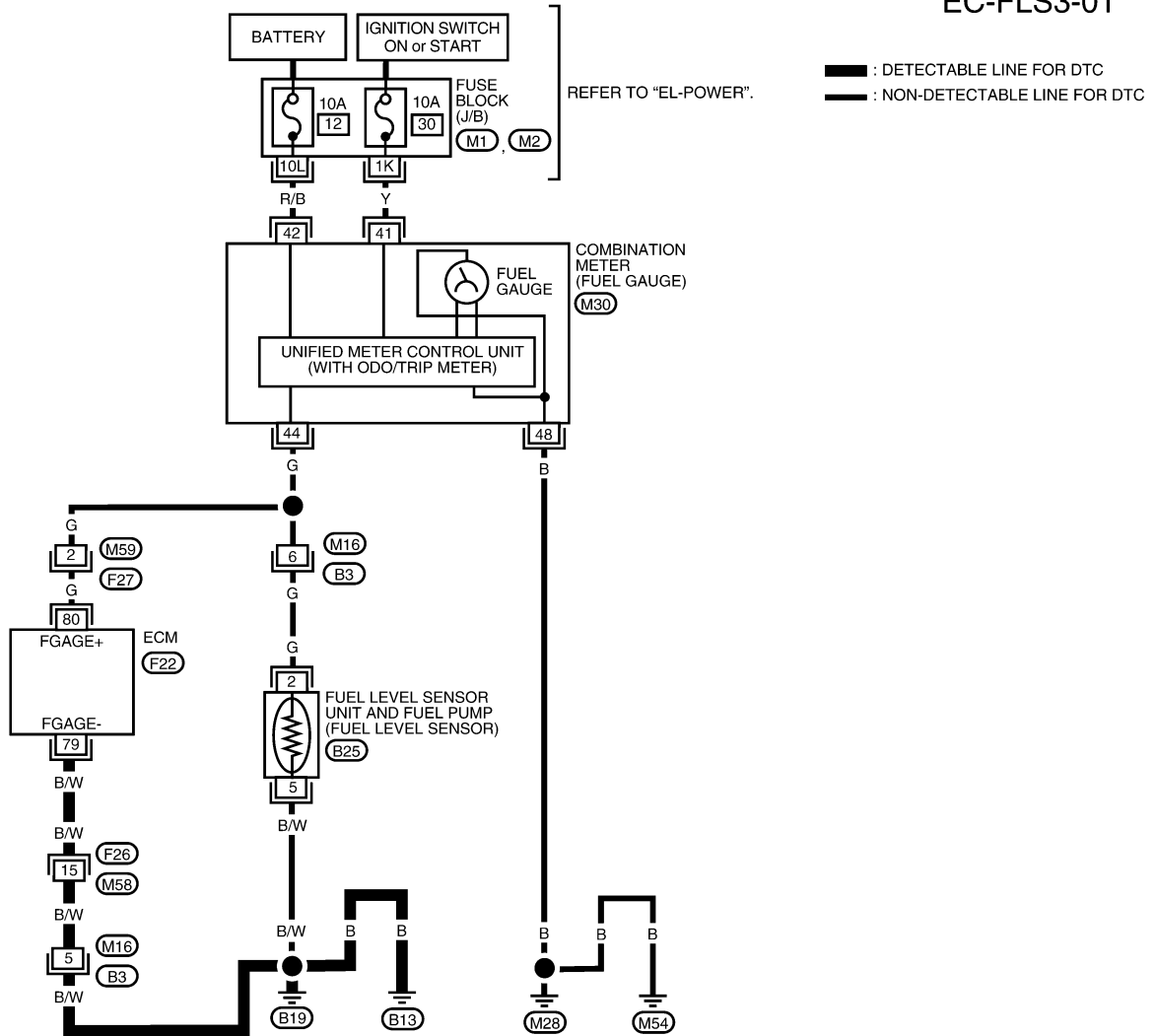
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1660

EC-FLS3-01



WEC145A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
80	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
79	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF579YA

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC1661

1	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 79 and body ground. Refer to Wiring Diagram. Continuity should exist. 4. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
1. Check the following. <ul style="list-style-type: none">● Harness connectors F26, M58● Harness connectors M16, B3● Harness for open and short between ECM and body ground	
	▶ Replace open circuit or short to ground or short to power in harness or connectors.

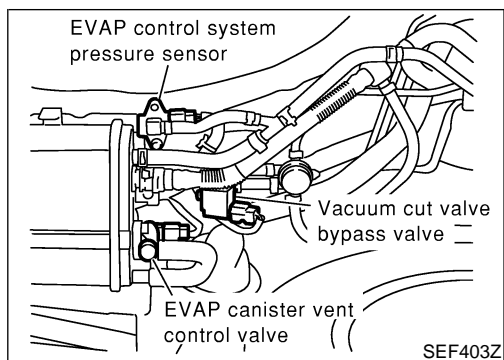
3	CHECK FUEL LEVEL SENSOR
Refer to EL-102 , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Replace fuel level sensor unit.

4	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838	
OK or NG	
	▶ INSPECTION END

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)

Description



Description

COMPONENT DESCRIPTION

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis. The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened.

~NIEC1662

NIEC1662S01

GI

MA

EM

LC

CONSULT-II Reference Value in Data Monitor Mode

NIEC1663

EC

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

FE

CL

MT

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through vacuum cut valve bypass valve.

NIEC1664

AT

AX

SU

BR

Possible Cause

- Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted.)
- Vacuum cut valve bypass valve

NIEC1665

ST

RS

BT

HA

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

NIEC1666

SC

EL

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

IDX

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC1666S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1302.

WITH GST

NIEC1666S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)

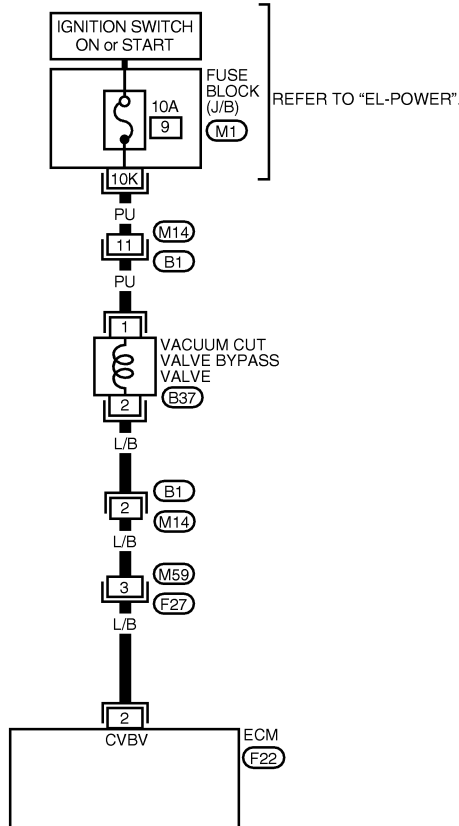
Wiring Diagram

Wiring Diagram

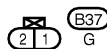
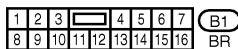
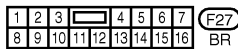
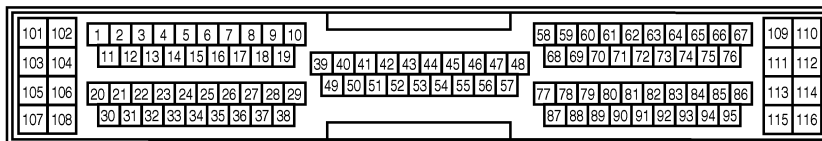
=NIEC1667

EC-BYPS/V-01

— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC



GI
 MA
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LEC211

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
2	L/B	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF585Y

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1668

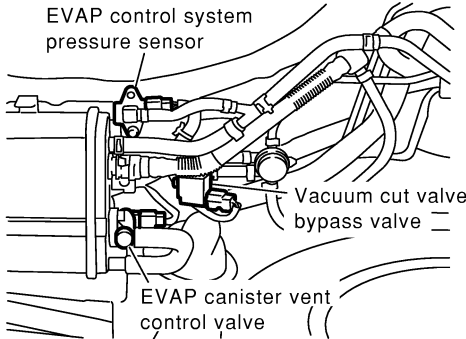
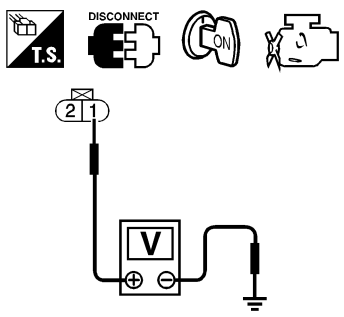
1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and then "ON". 2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON/OFF" on CONSULT-II screen. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VC/V BYPASS/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA- B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">A/F SEN1 (B1)</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">X.XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA- B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	X.XX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA- B1	XXX %																					
A/F SEN1 (B1)	XXX V																					
THRTL POS SEN	X.XX V																					
<p>4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.</p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

SEF564Z

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect vacuum cut valve bypass valve harness connector.</p>	
	
<p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p>	
 <p style="text-align: center;">Voltage: Battery voltage</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

SEF403Z

SEF356X

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between vacuum cut valve bypass valve and fuse 	
▶ Repair harness or connectors.	

5	CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 2 and vacuum cut valve bypass valve terminal 2. Refer to Wiring Diagram.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 7.
NG	▶ GO TO 6.

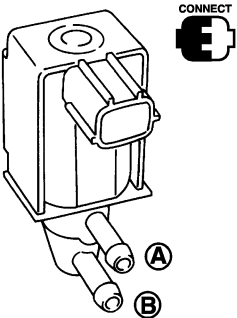
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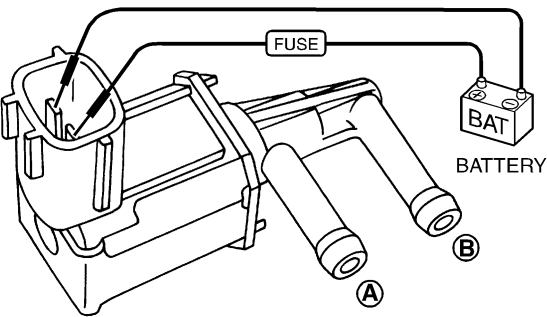
DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT)

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Harness for open or short between vacuum cut valve bypass valve and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK VACUUM CUT VALVE BYPASS VALVE																										
(E) With CONSULT-II <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time under the following conditions. 																											
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  </div> <div style="flex: 1;"> <table border="1" style="margin-left: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>VC/V BYPASS/V</td> <td>OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>A/F SEN1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X.XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="flex: 1; margin-left: 20px;"> <table border="1" style="width: 100%;"> <thead> <tr> <th>Condition VC/V BYPASS/V</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">ON</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">OFF</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 10px;">Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	X.XX V							Condition VC/V BYPASS/V	Air passage continuity between A and B	ON	Yes	OFF	No
ACTIVE TEST																											
VC/V BYPASS/V	OFF																										
MONITOR																											
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A/F SEN1 (B1)	XXX V																										
THRTL POS SEN	X.XX V																										
Condition VC/V BYPASS/V	Air passage continuity between A and B																										
ON	Yes																										
OFF	No																										
SEF565Z																											

(X) Without CONSULT-II <p>Check air passage continuity and operation delay time under the following conditions.</p>							
<div style="display: flex; align-items: flex-start;"> <div style="flex: 1;">  </div> <div style="flex: 1; margin-left: 20px;"> <table border="1" style="width: 100%;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table> <p style="text-align: center; margin-top: 10px;">Operation takes less than 1 second.</p> </div> </div>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
SEF358X							
OK or NG							

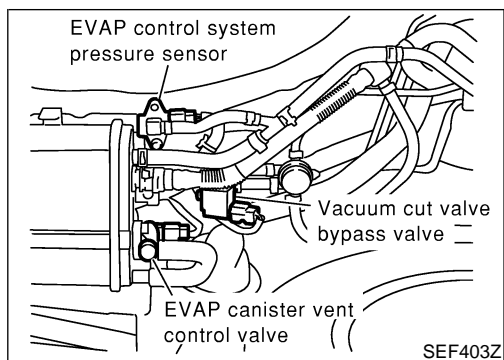
OK	▶	GO TO 8.
NG	▶	Replace vacuum cut valve bypass valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Description



Description

COMPONENT DESCRIPTION

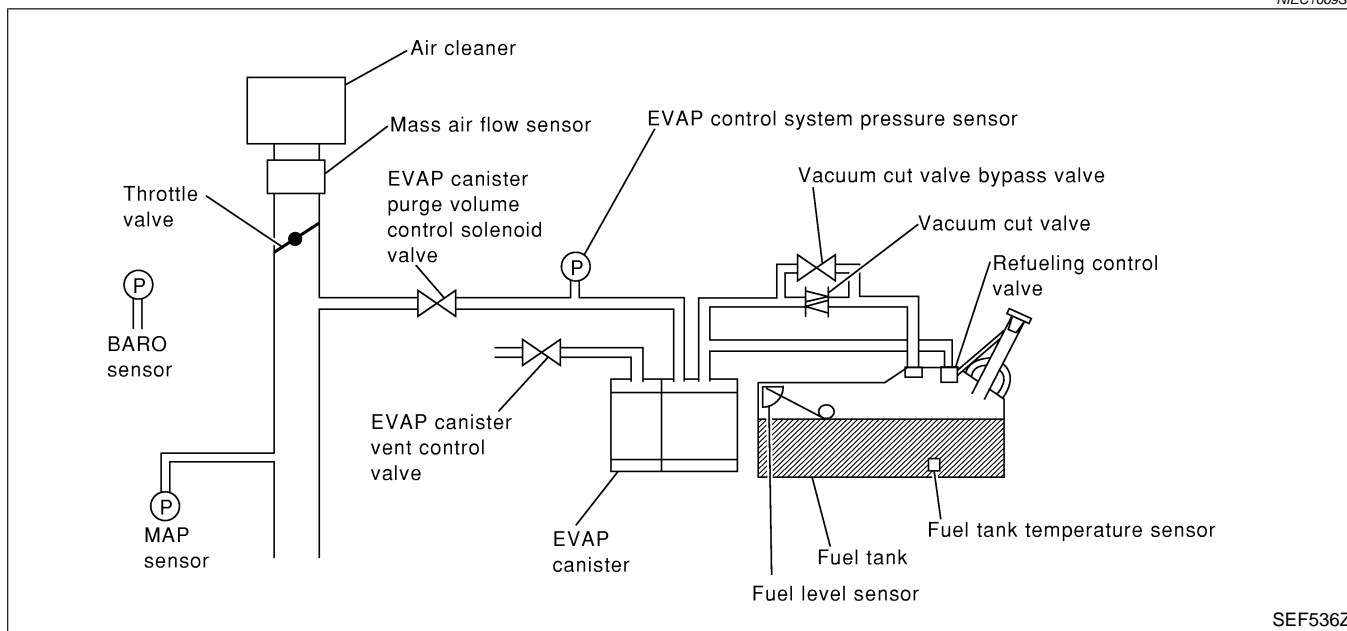
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

Malfunction is detected when vacuum cut valve bypass valve does not operate properly.

GI
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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Possible Cause

Possible Cause

NIEC1672

- Vacuum cut valve bypass valve
- Vacuum cut valve
- Bypass hoses for clogging
- EVAP control system pressure sensor and circuit
- EVAP canister vent control valve
- Hose between fuel tank and vacuum cut valve clogged
- Hose between vacuum cut valve and EVAP canister clogged
- EVAP canister
- EVAP purge port of fuel tank for clogging

7	VC CUT/V BP/V P1491	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	VHCL SPEED SE	XXX km/h

SEF748Y

DTC Confirmation Procedure

NIEC1673

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

For best results, perform test at a temperature of 0°C (32°F) or higher.

7	VC CUT/V BP/V P1491	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	B/FUEL SCHDL	XXX msec
	VHCL SPEED SE	XXX km/h

SEF749Y

WITH CONSULT-II

NIEC1673S01

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 30 seconds.)

7	VC CUT/V BP/V P1491	
	COMPLETED	

SEF239Y

ENG SPEED	1,000 - 3,800 rpm
Selector lever	Suitable position
Vehicle speed	36 - 120 km/h (22 - 75 MPH)
B/FUEL SCHDL	1.0 - 8.2 msec

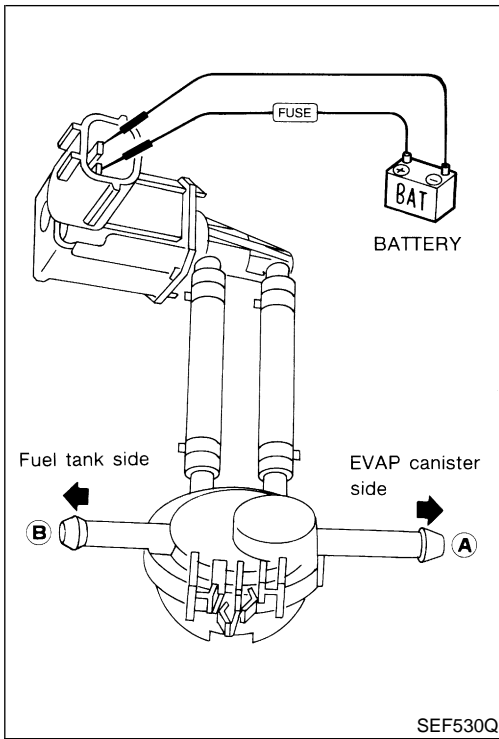
If "TESTING" is not displayed after 5 minutes, retry from step 3.

- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1309.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

WITH GST

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 2) Apply vacuum to port **A** and check that there is no suction from port **B**.
- 3) Apply vacuum to port **B** and check that there is suction from port **A**.
- 4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
- 5) Supply battery voltage to the terminal.
- 6) Blow air in port **A** and check that air flows freely out of port **B**.
- 7) Blow air in port **B** and check that air flows freely out of port **A**.
- 8) If NG, go to "Diagnostic Procedure", EC-1309.

GI

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

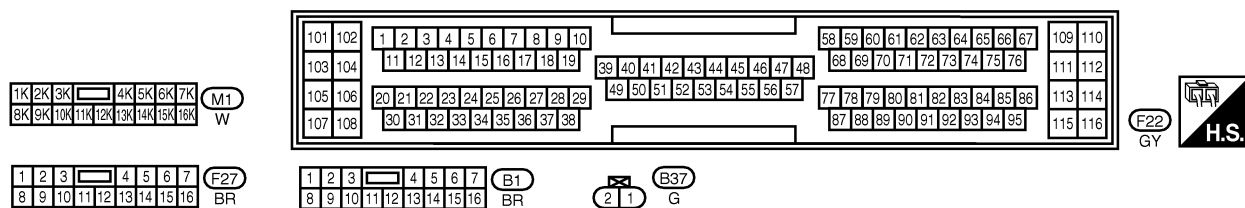
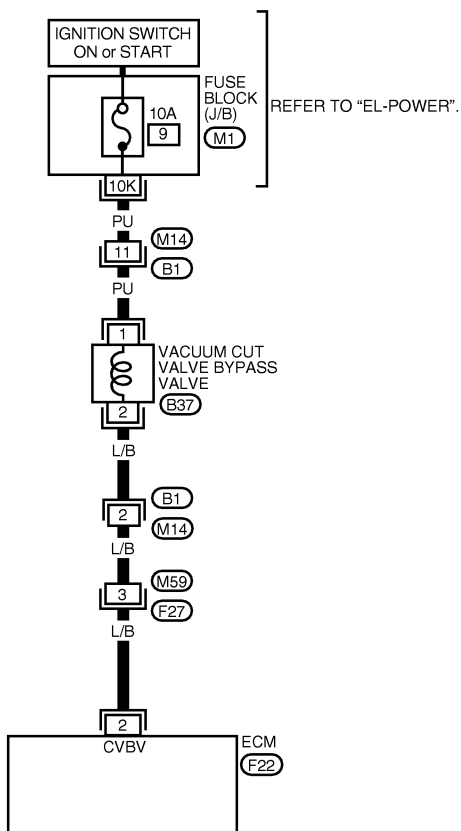
Wiring Diagram

Wiring Diagram

NIEC1675

EC-BYPS/V-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



LEC211

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
2	L/B	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF585Y

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

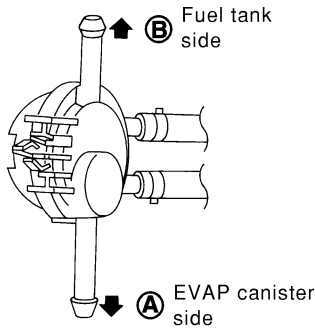
QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1676

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION																					
<p>With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Turn ignition switch "ON". 7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON". 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 																						
																						
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VC/V BYPASS/V</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <td colspan="2" style="text-align: center;">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA- B1</td> <td>XXX %</td> </tr> <tr> <td>A/F SEN1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>X.XX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA- B1	XXX %	A/F SEN1 (B1)	XXX V	THRTL POS SEN	X.XX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA- B1	XXX %																					
A/F SEN1 (B1)	XXX V																					
THRTL POS SEN	X.XX V																					
OK or NG																						
OK	▶	GO TO 4.																				
NG	▶	GO TO 5.																				

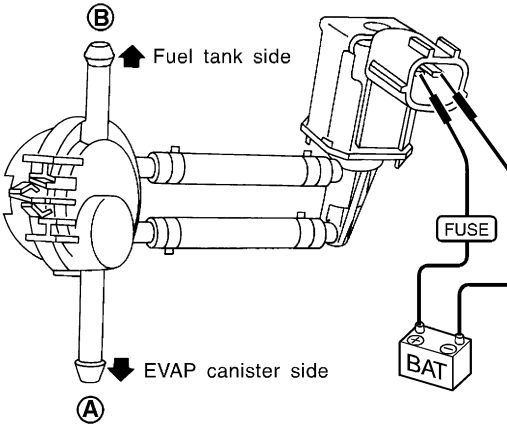
SEF566Z

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 RS
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 IDX

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Disconnect vacuum cut valve bypass valve harness connector. 7. Supply battery voltage to the terminal. 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 		
		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 7.

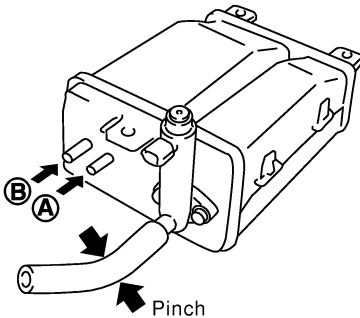
SEF914U

4	CHECK EVAP PURGE LINE	
Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair it.

5	CHECK EVAP PURGE PORT	
Check EVAP purge port of fuel tank for clogging.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Clean EVAP purge port.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

6	CHECK EVAP CANISTER	
<p>1. Pinch the fresh air hose. 2. Blow air into port A and check that it flows freely out of port B.</p>		
		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister.

7	CHECK BYPASS HOSE	
Check bypass hoses for clogging.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace hoses.

GI

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

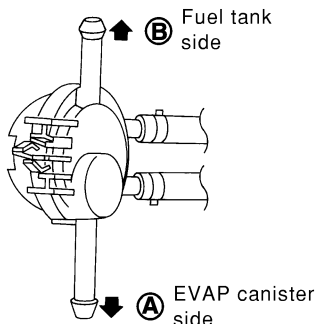
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

8 CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.

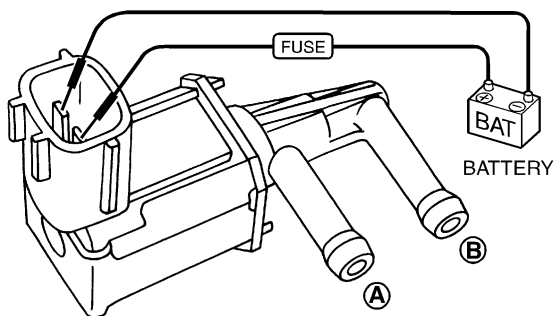


ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA- B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	X.XX V

SEF566Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

Operation takes less than 1 second.

SEF358X

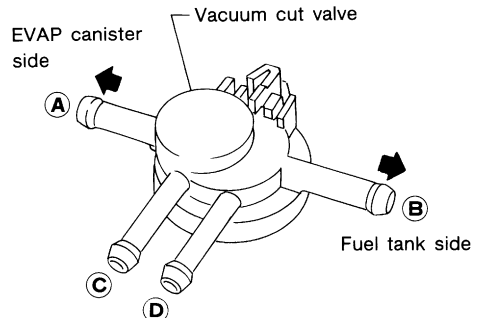
OK or NG

OK ▶ GO TO 9.

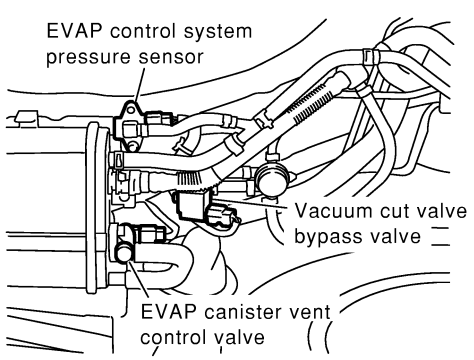
NG ▶ Replace vacuum cut valve bypass valve.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

9	CHECK VACUUM CUT VALVE	<p>Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div> <ol style="list-style-type: none"> a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 10.	NG	▶	Replace vacuum cut valve.	GI MA EM LC EC FE CL MT AT
OK	▶	GO TO 10.							
NG	▶	Replace vacuum cut valve.							

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 11.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair or replace.</td> </tr> </table>	OK	▶	GO TO 11.	NG	▶	Repair or replace.	AX SU BR
OK	▶	GO TO 11.							
NG	▶	Repair or replace.							

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	<ol style="list-style-type: none"> 1. Disconnect EVAP control system pressure sensor harness connector. <div style="text-align: center;">  </div> <ol style="list-style-type: none"> 2. Check connectors for water. Water should not exist. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 12.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace EVAP control system pressure sensor.</td> </tr> </table>	OK	▶	GO TO 12.	NG	▶	Replace EVAP control system pressure sensor.	ST RS BT HA SC EL IDX
OK	▶	GO TO 12.							
NG	▶	Replace EVAP control system pressure sensor.							

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

12	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 89 and ground.</p>	
SEF543Z	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard and EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 13.
NG	▶ Replace EVAP control system pressure sensor.

13	CHECK RUBBER TUBE FOR CLOGGING
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 14.
NG	▶ Clean the rubber tube using an air blower.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

14 CHECK EVAP CANISTER VENT CONTROL VALVE-I

- Remove EVAP canister vent control valve from EVAP canister.
- Check portion **B** of EVAP canister vent control valve for being rusted.

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

OK or NG

OK	▶	GO TO 15.
NG	▶	Replace EVAP canister vent control valve.

GI
MA
EM
LC
EC

15 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

- Reconnect harness disconnected connectors.
- Turn ignition switch ON.
- Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
- Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
A/F SEN1 (B1)	XXX V
THRTL POS SEN	XXX V

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 17.
NG	▶	GO TO 16.

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DTC P1491 VACUUM CUT VALVE BYPASS VALVE

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

System Description

NIEC1677

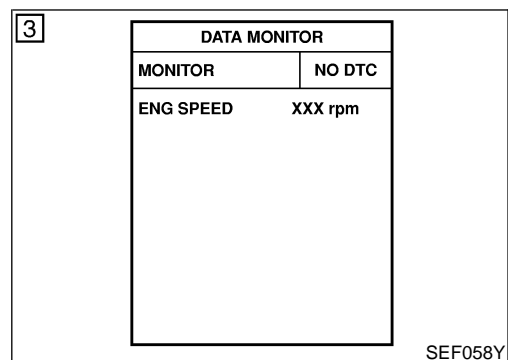
The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from TCM (Transmission Control Module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM (Transmission Control Module) but also ECM after the A/T related repair.

On Board Diagnosis Logic

NIEC1678

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1605	<ul style="list-style-type: none"> ● An incorrect signal from TCM (Transmission Control Module) is sent to ECM. 	<ul style="list-style-type: none"> ● Harness or connectors [The communication line circuit between ECM and TCM (Transmission Control Module) is open or shorted.] ● Dead (Weak) battery ● TCM (Transmission Control Module)

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DTC Confirmation Procedure

NIEC1679

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery is more than 10.5V with the ignition switch "ON".

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1319.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

DTC P1605 A/T DIAGNOSIS COMMUNICATION LINE

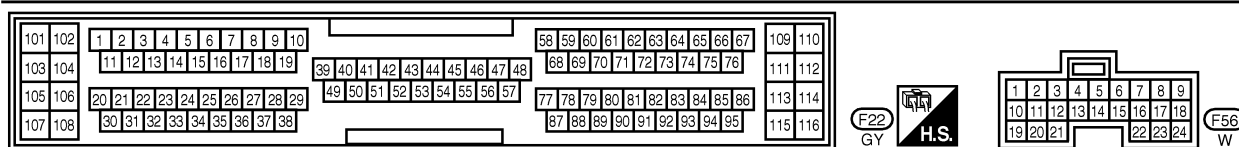
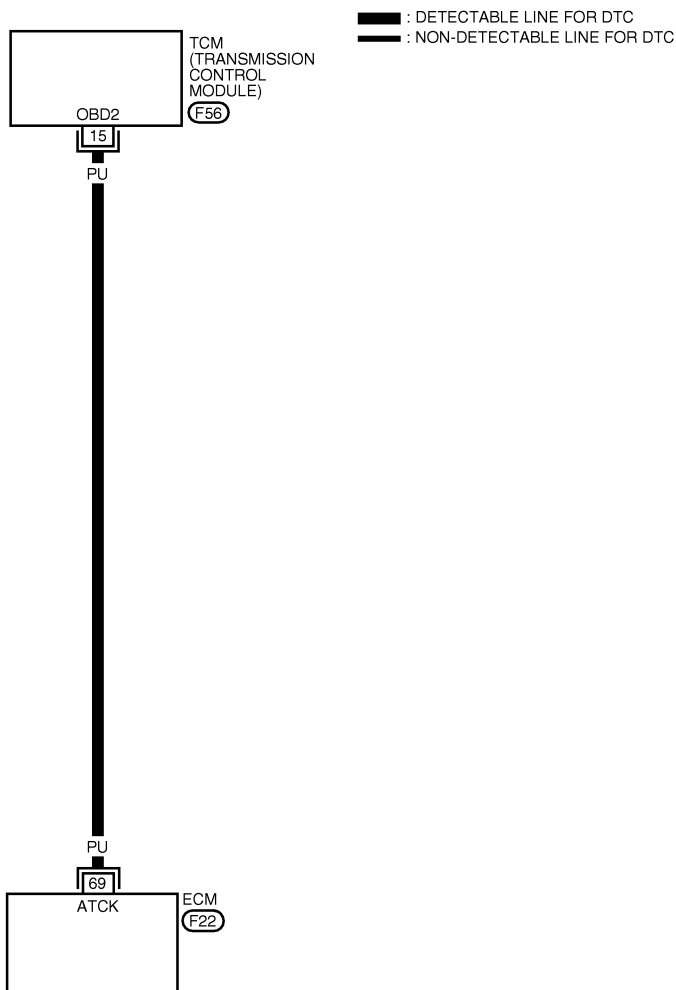
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1680

EC-ATDIAG-01



WEC404

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

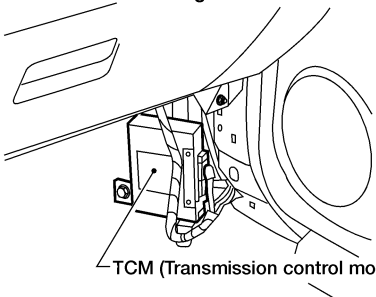
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
69	PU	A/T CHECK SIGNAL	IGN ON	0 - APPROX. 5V

SEF586YA

Diagnostic Procedure

NIEC1681

1	CHECK INPUT SIGNAL CIRCUIT	
	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and TCM harness connector.</p> <p style="text-align: center;">View with dash side lower garnish RH removed</p> <div style="text-align: center;">  <p>TCM (Transmission control module)</p> </div> <p style="text-align: right; font-size: small;">LEC306</p> <p>3. Check harness continuity between ECM terminal 69 and TCM terminal 15. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 2.
	NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

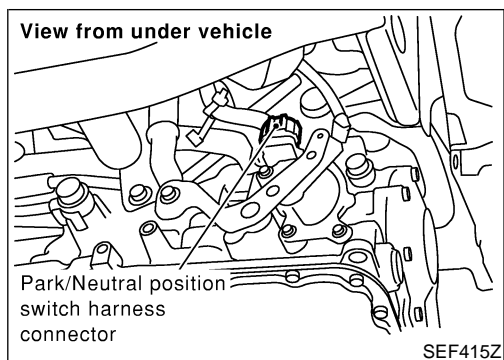
2	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶	INSPECTION END

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DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (CALIF CA)

Component Description



Component Description

When the gear position is “P” or “N”, park/neutral position (PNP) switch is “ON”. ^{NIEC1682}

ECM detects the park/neutral position when continuity with ground exists.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1683

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: “P” or “N” ON
		Except above OFF

On Board Diagnosis Logic

NIEC1684

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1706	● The signal of the PNP switch is not changed in the process of engine starting and driving.	● Harness or connectors (The PNP switch circuit is open or shorted.) ● PNP switch

2

DATA MONITOR	
MONITOR	NO DTC
P/N POSI SW	ON

SEF212Y

DTC Confirmation Procedure

NIEC1685

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch “ON”.
- 2) Select “P/N POSI SW” in “DATA MONITOR” mode with CONSULT-II. Then check the “P/N POSI SW” signal under the following conditions.

Position (Selector lever)	Known good signal
“N” and “P” position	ON
Except the above position	OFF

If NG, go to “Diagnostic Procedure”, EC-1323.

If OK, go to following step.

- 3) Select “DATA MONITOR” mode with CONSULT-II.

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

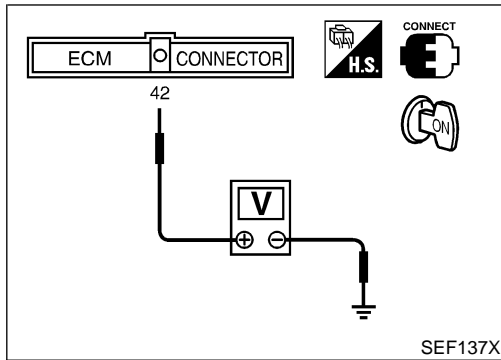
QG18DE (CALIF CA)

DTC Confirmation Procedure (Cont'd)

- 4) Start engine and warm it up to normal operating temperature.
- 5) Maintain the following conditions for at least 50 consecutive seconds.

ENG SPEED	1,600 - 3,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	3.0 - 12.5 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1323.



Overall Function Check

Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Check voltage between ECM terminal 42 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage (V) (Known-good data)
"P" (A/T only) and "N" position	Approx. 0
Except the above position	BATTERY VOLTAGE (11 - 14V)

- 3) If NG, go to "Diagnostic Procedure", EC-1323.

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DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

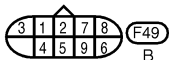
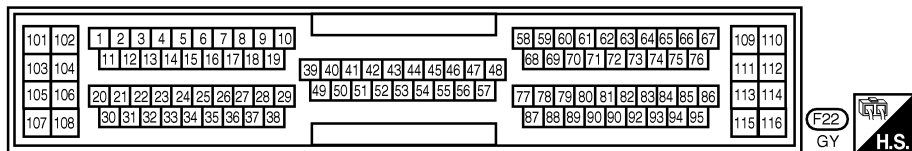
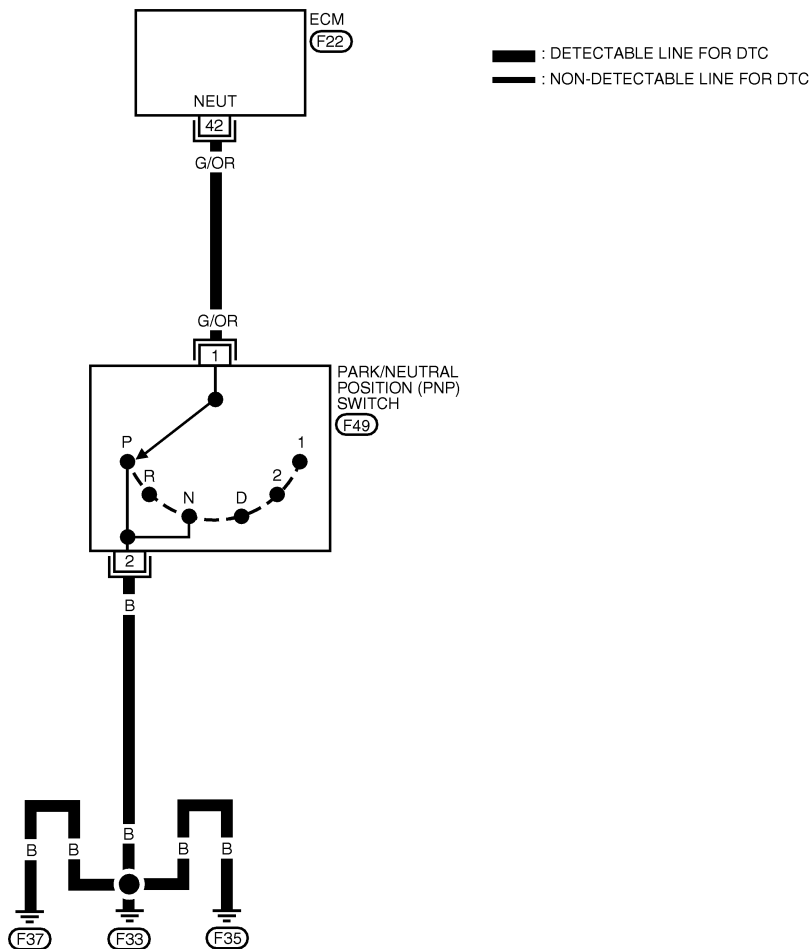
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1687

EC-PNP/SW-01



WEC409

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	G/OR	PARK/NEUTRAL POSITION (PNP) SWITCH	IGN ON WITH GEAR POSITION "N" OR "P"	APPROX. 0V
			IGN ON WITHOUT THE ABOVE GEAR POSITION	BATTERY VOLTAGE

SEF587Y

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

NIEC1688

1	CHECK GROUND CIRCUIT	
	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect PNP switch harness connector.</p> <p>3. Check harness continuity between PNP switch terminal 2 and body ground. Refer to Wiring Diagram. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 2.
	NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

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2	CHECK INPUT SIGNAL CIRCUIT	
	<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1. Refer to Wiring Diagram. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 3.
	NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

EC
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3	CHECK PNP SWITCH	
	<p>Refer to AT-114, "Component Inspection".</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 4.
	NG	▶ Replace PNP switch.

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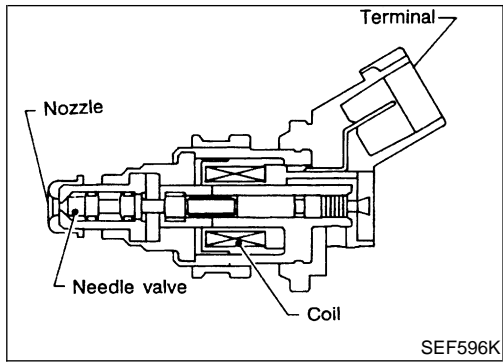
4	CHECK INTERMITTENT INCIDENT	
	<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.</p>	
	▶	INSPECTION END

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INJECTOR

QG18DE (CALIF CA)

Component Description



Component Description

The fuel injector is a small, precise solenoid valve. When the ^{NIEC1689}ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.

CONSULT-II Reference Value in Data Monitor Mode

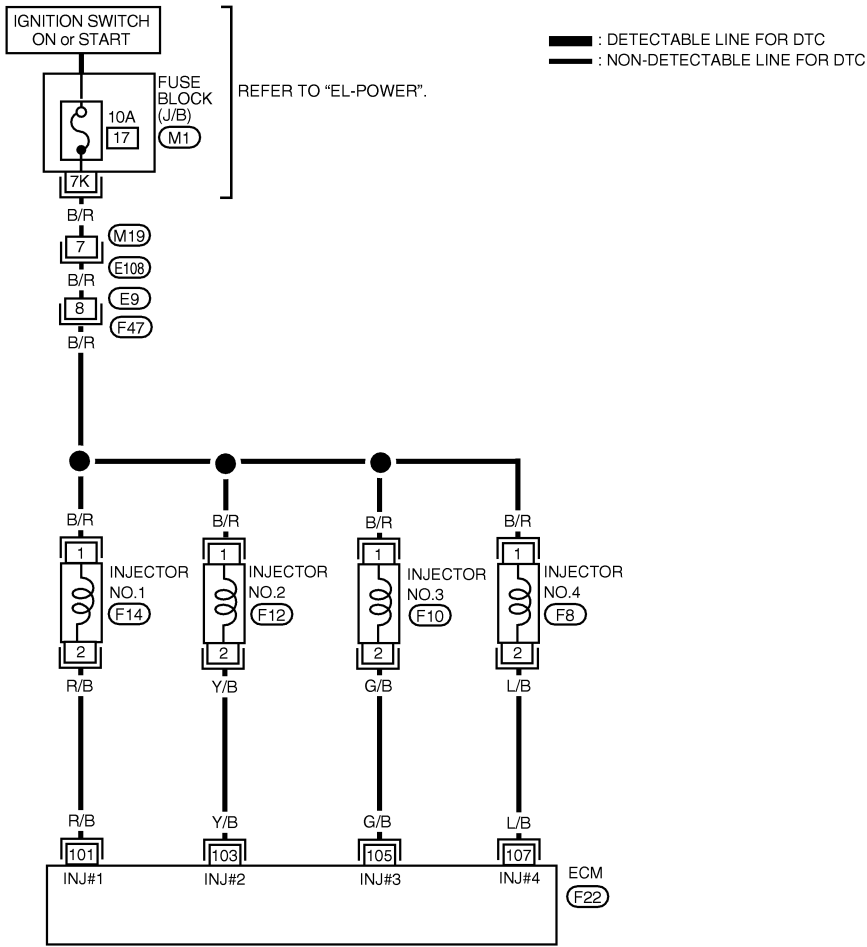
NIEC1690

MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: "N"● No-load	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 2.8 msec
B/FUEL SCHDL	<ul style="list-style-type: none">● Engine: After warming up● Air conditioner switch: OFF● Shift lever: "N"● No-load	Idle	1.0 - 1.6 msec
		2,000 rpm	0.7 - 1.3 msec

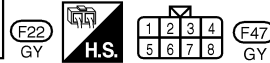
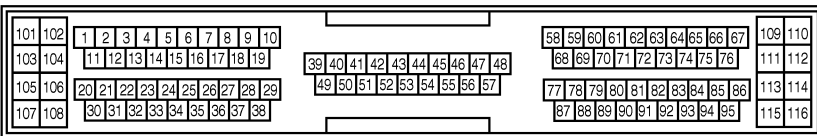
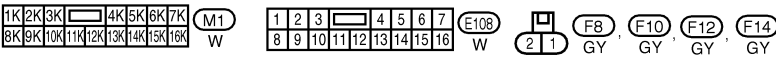
Wiring Diagram

NIEC1691

EC-INJECT-01



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WEC415

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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
101	R/B	INJECTOR NO. 1	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	
103	Y/B	INJECTOR NO. 2		
105	G/B	INJECTOR NO. 3	ENGINE RUNNING AT 2,000 RPM UNDER WARM-UP CONDITION	
107	L/B	INJECTOR NO. 4		

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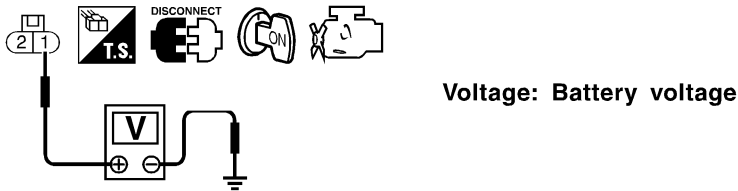
Diagnostic Procedure

NIEC1692

1	CHECK OVERALL FUNCTION																
<p> <input type="checkbox"/> With CONSULT-II 1. Start engine. 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. </p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr><td colspan="2">ACTIVE TEST</td></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><td colspan="2">MONITOR</td></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> <p style="text-align: right;">SEF190Y</p> <p>3. Make sure that each circuit produces a momentary engine speed drop.</p>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
<p> <input checked="" type="checkbox"/> Without CONSULT-II 1. Start engine. 2. Listen to each injector operating sound. </p> <div style="text-align: center;"> </div> <p style="text-align: right;">MEC703B</p> <p style="text-align: center;">Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>																	
OK	▶ INSPECTION END																
NG	▶ GO TO 2.																

INJECTOR

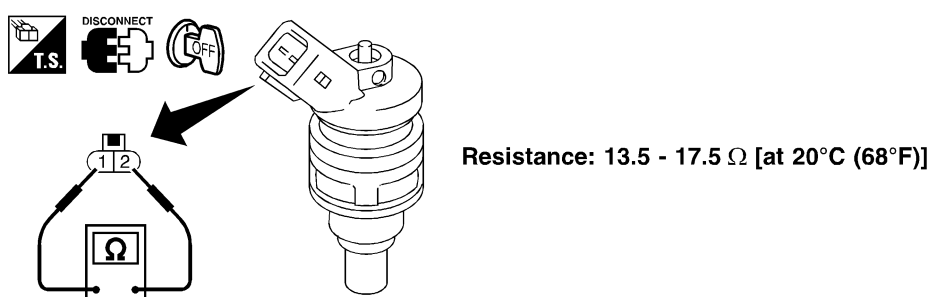
QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

2	CHECK POWER SUPPLY	
<p>1. Stop engine. 2. Disconnect injector harness connector. 3. Turn ignition switch "ON". 4. Check voltage between injector terminal 1 and ground with CONSULT-II or tester.</p>		
 <p style="text-align: right;">Voltage: Battery voltage</p>		
SEF949X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● Harness connectors M19, E108 ● Harness connectors E9, F47 ● Harness for open or short between injector and fuse 		
▶ Repair harness or connectors.		

4	CHECK OUTPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between injector harness connector terminal 2 and ECM terminals 101, 103, 105, 107. Refer to Wiring Diagram. Continuity should exist.</p>		
<p>4. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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5	CHECK INJECTOR	<p>1. Disconnect injector harness connector.</p> <p>2. Check resistance between terminals as shown in the figure.</p> <div style="text-align: center;">  <p style="text-align: right;">Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> </div> <p style="text-align: right;">SEF964XA</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 6.	
NG	▶	Replace injector.	

6	CHECK INTERMITTENT INCIDENT	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶	INSPECTION END	

START SIGNAL

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC1693

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

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START SIGNAL

QG18DE (CALIF CA)

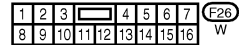
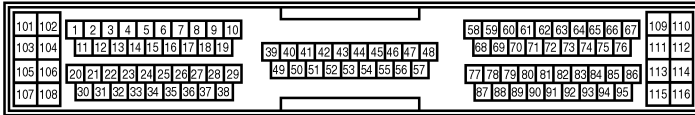
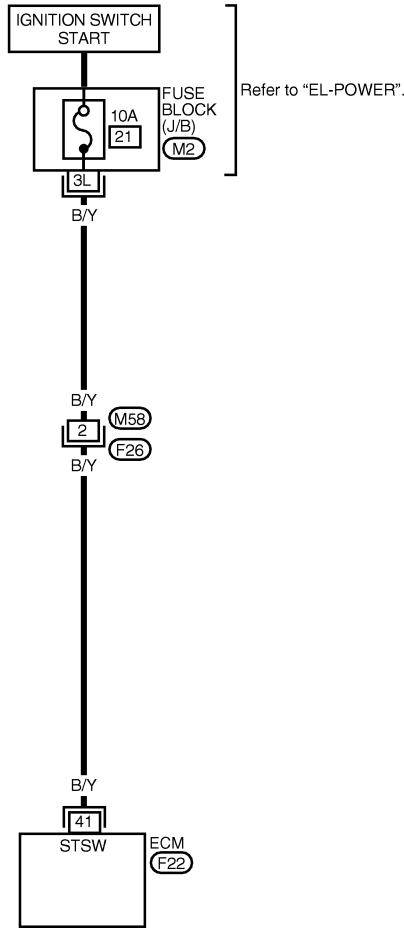
Wiring Diagram

Wiring Diagram

=NIEC1694

EC-S/SIG-01

: Detectable line for DTC
 : Non-detectable line for DTC



LEC212

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
41	B/Y	START SIGNAL	IGN ON IGN START	APPROX. 0V 9 - 14V


SEF589Y

Diagnostic Procedure


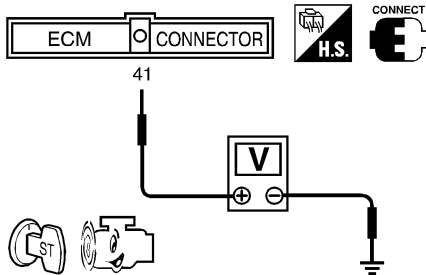
=NIEC1695

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

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2	CHECK OVERALL FUNCTION													
<p> With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>														
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITORING</th> <th>NO FAIL</th> </tr> </thead> <tbody> <tr> <td>START SIGNAL</td> <td>OFF</td> </tr> <tr> <td>CLSD TH/P SW</td> <td>ON</td> </tr> <tr> <td>AIR COND SIG</td> <td>OFF</td> </tr> <tr> <td>P/N POSI SW</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITORING	NO FAIL	START SIGNAL	OFF	CLSD TH/P SW	ON	AIR COND SIG	OFF	P/N POSI SW	ON
DATA MONITOR														
MONITORING	NO FAIL													
START SIGNAL	OFF													
CLSD TH/P SW	ON													
AIR COND SIG	OFF													
P/N POSI SW	ON													
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>"START SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON"</td> <td>OFF</td> </tr> <tr> <td>Ignition switch "START"</td> <td>ON</td> </tr> </tbody> </table>			Condition	"START SIGNAL"	Ignition switch "ON"	OFF	Ignition switch "START"	ON						
Condition	"START SIGNAL"													
Ignition switch "ON"	OFF													
Ignition switch "START"	ON													
SEF604X														
OK or NG														
OK	▶	INSPECTION END												
NG	▶	GO TO 4.												

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3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch to "START".</p> <p>2. Check voltage between ECM terminal 41 and ground under the following conditions.</p>								
								
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "START"</td> <td>Battery voltage</td> </tr> <tr> <td>Except above</td> <td>Approximately 0V</td> </tr> </tbody> </table>			Condition	Voltage	Ignition switch "START"	Battery voltage	Except above	Approximately 0V
Condition	Voltage							
Ignition switch "START"	Battery voltage							
Except above	Approximately 0V							
SEF529Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

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START SIGNAL

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors M58, F26● 10A fuse● Harness for open or short between ECM and fuse	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.
5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

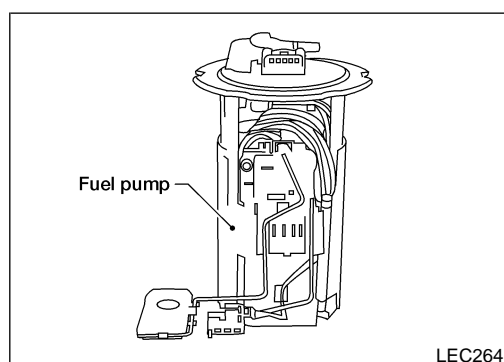
System Description

NIEC1696

Sensor	Input Signal to ECM	ECM function	Actuator
Crankshaft position sensor (POS)	Engine speed	Fuel pump control	Fuel pump relay
Camshaft position sensor (PHASE)	Engine speed and cylinder number		
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops



Component Description

A turbine type design fuel pump is used in the fuel tank.

NIEC1697

CONSULT-II Reference Value in Data Monitor Mode

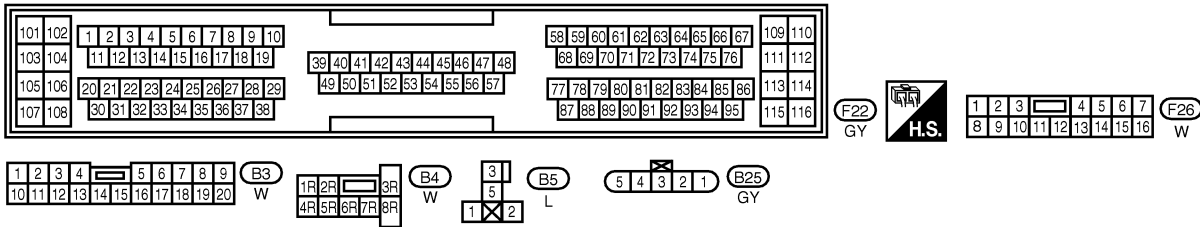
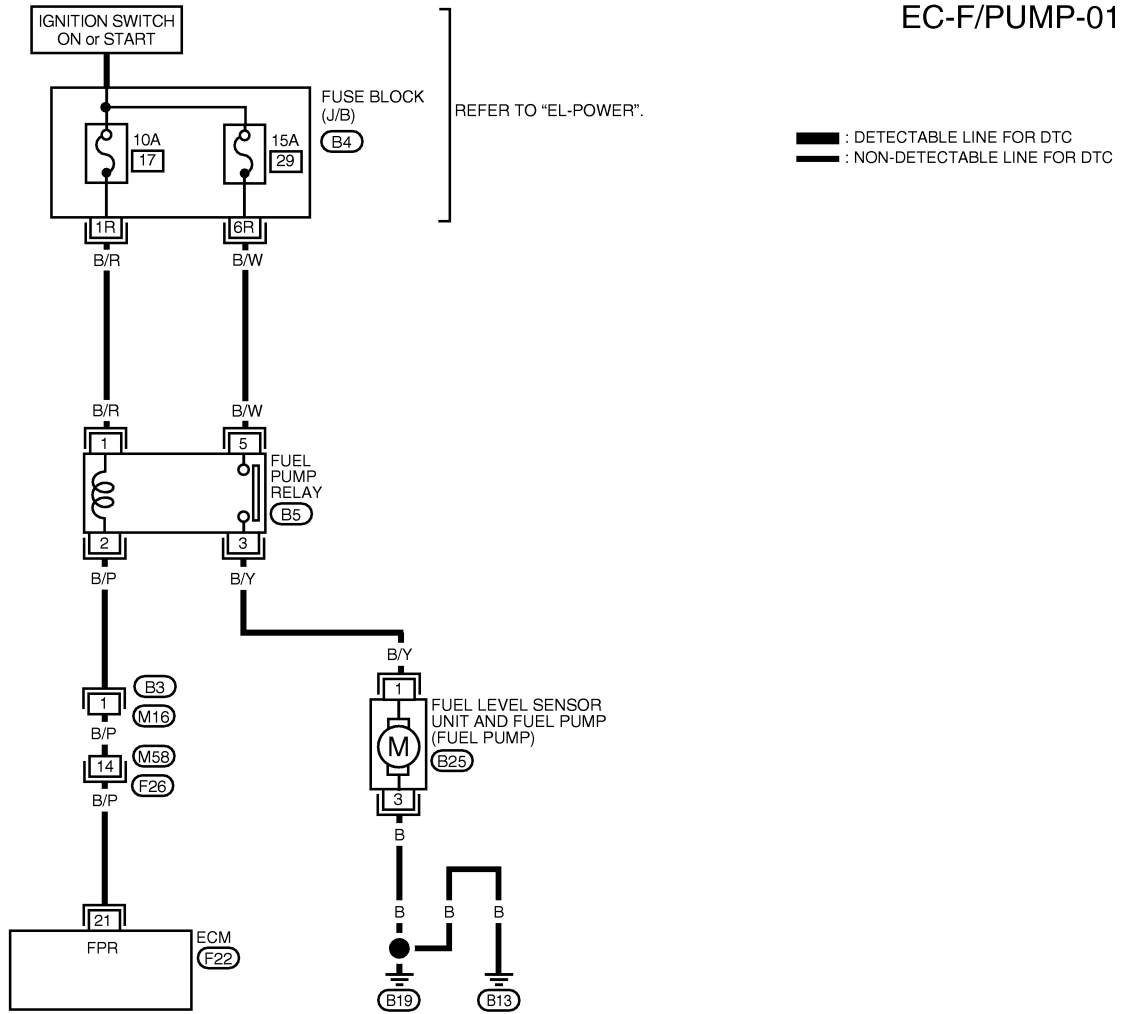
NIEC1698

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> Ignition switch is turned to ON (Operates for 5 seconds) Engine running and cranking When engine is stopped (stops in 1.0 seconds) 	ON
	<ul style="list-style-type: none"> Except as shown above 	OFF

Wiring Diagram

NIEC1699

EC-F/PUMP-01



WEC414

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

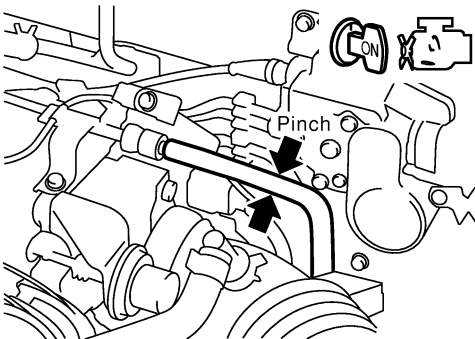
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
21	B/P	FUEL PUMP RELAY	FOR 5 SECONDS AFTER IGN ON	0 - 1V
			ENGINE RUNNING	
			MORE THAN 5 SECONDS AFTER IGN ON	

SEF611Z

Diagnostic Procedure

NIEC1700

1	CHECK OVERALL FUNCTION	
<p>1. Turn ignition switch "ON". 2. Pinch fuel feed hose with fingers.</p>		
		
SEF416Z		
<p>Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

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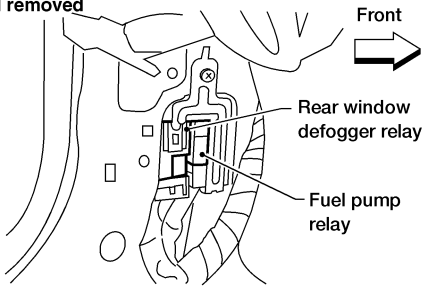
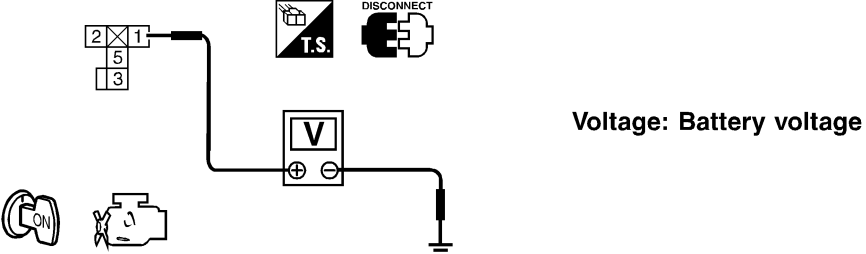
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2	CHECK POWER SUPPLY-I	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay-1.</p>		
<p>View with dash side lower garnish LH removed</p> 		
LEC363		
<p>3. Turn ignition switch "ON". 4. Check voltage between fuel pump relay terminals 1, 5 and ground with CONSULT-II or tester.</p>		
		
SEF530Z		
<p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

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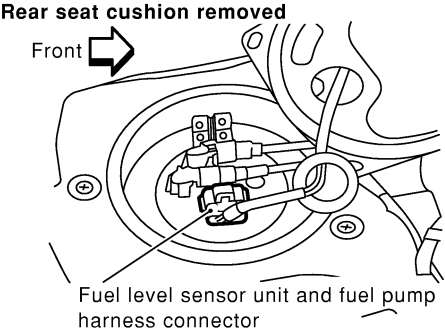
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3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● 10A fuse ● 15A fuse ● Harness for open or short between fuse and fuel pump relay 	
▶	Repair harness or connectors.

4	CHECK POWER GROUND CIRCUIT
1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector.	
 <p style="text-align: center;">Rear seat cushion removed</p> <p style="text-align: center;">Front →</p> <p style="text-align: center;">Fuel level sensor unit and fuel pump harness connector</p>	
SEF396Z	
3. Check harness continuity between fuel level sensor unit and fuel pump terminal 3 and body ground, fuel level sensor unit and fuel pump terminal 1 and fuel pump relay terminal 3. Refer to wiring diagram. Continuity should exist.	
4. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness for open or short between fuel level sensor unit and fuel pump and body ground ● Harness for open or short between fuel level sensor unit and fuel pump and fuel pump relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK OUTPUT SIGNAL CIRCUIT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 21 and fuel pump relay connector terminal 2. Refer to Wiring Diagram. Continuity should exist.	
3. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connector M58, F26 ● Harness for open or short between ECM and fuel pump relay 	
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

FUEL PUMP

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

8	CHECK FUEL PUMP RELAY
Refer to "Component Inspection", EC-1338.	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace fuel pump relay.

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9	CHECK FUEL PUMP
Refer to "Component Inspection", EC-1338.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace fuel pump.

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10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶ INSPECTION END

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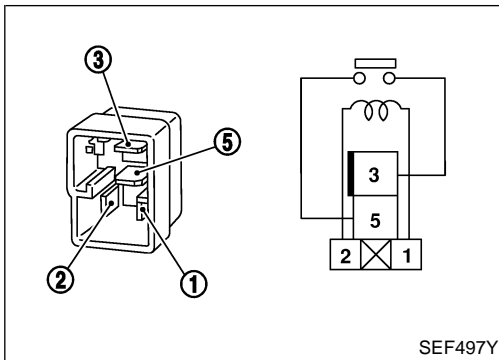
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Component Inspection

=NIEC1701

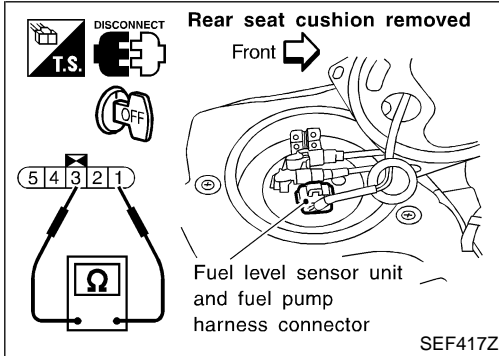
FUEL PUMP RELAY

NIEC1701S01

Check continuity between terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



FUEL PUMP

NIEC1701S02

1. Disconnect fuel pump harness connector.
2. Check resistance between terminals 1 and 2.

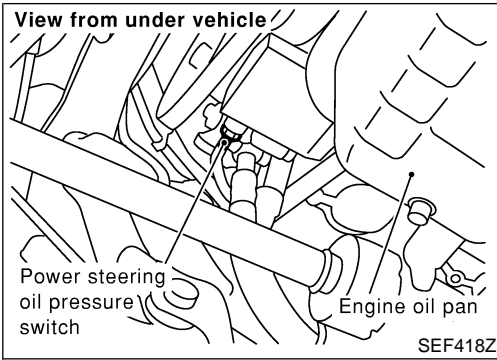
Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]

If NG, replace fuel pump.

POWER STEERING OIL PRESSURE SWITCH

QG18DE (CALIF CA)

Component Description



Component Description

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM adjusts the IACV-AAC valve to increase the idle speed and adjust for the increased load.

NIEC1702

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1703

EC

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	<ul style="list-style-type: none"> Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is fully turned	ON

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POWER STEERING OIL PRESSURE SWITCH

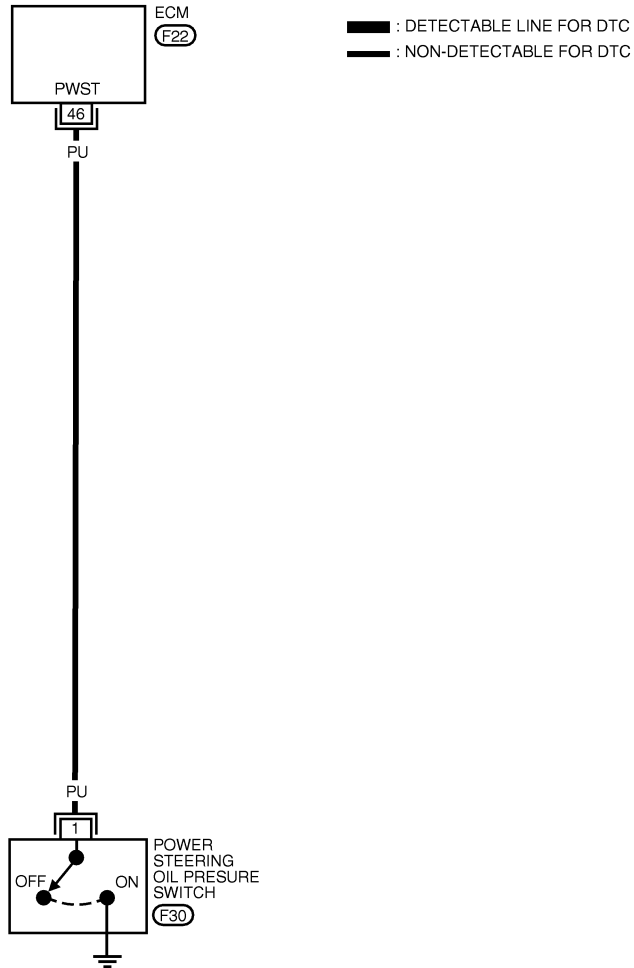
QG18DE (CALIF CA)

Wiring Diagram

Wiring Diagram

NIEC1704

EC-PST/SW-01



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110							
103	104	11	12	13	14	15	16	17	18	19	39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112	
105	106	20	21	22	23	24	25	26	27	28	29	49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114
107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	

F22
GY

H.S.

①

F30

WEC416

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
46	PU	POWER STEERING OIL PRESSURE SWITCH	ENGINE RUNNING WITH STEERING WHEEL BEING FULLY TURNED	APPROX. 0V
			ENGINE RUNNING WITH STEERING WHEEL NOT BEING TURNED	APPROX. 5V

SEF591YA

POWER STEERING OIL PRESSURE SWITCH

QG18DE (CALIF CA)

Diagnostic Procedure

Diagnostic Procedure

=NIEC1705

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION							
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2" style="text-align: center;">DATA MONITOR</th> </tr> <tr> <th style="text-align: center;">MONITOR</th> <th style="text-align: center;">NO DTC</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">PW/ST SIGNAL</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	PW/ST SIGNAL	OFF
DATA MONITOR								
MONITOR	NO DTC							
PW/ST SIGNAL	OFF							
<table border="1" style="margin: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">PW/ST SIGNAL indication</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Steering is in neutral position</td> <td style="text-align: center;">OFF</td> </tr> <tr> <td style="text-align: center;">Steering is turned</td> <td style="text-align: center;">ON</td> </tr> </tbody> </table>			Condition	PW/ST SIGNAL indication	Steering is in neutral position	OFF	Steering is turned	ON
Condition	PW/ST SIGNAL indication							
Steering is in neutral position	OFF							
Steering is turned	ON							
SEF531Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

3	CHECK OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Start engine.</p> <p>2. Check voltage between ECM terminal 46 and ground under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">When steering wheel is turned quickly</td> <td style="text-align: center;">Approximately 0V</td> </tr> <tr> <td style="text-align: center;">Except above</td> <td style="text-align: center;">Approximately 5V</td> </tr> </tbody> </table>			Condition	Voltage	When steering wheel is turned quickly	Approximately 0V	Except above	Approximately 5V
Condition	Voltage							
When steering wheel is turned quickly	Approximately 0V							
Except above	Approximately 5V							
SEF532Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

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POWER STEERING OIL PRESSURE SWITCH

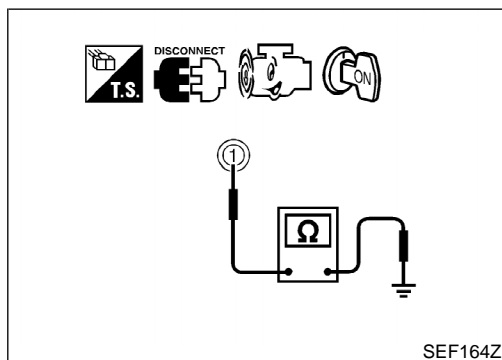
QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

4	CHECK INPUT SIGNAL CIRCUIT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect power steering oil pressure switch harness connector. 3. Disconnect ECM harness connector. 4. Check harness continuity between ECM terminal 46 and terminal 1. Refer to Wiring Diagram. <p style="margin-left: 20px;">Continuity should exist.</p> <ol style="list-style-type: none"> 5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK POWER STEERING OIL PRESSURE SWITCH	
Refer to "Component Inspection", EC-1342.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace power steering oil pressure switch.

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
	▶	INSPECTION END



Component Inspection

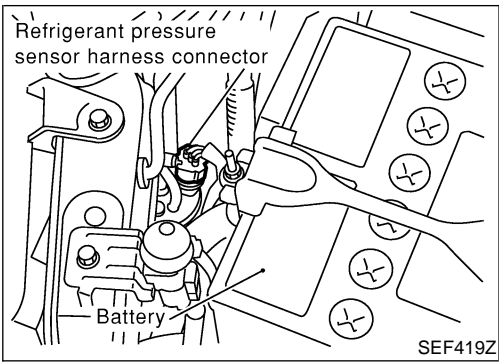
POWER STEERING OIL PRESSURE SWITCH

NIEC1706
NIEC1706S01

1. Turn ignition switch "OFF".
2. Disconnect power steering oil pressure switch harness connector.
3. Start engine and let it idle.
4. Check continuity between terminals 1 and body ground.

Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.



Description

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

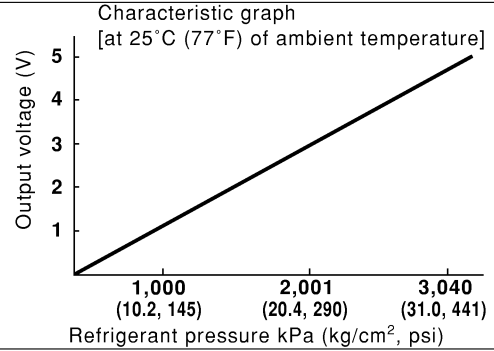
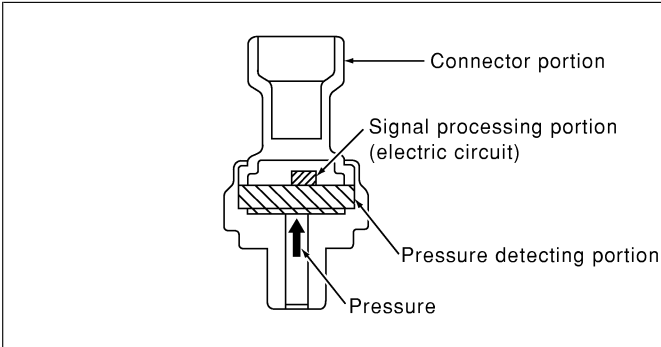
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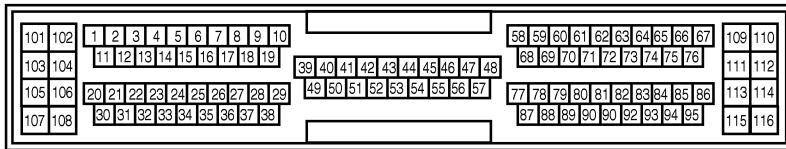
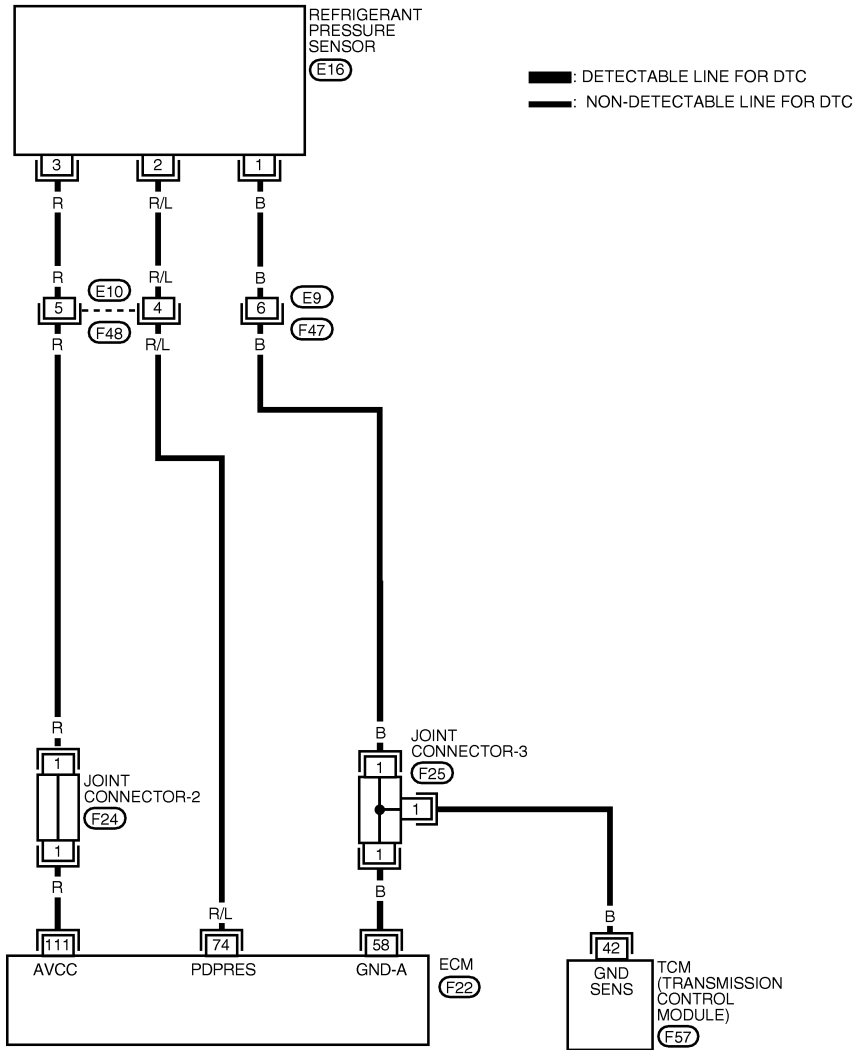
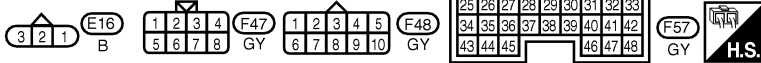
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Wiring Diagram

NIEC1708

EC-RP/SEN-01


 REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR


WEC417

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
74	R/L	REFRIGERANT PRESSURE SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH A/C SWITCH AND BLOWER SWITCH ON	0.36 - 3.88V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF592Y

Diagnostic Procedure

NIEC1709

1	CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION	
<p>1. Start engine and warm it up to normal operating temperature. 2. Turn A/C switch and fan control switch "ON". 3. Check voltage between ECM terminal 74 and ground with CONSULT-II or tester.</p>		
SEF952X		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

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2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn A/C switch and fan control switch "OFF". 2. Stop engine. 3. Disconnect refrigerant pressure sensor harness connector.</p>		
SEF419Z		
<p>4. Turn ignition switch "ON". 5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.</p>		
SEF953X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

REFRIGERANT PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Joint connector-2 ● Harness for open or short between ECM and refrigerant pressure sensor 	
▶	Repair harness or connectors.

4	CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to Wiring Diagram. <b style="color: blue;">Continuity should exist.	
3. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Joint connector-3 ● Harness for open or short between TCM and refrigerant pressure sensor ● Harness for open or short between ECM and refrigerant pressure sensor 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 74 and refrigerant pressure sensor terminal 2. Refer to Wiring Diagram. <b style="color: blue;">Continuity should exist.	
3. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between ECM and refrigerant pressure sensor 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK REFRIGERANT PRESSURE SENSOR
Refer to HA-49 , "Refrigerant pressure sensor".	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace refrigerant pressure sensor.

REFRIGERANT PRESSURE SENSOR

QG18DE (CALIF CA)

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
▶	INSPECTION END

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ELECTRICAL LOAD SIGNAL

QG18DE (CALIF CA)

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

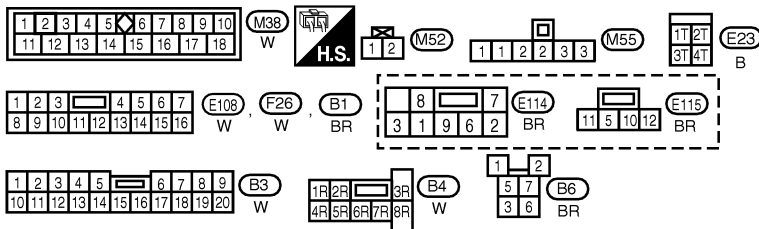
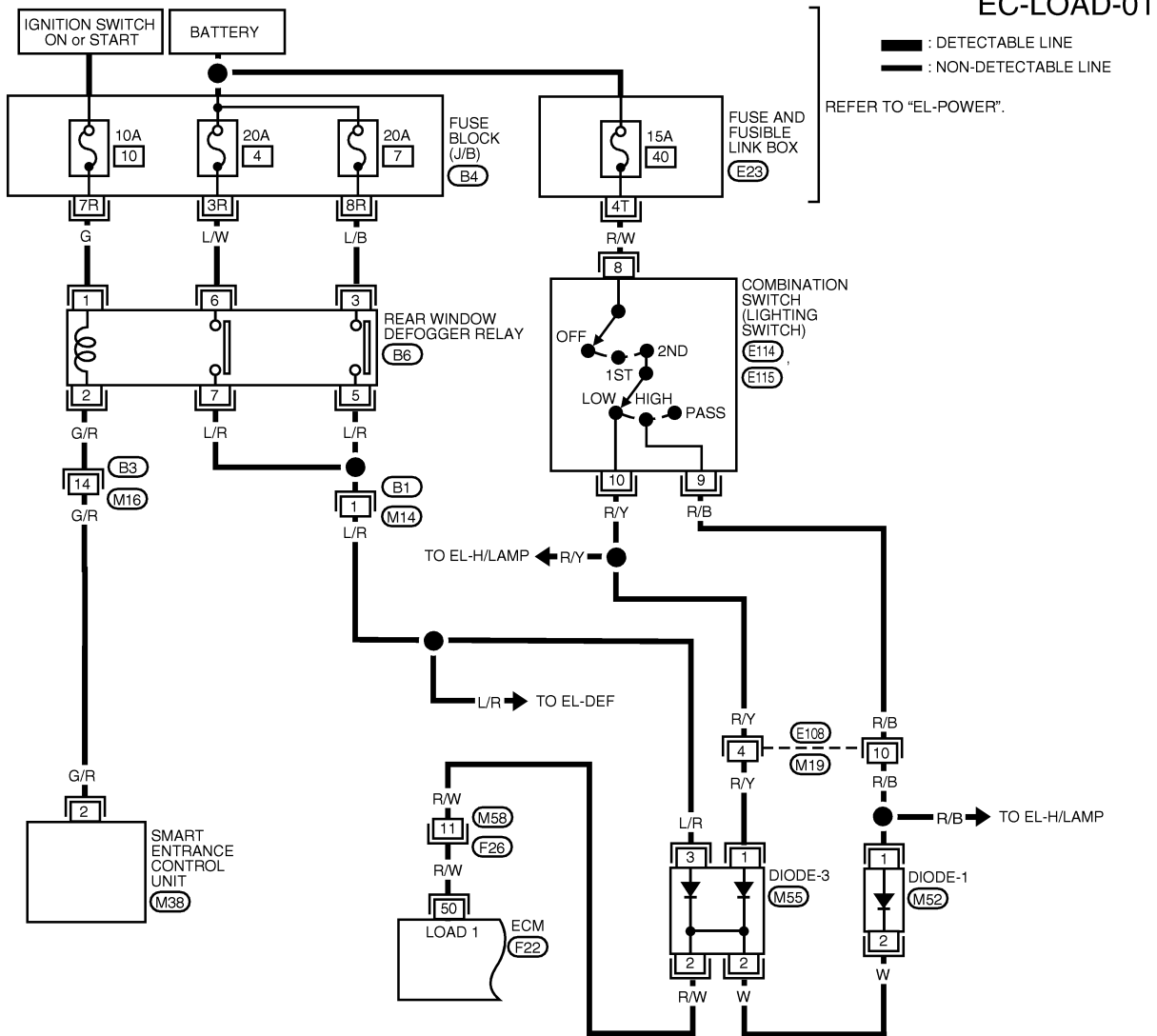
NIEC1710

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch and/or lighting switch "ON"	ON
		Rear window defogger switch and lighting switch "OFF"	OFF

Wiring Diagram

=NIEC1711



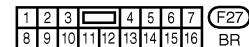
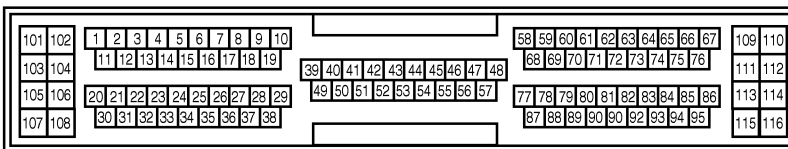
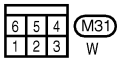
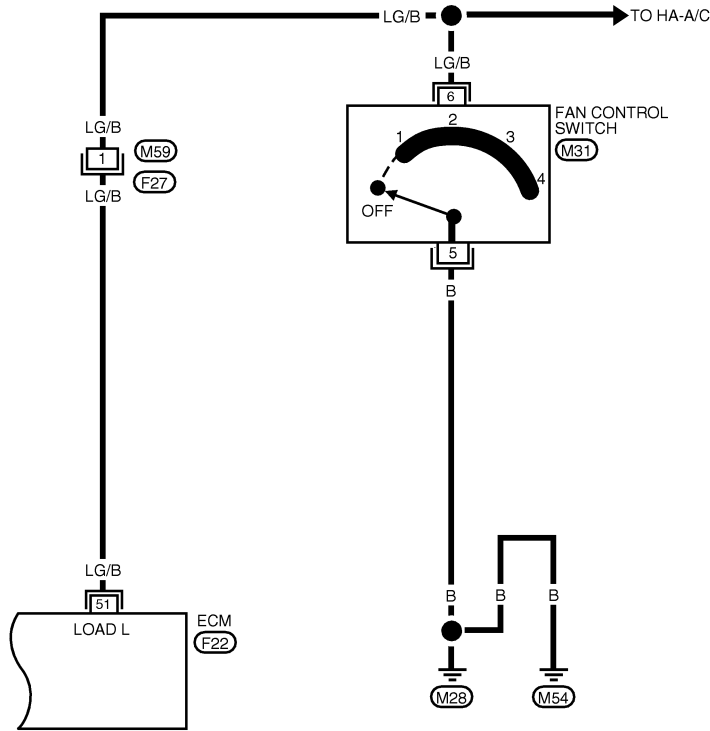
REFER TO THE FOLLOWING.
 (F22) - ELECTRICAL UNITS

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
50	R/W	ELECTRICAL LOAD SIGNAL	IGN ON WITH REAR WINDOW DEFOGGER SWITCH ON OR LIGHTING SWITCH 2ND POSITION	BATTERY VOLTAGE
			IGN ON WITH REAR WINDOW DEFOGGER SWITCH AND LIGHTING SWITCH OFF	0V

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC226

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
51	LG/B	HEATER FAN SWITCH	IGN ON WITH FAN CONTROL SWITCH ON	APPROX. 0V
			IGN ON WITH FAN CONTROL SWITCH OFF	APPROX. 5V

Diagnostic Procedure

NIEC1712

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 5.

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2	CHECK LOAD SIGNAL (REAR WINDOW DEFOGGER) CIRCUIT OVERALL FUNCTION							
<p>With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <tr><th colspan="2">DATA MONITOR</th></tr> <tr><th>MONITOR</th><th>NO DTC</th></tr> <tr><td>LOAD SIGNAL</td><td>ON</td></tr> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tr><th>Conditions</th><th>"LOAD SIGNAL"</th></tr> <tr><td>Rear window defogger switch "ON"</td><td>ON</td></tr> <tr><td>Rear window defogger switch "OFF"</td><td>OFF</td></tr> </table>			Conditions	"LOAD SIGNAL"	Rear window defogger switch "ON"	ON	Rear window defogger switch "OFF"	OFF
Conditions	"LOAD SIGNAL"							
Rear window defogger switch "ON"	ON							
Rear window defogger switch "OFF"	OFF							
SEF602Z								
OK or NG								
OK	▶	GO TO 3.						
NG	▶	GO TO 9.						

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3	CHECK LOAD SIGNAL (HEADLAMP LOW BEAM) CIRCUIT OVERALL FUNCTION							
<p>With CONSULT-II</p> <p>Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <tr><th colspan="2">DATA MONITOR</th></tr> <tr><th>MONITOR</th><th>NO DTC</th></tr> <tr><td>LOAD SIGNAL</td><td>ON</td></tr> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tr><th>Condition</th><th>"LOAD SIGNAL"</th></tr> <tr><td>Lighting switch "2ND" and "LOW" position</td><td>ON</td></tr> <tr><td>Lighting switch "OFF"</td><td>OFF</td></tr> </table>			Condition	"LOAD SIGNAL"	Lighting switch "2ND" and "LOW" position	ON	Lighting switch "OFF"	OFF
Condition	"LOAD SIGNAL"							
Lighting switch "2ND" and "LOW" position	ON							
Lighting switch "OFF"	OFF							
SEF167Z								
OK or NG								
OK	▶	GO TO 4.						
NG	▶	GO TO 13.						

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4	CHECK LOAD SIGNAL (HEADLAMP HIGH BEAM) CIRCUIT OVERALL FUNCTION							
<p> With CONSULT-II Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th style="width: 70%;">MONITOR</th> <th style="width: 30%;">NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td style="text-align: center;">ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Condition</th> <th style="width: 30%;">"LOAD SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "2ND" and "HIGH" position</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Condition	"LOAD SIGNAL"	Lighting switch "2ND" and "HIGH" position	ON	Lighting switch "OFF"	OFF
Condition	"LOAD SIGNAL"							
Lighting switch "2ND" and "HIGH" position	ON							
Lighting switch "OFF"	OFF							
SEF168Z								
OK or NG								
OK	▶	GO TO 8.						
NG	▶	GO TO 17.						

5	CHECK LOAD SIGNAL (REAR WINDOW DEFOGGER) CIRCUIT OVERALL FUNCTION							
<p> Without CONSULT-II 1. Turn ignition switch "ON". 2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Condition</th> <th style="width: 30%;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td style="text-align: center;">BATTERY VOLTAGE</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td style="text-align: center;">0V</td> </tr> </tbody> </table>			Condition	Voltage	Rear window defogger switch "ON"	BATTERY VOLTAGE	Rear window defogger switch "OFF"	0V
Condition	Voltage							
Rear window defogger switch "ON"	BATTERY VOLTAGE							
Rear window defogger switch "OFF"	0V							
SEF956X								
OK or NG								
OK	▶	GO TO 6.						
NG	▶	GO TO 9.						

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6 CHECK LOAD SIGNAL (HEADLAMP LOW BEAM) CIRCUIT OVERALL FUNCTION

⊗ Without CONSULT-II
Check voltage between ECM terminal 50 and ground under the following conditions.

Condition	Voltage
Lighting switch "2ND" and "LOW" position	BATTERY VOLTAGE
Lighting switch "OFF"	0V

SEF183Z

OK or NG

OK	▶	GO TO 7.
NG	▶	GO TO 13.

7 CHECK LOAD SIGNAL (HEADLAMP HIGH BEAM) CIRCUIT OVERALL FUNCTION

⊗ Without CONSULT-II
Check voltage between ECM terminal 50 and ground under the following conditions.

Condition	Voltage
Lighting switch "2ND" and "HIGH" position	BATTERY VOLTAGE
Lighting switch "OFF"	0V

SEF184Z

OK or NG

OK	▶	GO TO 8.
NG	▶	GO TO 17.

8 CHECK LOAD SIGNAL (FAN CONTROL SWITCH) CIRCUIT OVERALL FUNCTION

Check voltage between ECM terminal 51 and ground under the following conditions.

Condition	Voltage
Fan control switch "ON"	BATTERY VOLTAGE
Fan control switch "OFF"	0V

SEF166Z

OK or NG

OK	▶	INSPECTION END
NG	▶	GO TO 21.

9	CHECK REAR WINDOW DEFOGGER FUNCTION	
1. Start engine. 2. Turn "ON" the rear window defogger switch. 3. Check the rear windshield. Is the rear windshield heated up? <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 10.
No	▶	Refer to EL-143 , "Rear Window Defogger".

10	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect rear window defogger relay. 4. Check harness continuity between ECM terminal 50 and rear window defogger relay terminals 5 and 7 under the following conditions.								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 10%;">CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Should not exist.</td> </tr> </tbody> </table>	CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
5. Also check harness for short to ground and short to power.								
OK or NG								
OK	▶	GO TO 12.						
NG	▶	GO TO 11.						

SEF560Y

11	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M58, F26 ● Diode M55 ● Harness for open and short between ECM and rear window defogger relay 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

12	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
		▶ INSPECTION END

13	CHECK HEADLAMP LOW BEAM FUNCTION	
1. Start engine. 2. Turn the lighting switch "2ND" and "LOW" position. 3. Check that headlamp low beams are illuminated.		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Refer to EL-35 , "HEADLAMP (FOR USA)".

14	CHECK HEADLAMP INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connectors. 4. Check harness continuity between ECM terminal 50 and lighting switch terminal 10 under the following conditions.</p>								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="width: 20%;">CONDITION</th> <th>CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Should not exist.</td> </tr> </tbody> </table>			CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 16.						
NG	▶	GO TO 15.						

15	DETECT MALFUNCTIONING PART				
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness connectors M19, E108 ● Diode M55 ● Harness for open and short between ECM and lighting switch 					
<table border="1" style="border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>				▶	Repair open circuit or short to ground or short to power in harness or connectors.
	▶	Repair open circuit or short to ground or short to power in harness or connectors.			

16	CHECK INTERMITTENT INCIDENT				
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.					
<table border="1" style="border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>				▶	INSPECTION END
	▶	INSPECTION END			

17	CHECK HEADLAMP HIGH BEAM FUNCTION	
<p>1. Start engine. 2. Turn the lighting switch "2ND" and "HIGH" position. 3. Check that headlamp high beams are illuminated.</p>		
OK or NG		
OK	▶	GO TO 18.
NG	▶	Refer to EL-35 , "HEADLAMP (FOR USA)".

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18	CHECK HEADLAMP HIGH BEAM INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT (FOR USA)							
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connector. 4. Check harness continuity between ECM terminal 50 and lighting switch terminal 9 under the following conditions.</p>								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 10%;">CONDITION</th> <th style="width: 90%;">CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table>	CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
SEF200Z								
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 20.						
NG	▶	GO TO 19.						

19	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness connectors E108, M19 ● Diode-1 M52 ● Diode-3 M55 ● Harness for open and short between ECM and lighting switch 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

20	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.		
		▶ INSPECTION END

21	CHECK FAN CONTROL SWITCH FUNCTION	
<p>1. Start engine. 2. Turn "ON" the fan control switch. 3. Check the blower fan motor. Is the blower fan motor operating?</p> <p style="text-align: center;">Yes or No</p>		
Yes	▶	GO TO 22.
No	▶	Refer to HA-36 , "Trouble Diagnosis Procedure for Blower Motor".

ELECTRICAL LOAD SIGNAL

QG18DE (CALIF CA)
Diagnostic Procedure (Cont'd)

22	CHECK FAN CONTROL SWITCH INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT	
	<p>1. Stop engine.</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Disconnect fan control switch harness connector.</p> <p>4. Check harness continuity between ECM terminal 51 and fan control switch terminal 6. Refer to Wiring Diagram.</p> <p style="color: blue; font-weight: bold;">Continuity should exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
	OK	▶ GO TO 24.
	NG	▶ GO TO 23.

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23	DETECT MALFUNCTIONING PART	
	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M59, F27 ● Harness for open and short between ECM and fan control switch 	
	▶	Repair open circuit or short to ground or short to power in harness or connectors.

EC
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24	CHECK INTERMITTENT INCIDENT	
	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-838.	
	▶	INSPECTION END

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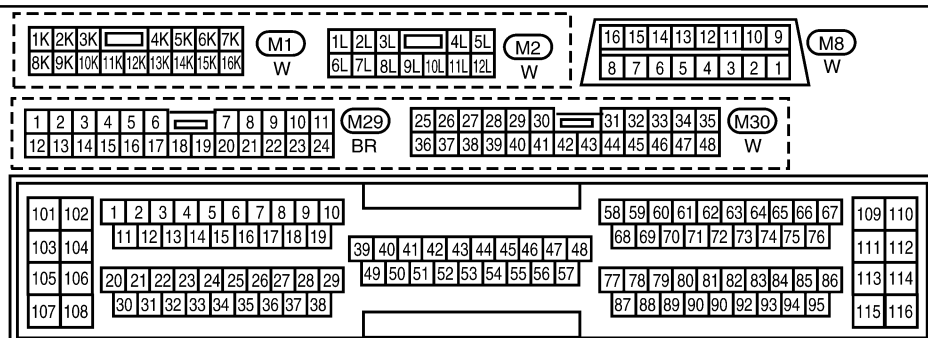
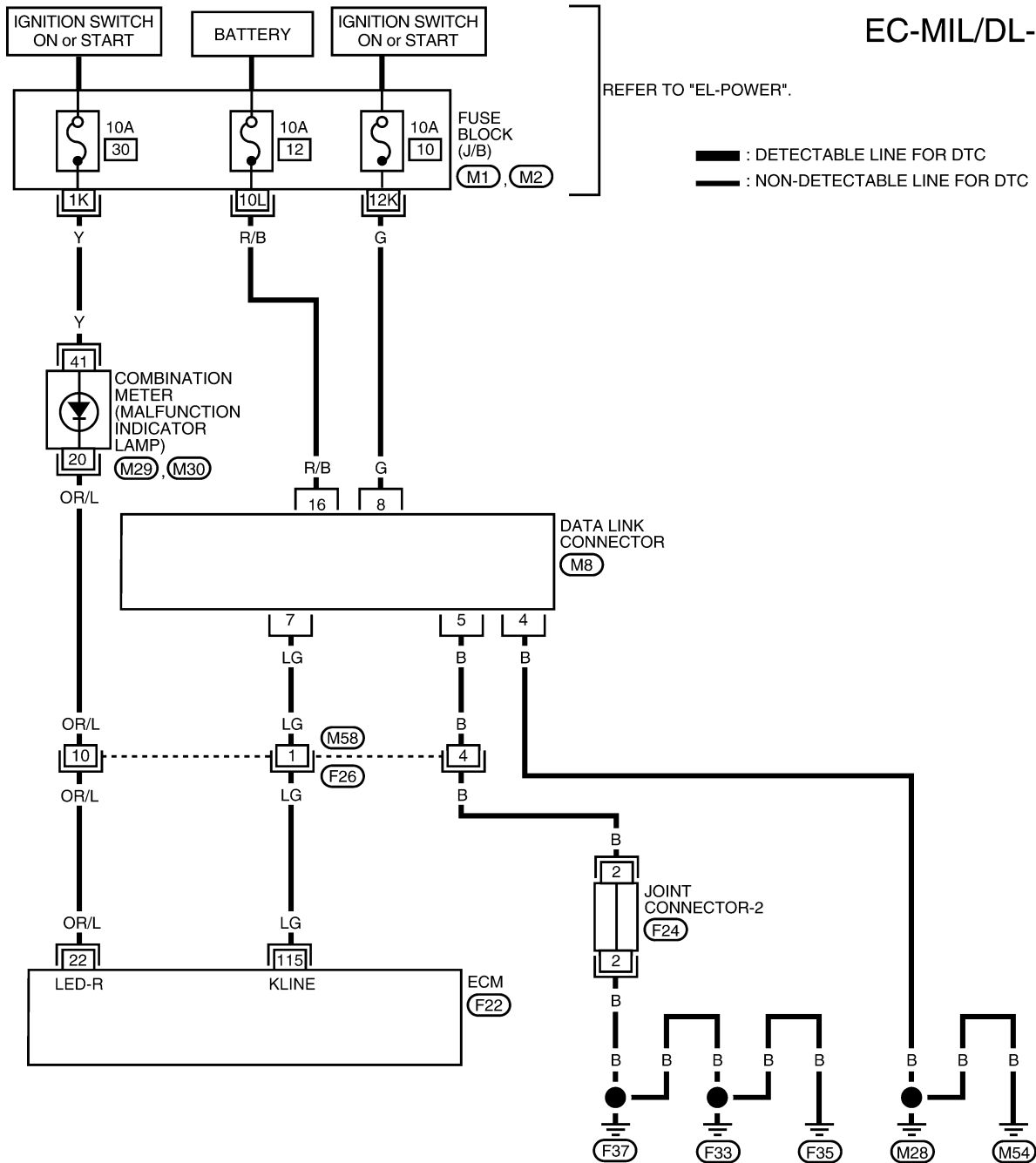
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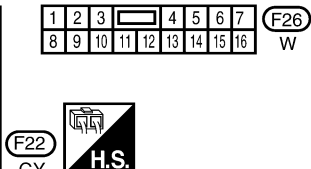
Wiring Diagram

NIEC1713

EC-MIL/DL-01



REFER TO THE FOLLOWING.
(F24) - JOINT CONNECTOR



SERVICE DATA AND SPECIFICATIONS (SDS)

QG18DE (CALIF CA)

Fuel Pressure Regulator

Fuel Pressure Regulator

NIEC1714

Fuel pressure at idling kPa (kg/cm ² , psi)	Approximately 350 (3.57, 51)
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Idle Speed and Ignition Timing

NIEC1715

Target idle speed*1 rpm (Engine is warmed up to normal operating temperature)	No-load*2 (in "P" or "N" position)	800±50
Air conditioner: ON rpm	In "P" or "N" position	850 or more
Ignition timing*1	In "P" or "N" position	9°±5° BTDC
Throttle position sensor idle position V		0.15 - 0.85

*1: Throttle position sensor harness connector connected

*2: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Mass Air Flow Sensor

NIEC1716

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.0 - 1.7*
Mass air flow (Using CONSULT-II or GST) g/m/sec	1.4 - 4.0 at idle* 5.0 - 10.0 at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and idling under no-load.

Engine Coolant Temperature Sensor

NIEC1717

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

EGR Temperature Sensor

NIEC1718

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.62 - 1.05
50 (122)	2.25	0.065 - 0.094
100 (212)	0.59	0.011 - 0.015

Fuel Pump

NIEC1719

Resistance [at 25°C (77°F)] Ω	0.2 - 5.0
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IACV-AAC Valve

NIEC1720

Resistance [at 20°C (68°F)] Ω	Approximately 22
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Injector

NIEC1721

Resistance [at 20°C (68°F)] Ω	13.5 - 17.5
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Resistor

NIEC1722

Resistance [at 25°C (77°F)] Ω	4 - 8
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SERVICE DATA AND SPECIFICATIONS (SDS)

QG18DE (CALIF CA)

Throttle Position Sensor

Throttle Position Sensor

NIEC1723

Throttle valve conditions	Voltage (at normal operating temperature, engine off, ignition switch ON, throttle opener disengaged)
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

Air Fuel Ratio (A/F) Sensor 1 Heater

NIEC1724

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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Calculated Load Value

NIEC1725

	Calculated load value % (Using CONSULT-II or GST)
At idle	20.0 - 35.5
At 2,500 rpm	17.0 - 30.0

Intake Air Temperature Sensor

NIEC1726

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

EVAP Canister Purge Volume Control Valve

NIEC1727

Resistance [at 20°C (68°F)] Ω	22 - 26
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Heated Oxygen Sensor 2 Heater

NIEC1728

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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Crankshaft Position Sensor (POS)

NIEC1729

Resistance [at 20°C (68°F)] Ω	166 - 204
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Fuel Tank Temperature Sensor

NIEC1730

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

Heated Oxygen Sensor 3 Heater

NIEC1731

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC

Alphabetical & P No. Index for DTC

NIEC0724

NIEC0724S01

ALPHABETICAL INDEX FOR DTC

Items (CONSULT-II screen terms)	DTC*1	Reference page
Unable to access ECM	—	EC-1476
ABSL PRES SEN/CIRC	P0105	EC-1516
AIR TEMP SEN/CIRC	P0110	EC-1518
A/T 1ST GR FNCTN	P0731	AT-130
A/T 2ND GR FNCTN	P0732	AT-137
A/T 3RD GR FNCTN	P0733	AT-143
A/T 4TH GR FNCTN	P0734	AT-149
A/T COMM LINE	P0600*2	EC-1781
A/T DIAG COMM LINE	P1605	EC-1891
A/T TCC S/V FNCTN	P0744	AT-162
ATF TEMP SEN/CIRC	P0710	AT-115
CKP SEN/CIRCUIT	P0335	EC-1667
CKP SENSOR (COG)	P1336	EC-1808
CLOSED LOOP-B1	P1148	EC-1788
CLOSED TP SW/CIRC	P0510	EC-1773
CMP SEN/CIRCUIT	P0340	EC-1672
COOLANT T SEN/CIRC*3	P0115	EC-1524
*COOLAN T SEN/CIRC	P0125	EC-1540
CYL 1 MISFIRE	P0301	EC-1656
CYL 2 MISFIRE	P0302	EC-1656
CYL 3 MISFIRE	P0303	EC-1656
CYL 4 MISFIRE	P0304	EC-1656
ECM	P0605	EC-1784
EGR SYSTEM	P0400	EC-1679
EGR SYSTEM	P1402	EC-1820
EGR TEMP SEN/CIRC	P1401	EC-1813
EGR VOL CONT/V CIR	P0403	EC-1688
ENGINE SPEED SIG	P0725	AT-126
ENG OVER TEMP	P0217	EC-1638
ENG OVER TEMP	P1217*2	EC-1790
EVAP GROSS LEAK	P0455	EC-1739
EVAP PURG FLOW/MON	P1447	EC-1849
EVAP SYS PRES SEN	P0450	EC-1727
EVAP SMALL LEAK	P0440	EC-1699
EVAP SMALL LEAK	P1440	EC-1827

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TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page
FUEL LEVEL SENSOR	P0461	EC-1754
FUEL LEVL SEN/CIRC	P0464	EC-1756
FUEL LEVL SEN/CIRC	P1464	EC-1870
FUEL LEV SEN SLOSH	P0460	EC-1750
FUEL SYS-LEAN/BK1	P0171	EC-1619
FUEL SYS-RICH/BK1	P0172	EC-1626
FUEL TEMP SEN/CIRC	P0180	EC-1633
HO2S1 (B1)	P0130	EC-1545
HO2S1 (B1)	P0131	EC-1552
HO2S1 (B1)	P0132	EC-1558
HO2S1 (B1)	P0133	EC-1564
HO2S1 (B1)	P0134	EC-1573
HO2S1 HTR (B1)	P0135	EC-1579
HO2S2 (B1)	P0137	EC-1584
HO2S2 (B1)	P0138	EC-1592
HO2S2 (B1)	P0139	EC-1600
HO2S2 (B1)	P0140	EC-1608
HO2S2 HTR (B1)	P0141	EC-1614
IACV/AAC VLV/CIRC	P0505	EC-1764
KNOCK SEN/CIRC-B1	P0325*2	EC-1663
L/PRES SOL/CIRC	P0745	AT-173
MAF SEN/CIRCUIT*3	P0100	EC-1507
MULTI CYL MISFIRE	P0300	EC-1656
NATS MALFUNCTION	P1610 - P1615*2	EL-301
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—
O/R CLTCH SOL/CIRC	P1760	AT-194
P-N POS SW/CIRCUIT	P1706	EC-1894
PNP SW/CIRC	P0705	AT-110
PURG VOLUME CONT/V	P0443	EC-1714
PURG VOLUME CONT/V	P1444	EC-1829
SFT SOL A/CIRC*3	P0750	AT-178
SFT SOL B/CIRC*3	P0755	AT-182
TCC SOLENOID/CIRC	P0740	AT-158
THERMOSTAT FNCTN	P1126	EC-1786
TP SEN/CIRC A/T*3	P1705	AT-186
TRTL POS SEN/CIRC*3	P0120	EC-1529
TW CATALYST SYS-B1	P0420	EC-1695

TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	Reference page
VC CUT/V BYPASS/V	P1491	EC-1879
VC/V BYPASS/V	P1490	EC-1873
VEH SPEED SEN/CIRC*4	P0500	EC-1760
VEH SPD SEN/CIR A/T*4	P0720	AT-121
VENT CONTROL VALVE	P0446	EC-1720
VENT CONTROL VALVE	P1446	EC-1841
VENT CONTROL VALVE	P1448	EC-1861

*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

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TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC (Cont'd)

P NO. INDEX FOR DTC

-NIEC0724S02

DTC*1	Items (CONSULT-II screen terms)	Reference page
—	Unable to access ECM	EC-1476
P0000	NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	—
P0100	MAF SEN/CIRCUIT*3	EC-1507
P0105	ABSL PRES SEN/CIRC	EC-1516
P0110	AIR TEMP SEN/CIRC	EC-1518
P0115	COOLANT T SEN/CIRC*3	EC-1524
P0120	THRTL POS SEN/CIRC*3	EC-1529
P0125	*COOLAN T SEN/CIRC	EC-1540
P0130	HO2S1 (B1)	EC-1545
P0131	HO2S1 (B1)	EC-1552
P0132	HO2S1 (B1)	EC-1558
P0133	HO2S1 (B1)	EC-1564
P0134	HO2S1 (B1)	EC-1573
P0135	HO2S1 HTR (B1)	EC-1579
P0137	HO2S2 (B1)	EC-1584
P0138	HO2S2 (B1)	EC-1592
P0139	HO2S2 (B1)	EC-1600
P0140	HO2S2 (B1)	EC-1608
P0141	HO2S2 HTR (B1)	EC-1614
P0171	FUEL SYS-LEAN/BK1	EC-1619
P0172	FUEL SYS-RICH/BK1	EC-1626
P0180	FUEL TEMP SEN/CIRC	EC-1633
P0217	ENG OVER TEMP	EC-1638
P0300	MULTI CYL MISFIRE	EC-1656
P0301	CYL 1 MISFIRE	EC-1656
P0302	CYL 2 MISFIRE	EC-1656
P0303	CYL 3 MISFIRE	EC-1656
P0304	CYL 4 MISFIRE	EC-1656
P0325*2	KNOCK SEN/CIRC-B1	EC-1663
P0335	CKP SEN/CIRCUIT	EC-1667
P0340	CMP SEN/CIRCUIT	EC-1672
P0400	EGR SYSTEM	EC-1679
P0403	EGR VOL CONT/V CIR	EC-1688
P0420	TW CATALYST SYS-B1	EC-1695
P0440	EVAP SMALL LEAK	EC-1699
P0443	PURG VOLUME CONT/V	EC-1714

TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page	
P0446	VENT CONTROL VALVE	EC-1720	GI
P0450	EVAP SYS PRES SEN	EC-1727	MA
P0455	EVAP GROSS LEAK	EC-1739	EM
P0460	FUEL LEV SEN SLOSH	EC-1750	LC
P0461	FUEL LEVEL SENSOR	EC-1754	LC
P0464	FUEL LEVL SEN/CIRC	EC-1756	EC
P0500	VEH SPEED SEN/CIRC*4	EC-1760	FE
P0505	IACV/AAC VLV/CIRC	EC-1764	CL
P0510	CLOSED TP SW/CIRC	EC-1773	MT
P0600*2	A/T COMM LINE	EC-1781	AT
P0605	ECM	EC-1784	AX
P0705	PNP SW/CIRC	AT-110	SU
P0710	ATF TEMP SEN/CIRC	AT-115	BR
P0720	VEH SPD SEN/CIR A/T*4	AT-121	ST
P0725	ENGINE SPEED SIG	AT-126	RS
P0731	A/T 1ST GR FNCTN	AT-130	BT
P0732	A/T 2ND GR FNCTN	AT-137	HA
P0733	A/T 3RD GR FNCTN	AT-143	SC
P0734	A/T 4TH GR FNCTN	AT-149	EL
P0740	TCC SOLENOID/CIRC	AT-158	IDX
P0744	A/T TCC S/V FNCTN	AT-162	
P0745	L/PRESS SOL/CIRC	AT-173	
P0750	SFT SOL A/CIRC*3	AT-178	
P0755	SFT SOL B/CIRC*3	AT-182	
P1126	THERMOSTAT FNCTN	EC-1786	
P1148	CLOSED LOOP-B1	EC-1788	
P1217*2	ENG OVER TEMP	EC-1790	
P1336	CKP SENSOR (COG)	EC-1808	
P1401	EGR TEMP SEN/CIRC	EC-1813	
P1402	EGR SYSTEM	EC-1820	
P1440	EVAP SMALL LEAK	EC-1827	
P1444	PURG VOLUME CONT/V	EC-1829	
P1446	VENT CONTROL VALVE	EC-1841	
P1447	EVAP PURG FLOW/MON	EC-1849	
P1448	VENT CONTROL VALVE	EC-1861	
P1464	FUEL LEVL SEN/CIRC	EC-1870	
P1490	VC/V BYPASS/V	EC-1873	

TROUBLE DIAGNOSIS — INDEX

SR20DE

Alphabetical & P No. Index for DTC (Cont'd)

DTC*1	Items (CONSULT-II screen terms)	Reference page
P1491	VC CUT/V BYPASS/V	EC-1879
P1605	A/T DIAG COMM LINE	EC-1891
P1610 - P1615*2	NATS MALFUNCTION	EL-301
P1705	TP SEN/CIRC A/T*3	AT-186
P1706	P-N POS SW/CIRCUIT	EC-1894
P1760	O/R CLTCH SOL/CIRC	AT-194

*1: 1st trip DTC No. is the same as DTC No.

*2: This DTC is displayed with CONSULT-II only.

*3: When the fail-safe operation occurs, the MIL illuminates.

*4: The MIL illuminates when both the "Revolution sensor signal" and the "Vehicle speed sensor signal" meet the fail-safe condition at the same time.

PRECAUTIONS

SR20DE

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

NIEC0725

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER" used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. The SRS system composition which is available to NISSAN MODEL B15 is as follows:

- For a frontal collision
The Supplemental Restraint System consists of driver air bag module (located in the center of the steering wheel), front passenger air bag module (located on the instrument panel on passenger side), front seat belt pre-tensioners, a diagnosis sensor unit, warning lamp, wiring harness and spiral cable.
- For a side collision
The Supplemental Restraint System consists of front side air bag module (located in the outer side of front seat), side air bag (satellite) sensor, diagnosis sensor unit (one of components of air bags for a frontal collision), wiring harness, warning lamp (one of components of air bags for a frontal collision).

Information necessary to service the system safely is included in the **RS section** of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance should be performed by an authorized NISSAN dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the RS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. Spiral cable and wiring harnesses covered with yellow insulation tape either just before the harness connectors or for the complete harness are related to the SRS.

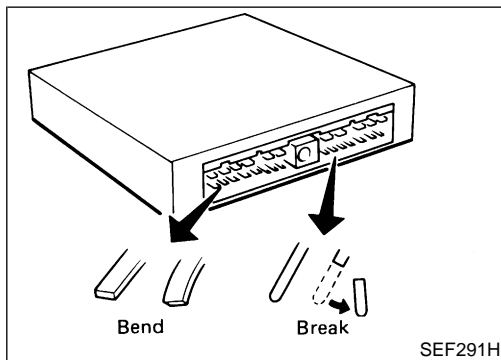
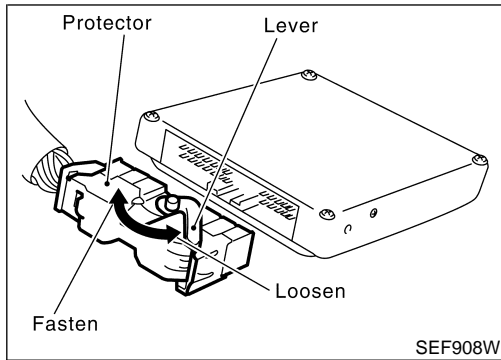
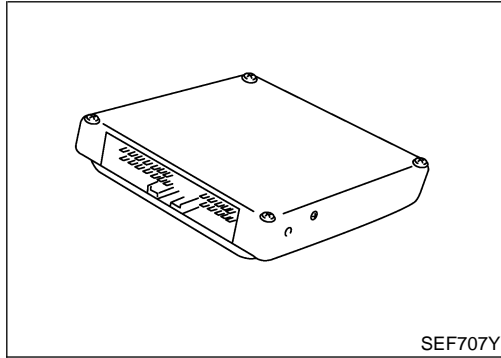
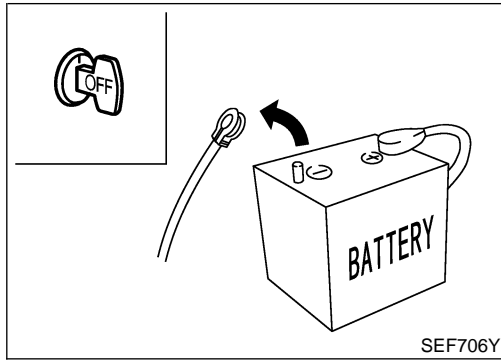
Precautions for On Board Diagnostic (OBD) System of Engine and A/T

NIEC0726

The ECM has an on board diagnostic system. It will light up the malfunction indicator lamp (MIL) to warn the driver of a malfunction causing emission deterioration.

CAUTION:

- Be sure to turn the ignition switch "OFF" and disconnect the negative battery terminal before any repair or inspection work. The open/short circuit of related switches, sensors, solenoid valves, etc. will cause the MIL to light up.
- Be sure to connect and lock the connectors securely after work. A loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure the connector is free from water, grease, dirt, bent terminals, etc.)
- Certain systems and components, especially those related to OBD, may use a new style slide-locking type harness connector. For description and how to disconnect, refer to EL section, "Description", "HARNES CONNECTOR".
- Be sure to route and secure the harnesses properly after work. The interference of the harness with a bracket, etc. may cause the MIL to light up due to the short circuit.
- Be sure to connect rubber tubes properly after work. A misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or fuel injection system, etc.
- Be sure to erase the unnecessary malfunction information (repairs completed) from the ECM and TCM (Transmission Control Module) before returning the vehicle to the customer.



Precautions

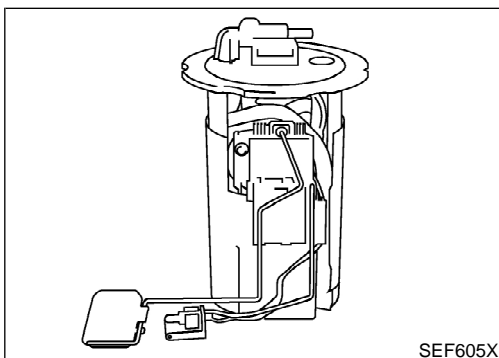
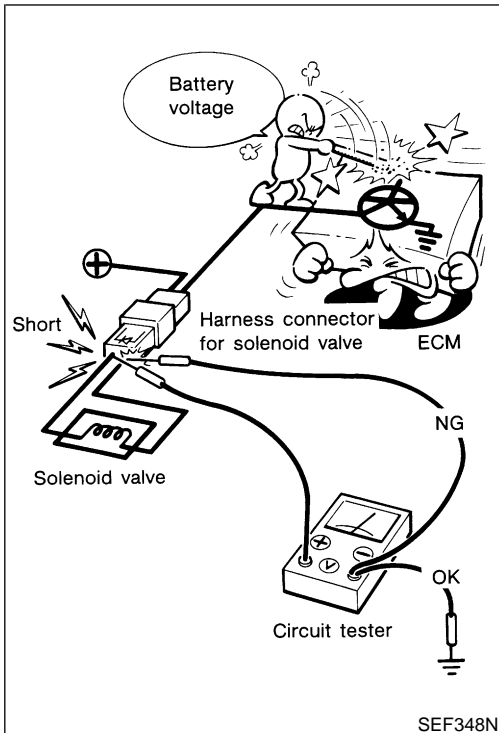
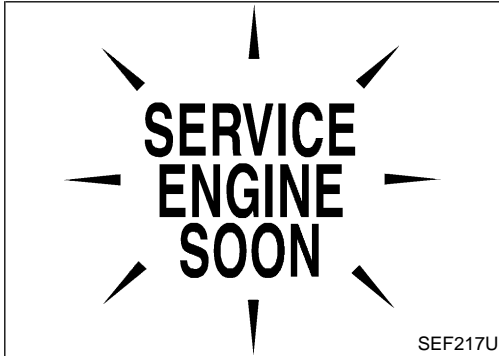
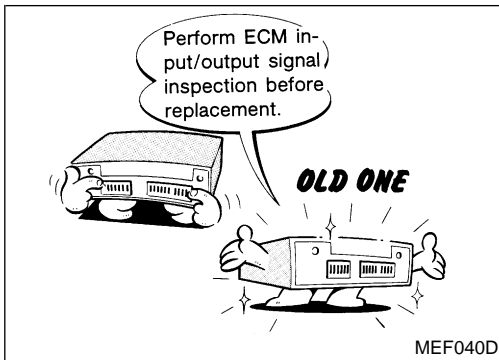
NIEC0727

- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.
- Before connecting or disconnecting the ECM harness connector, turn ignition switch OFF and disconnect negative battery terminal. Failure to do so may damage the ECM because battery voltage is applied to ECM even if ignition switch is turned off.
- Before removing parts, turn ignition switch OFF and then disconnect battery ground cable.
- Do not disassemble ECM.
- If a battery terminal is disconnected, the memory will return to the ECM value.
The ECM will now start to self-control at its initial value. Engine operation can vary slightly when the terminal is disconnected. However, this is not an indication of a problem. Do not replace parts because of a slight variation.
- When connecting ECM harness connector, fasten it securely with a lever as far as it will go, as shown at left.
- When connecting or disconnecting pin connectors into or from ECM, take care not to damage pin terminals (bend or break).
Make sure that there are not any bends or breaks on ECM pin terminals when connecting pin connectors.
- Securely connect ECM harness connectors.
A poor connection can cause an extremely high (surge) voltage to develop in coil and condenser, thus resulting in damage to ICs.
- Keep ECM harness at least 10 cm (4 in) away from adjacent harness, to prevent an ECM system malfunctions due to receiving external noise, degraded operation of ICs, etc.
- Keep ECM parts and harness dry.

PRECAUTIONS

SR20DE

Precautions (Cont'd)



- Before replacing ECM, perform Terminals and Reference Value inspection and make sure ECM functions properly. Refer to EC-1486.
- Handle mass air flow sensor carefully to avoid damage.
- Do not disassemble mass air flow sensor.
- Do not clean mass air flow sensor with any type of detergent.
- Do not disassemble IAC valve-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor.
- After performing each TROUBLE DIAGNOSIS, perform "Overall Function Check" or "DTC Confirmation Procedure".
The DTC should not be displayed in the "DTC Confirmation Procedure" if the repair is completed. The "Overall Function Check" should be a good result if the repair is completed.

- When measuring ECM signals with a circuit tester, never allow the two tester probes to contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.
- Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's power transistor. Use a ground other than ECM terminals, such as an engine ground.

- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

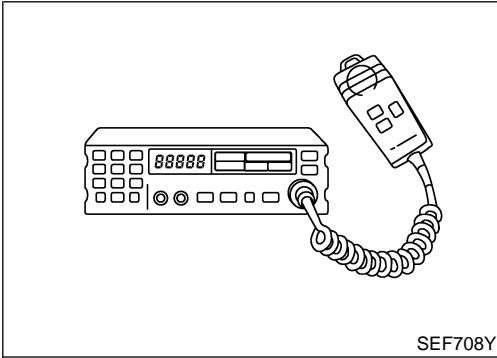
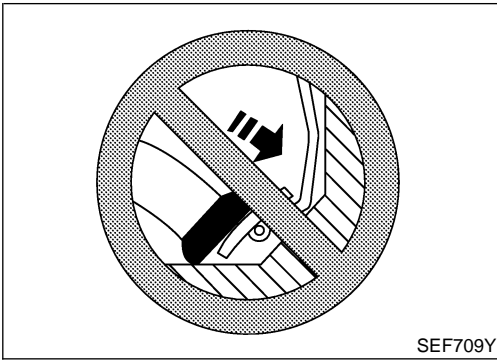
HA

SC

EL

IDX

Precautions (Cont'd)



- Do not depress accelerator pedal when starting.
- Immediately after starting, do not rev up engine unnecessarily.
- Do not rev up engine just prior to shutdown.

- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
 - a) Keep the antenna as far as possible from the electronic control units.
 - b) Keep the antenna feeder line more than 20 cm (8 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - c) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - d) Be sure to ground the radio to vehicle body.

Wiring Diagrams and Trouble Diagnosis

NIEC0728

When you read Wiring diagrams, refer to the following:

- **GI-11**, "HOW TO READ WIRING DIAGRAMS"
- **EL-9**, "POWER SUPPLY ROUTING" for power distribution circuit

When you perform trouble diagnosis, refer to the following:

- **GI-35**, "How To Follow Test Groups In Trouble Diagnosis"
- **GI-24**, "HOW TO PERFORM EFFICIENT DIAGNOSES FOR AN ELECTRICAL INCIDENT"

PREPARATION

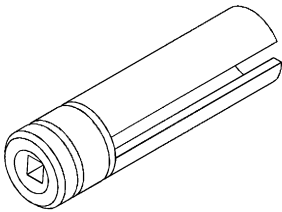
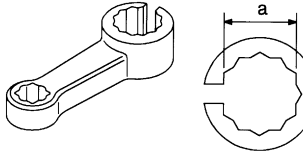
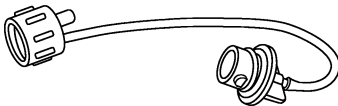
SR20DE

Special Service Tools

Special Service Tools

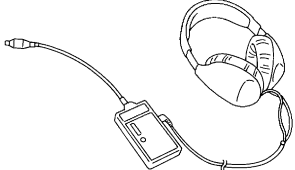
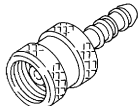
NIEC0729

The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description		GI
KV10117100 (J36471-A) Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensor 1 (front) with 22 mm (0.87 in) hexagon nut	MA
KV10114400 (J-38365) Heated oxygen sensor wrench		Loosening or tightening heated oxygen sensor 2 (rear) a: 22 mm (0.87 in)	EM
Fuel filler cap adapter (J-45356)		Checking fuel tank vacuum relief valve opening pressure	LC
			EC
			FE
			CL
			MT
			AT
			AX
			SU

Commercial Service Tools

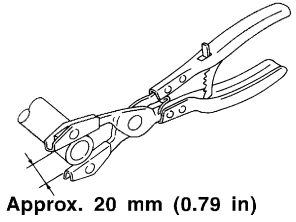
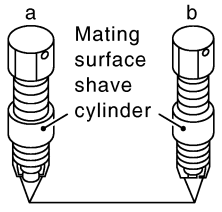
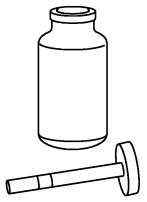
NIEC0730

Tool name	Description		ST
Leak detector (J41416)		Locating the EVAP leak	RS
EVAP service port adapter (J41413-OBD)		Applying positive pressure through EVAP service port	BT
			HA
			SC
			EL
			IDX

PREPARATION

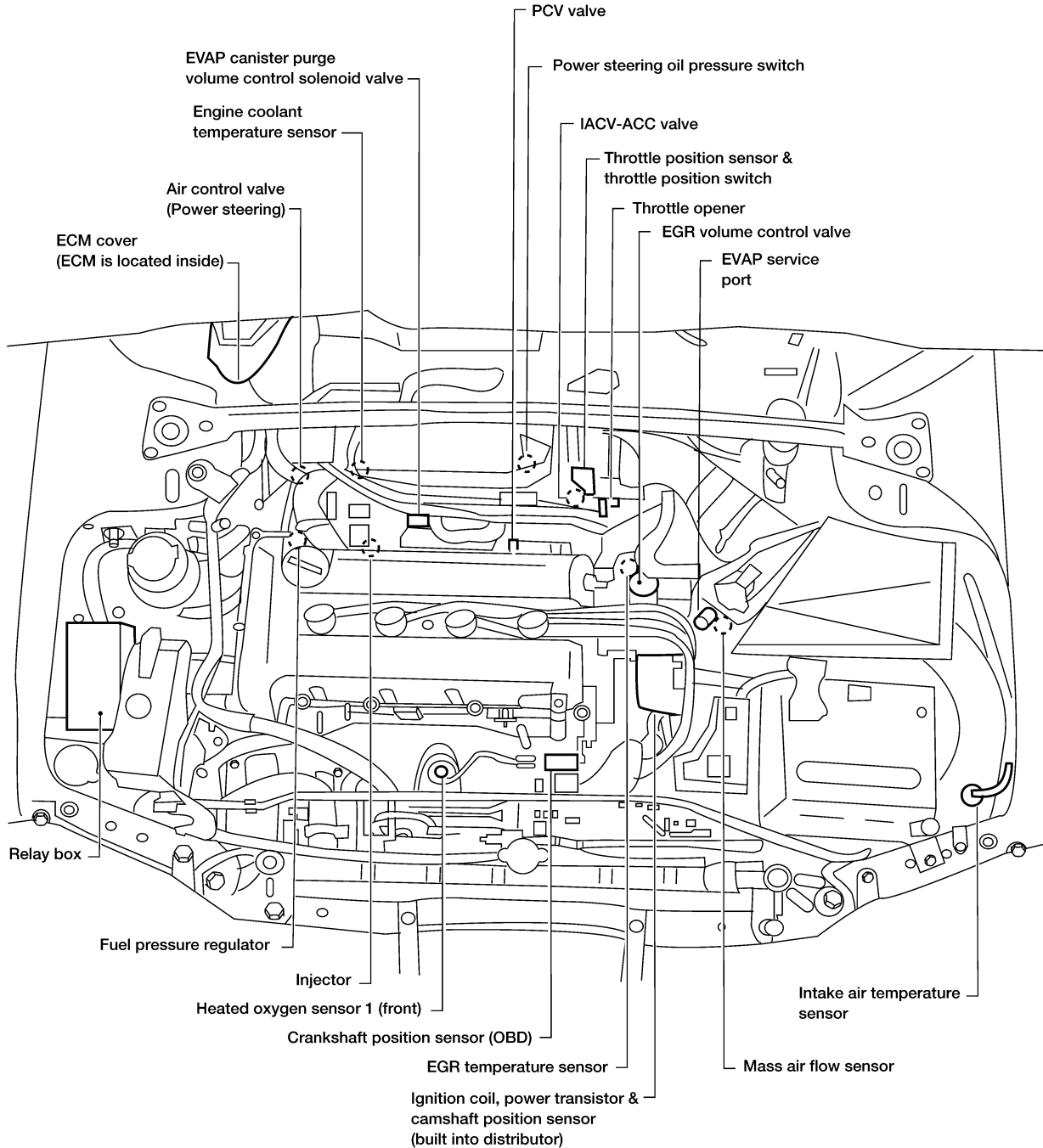
SR20DE

Commercial Service Tools (Cont'd)

Tool name	Description
Hose clipper NT720	 <p>Approx. 20 mm (0.79 in)</p> <p>Clamping the EVAP purge hose between the fuel tank and EVAP canister applied to DTC P1440 [EVAP control system (Small leak — Positive pressure)]</p>
Oxygen sensor thread cleaner (J-43897-18) (J-43897-12) NT778	 <p>Mating surface shave cylinder</p> <p>Reconditioning the exhaust system threads before installing a new oxygen sensor. Use with anti-seize lubricant shown below.</p> <p>a: J-43897-18 18 mm diameter with pitch 1.5 mm, for Zirconia Oxygen Sensor b: J-43897-12 12 mm diameter with pitch 1.25 mm, for Titania Oxygen Sensor</p>
Anti-seize lubricant (Permatex™ 133AR or equivalent meeting MIL specification MIL-A-907) NT779	 <p>Lubricating oxygen sensor thread cleaning tool when reconditioning exhaust system threads.</p>

Engine Control Component Parts Location

NIEC0731

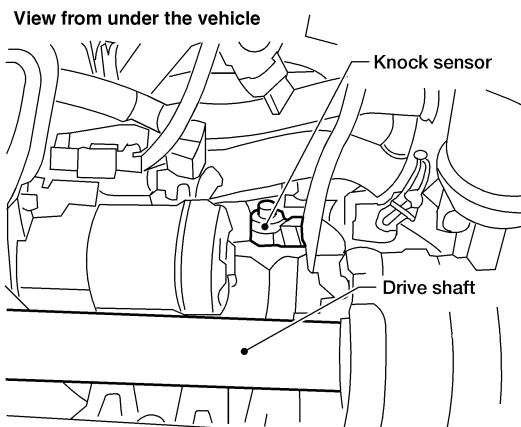
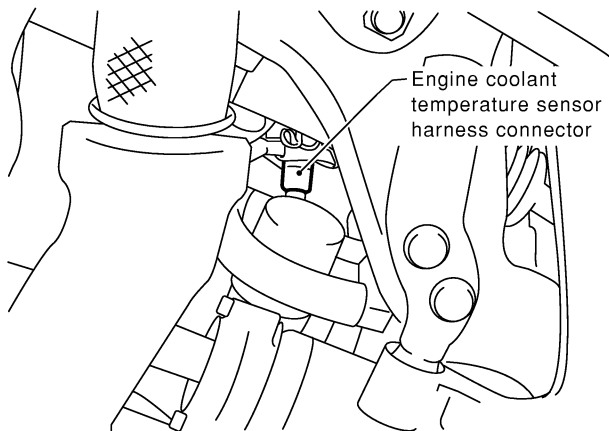
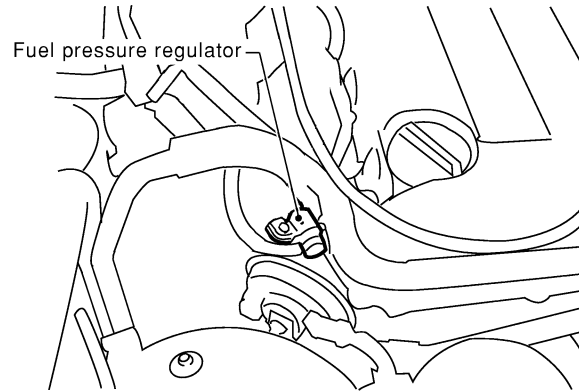
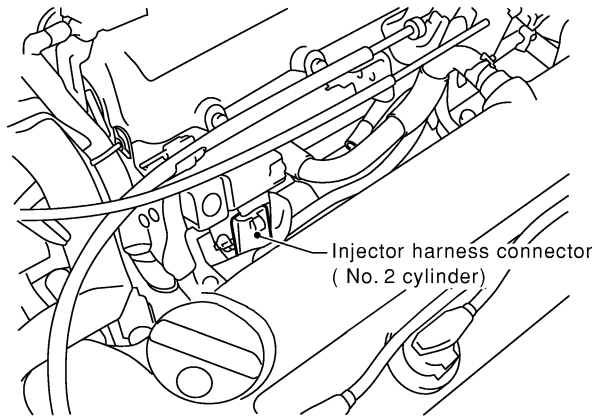
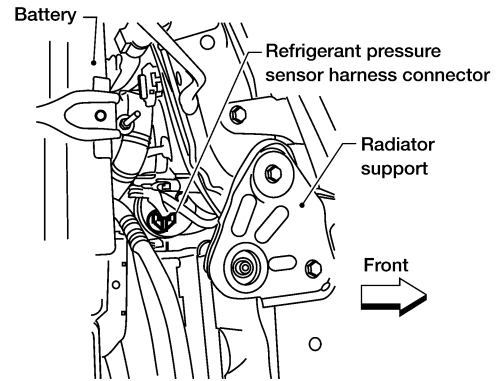
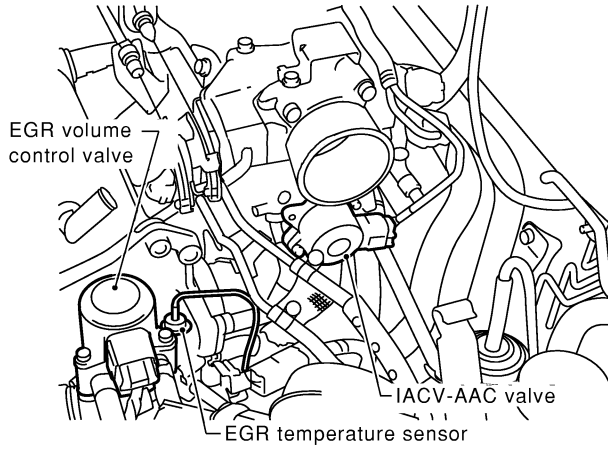


- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

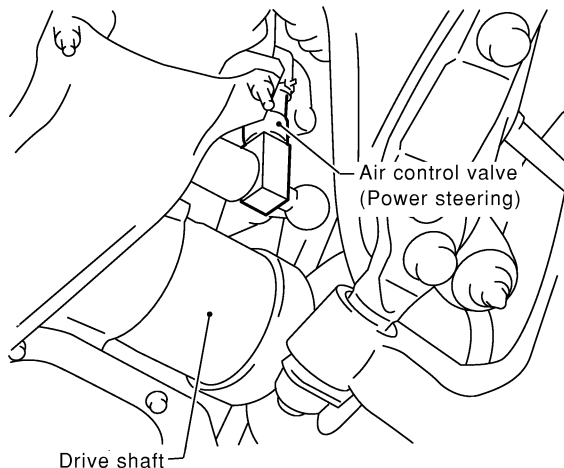
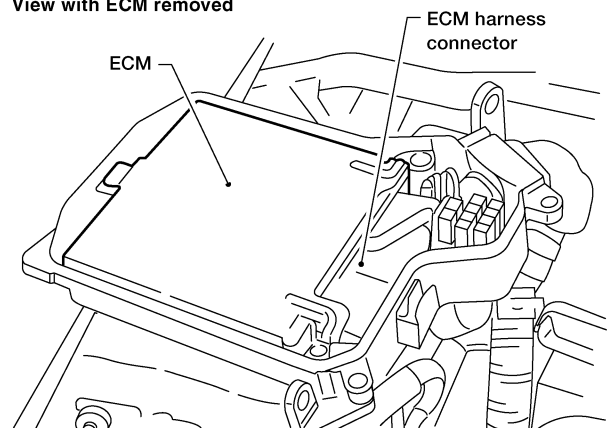
SR20DE

Engine Control Component Parts Location (Cont'd)

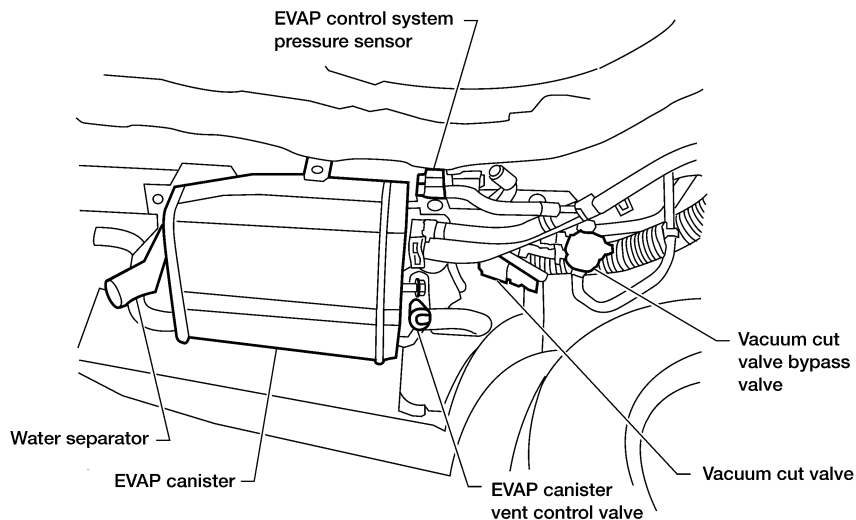
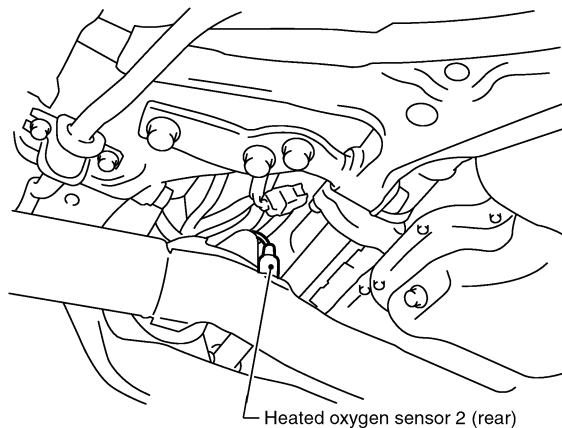
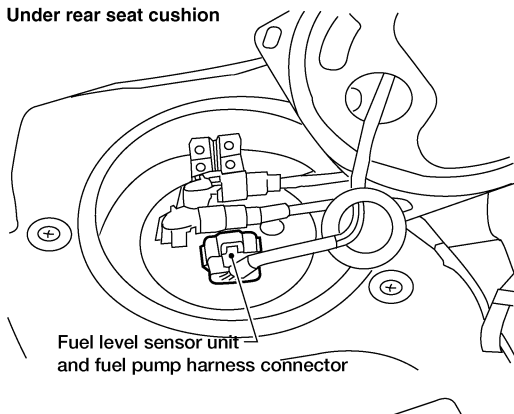


LEC303

View with ECM removed



Under rear seat cushion



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

ST

RS

BT

HA

SC

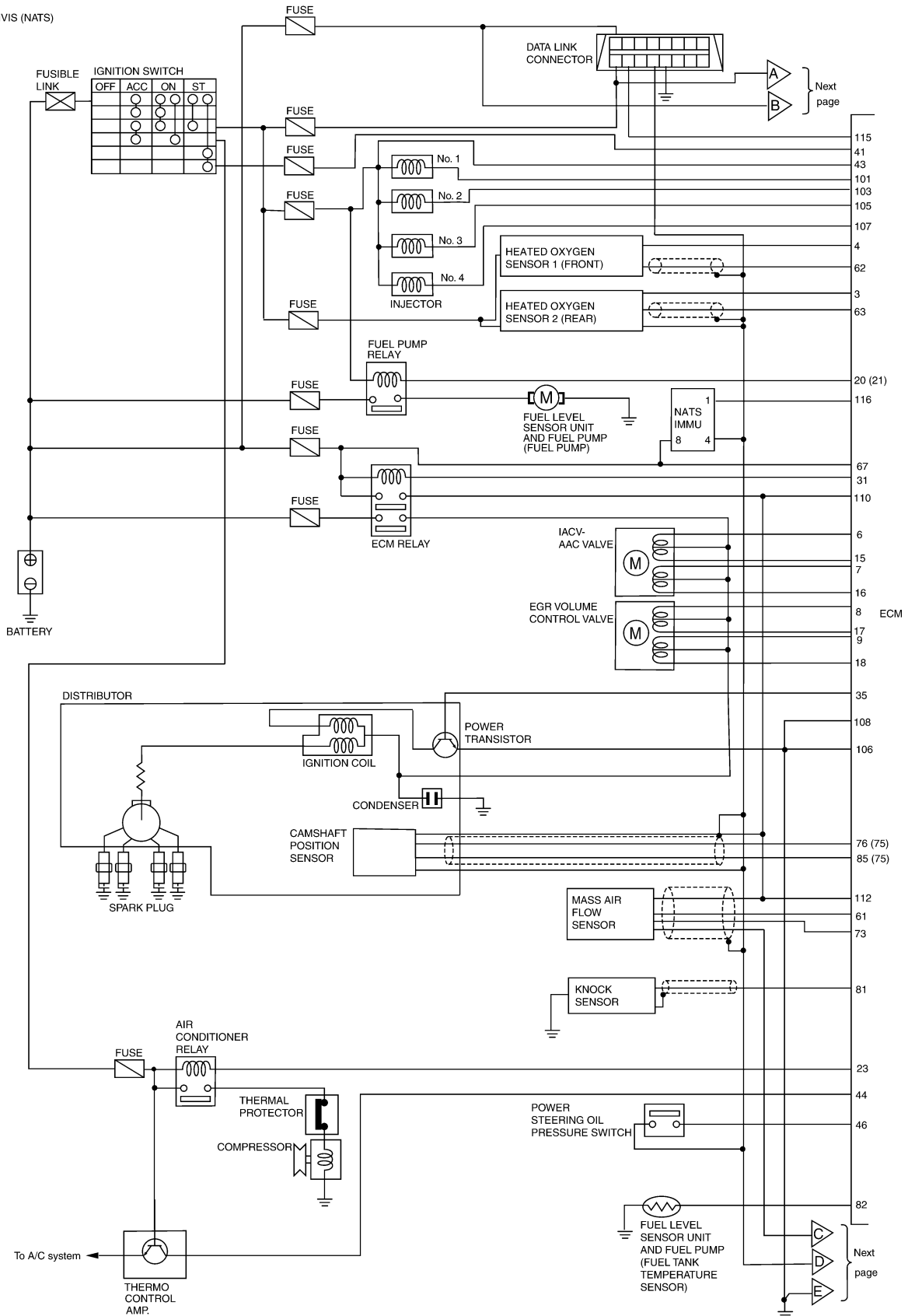
EL

IDX

Circuit Diagram

NIEC0732

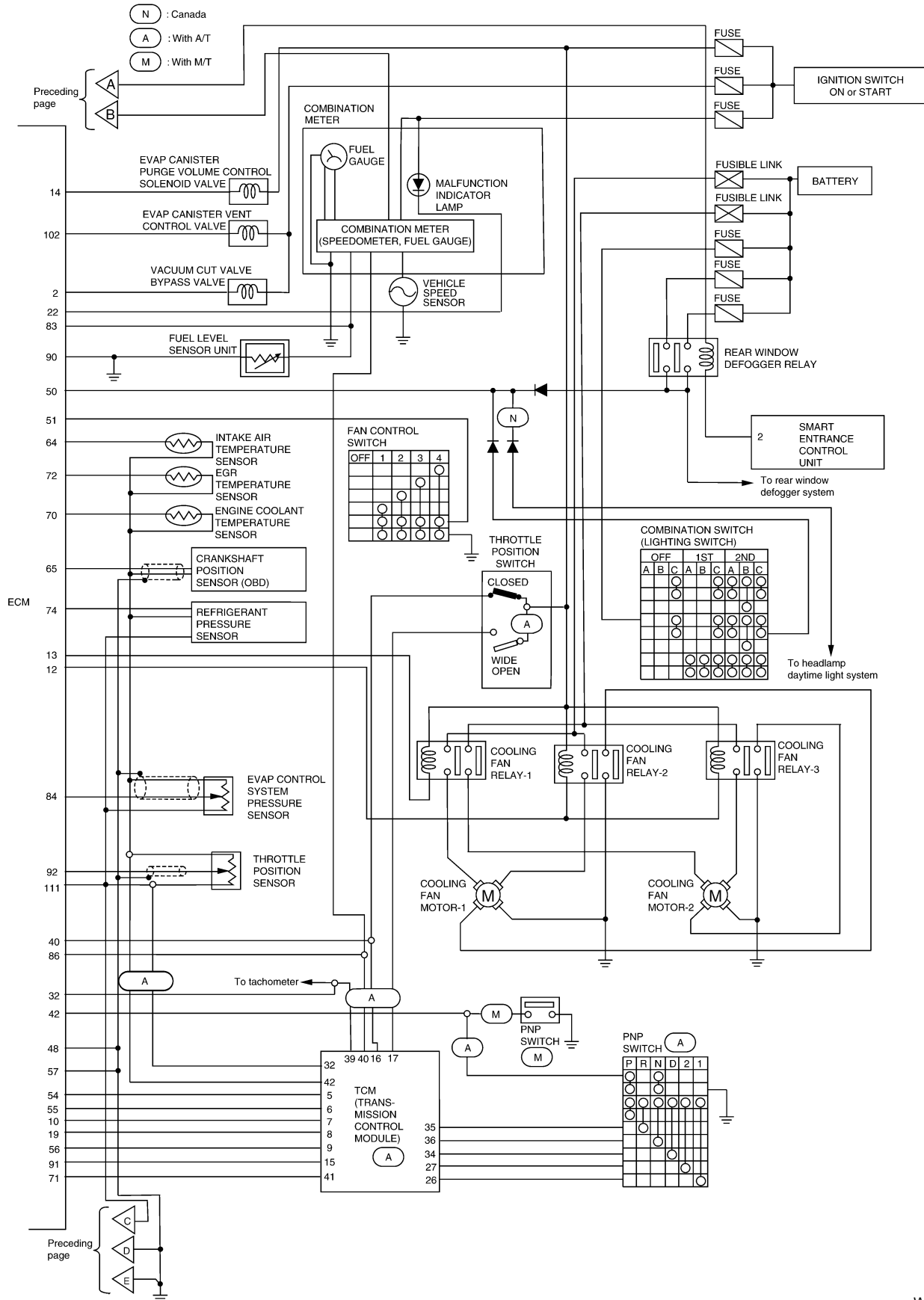
(WN) : WITH NVIS (NATS)



ENGINE AND EMISSION CONTROL OVERALL SYSTEM

SR20DE

Circuit Diagram (Cont'd)



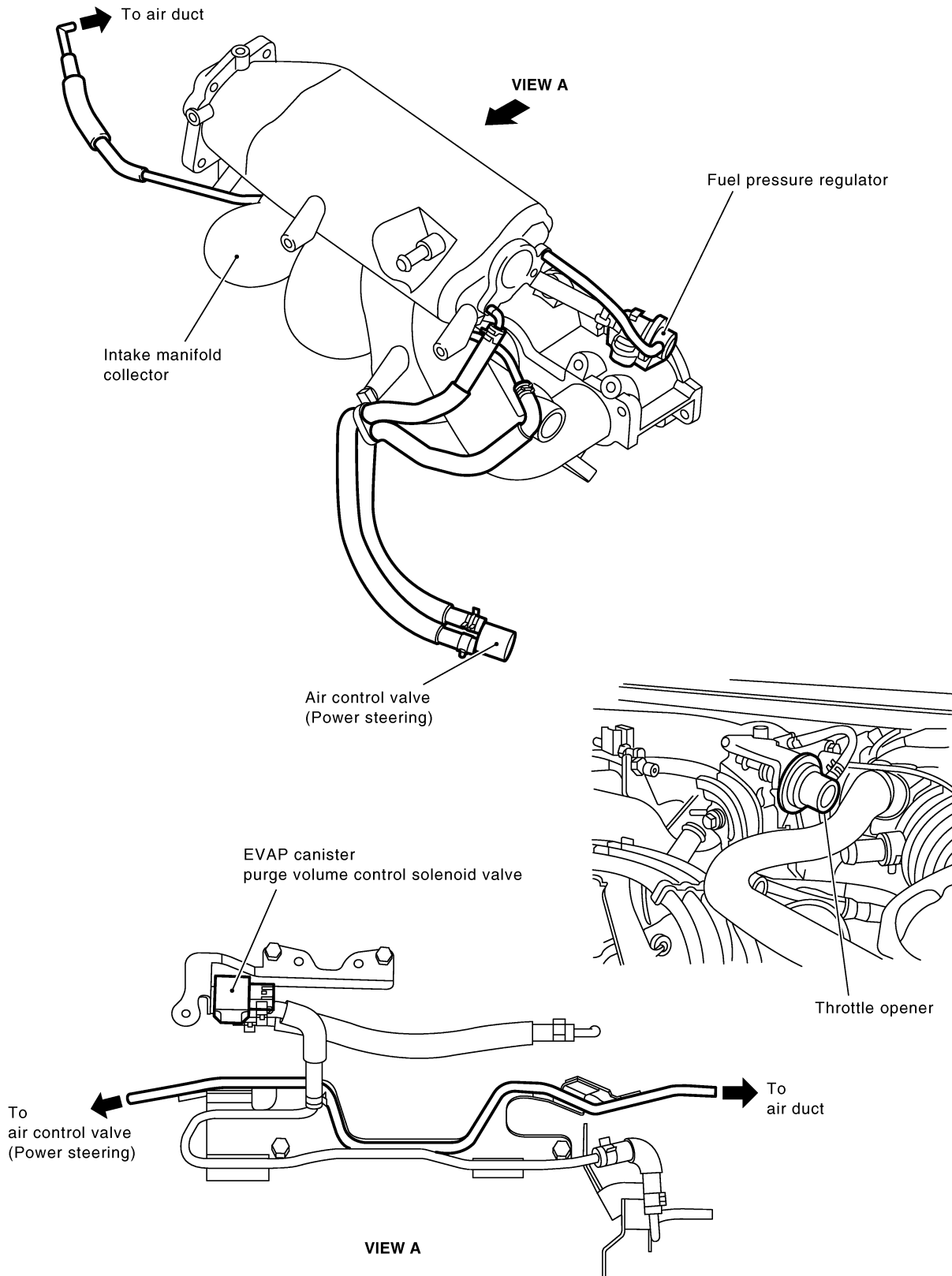
GI
 MA
 EM
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WEC138A

Vacuum Hose Drawing

NIEC0734

Refer to "System Diagram" on EC-1378 for vacuum control system.



- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
- BT
- HA
- SC
- EL
- IDX

NOTE: Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

System Chart

NIEC0735

Input (Sensor)	ECM Function	Output (Actuator)
<ul style="list-style-type: none"> ● Camshaft position sensor ● Mass air flow sensor ● Engine coolant temperature sensor ● Heated oxygen sensor 1 (front) ● Ignition switch ● Throttle position sensor ● PNP switch ● Air conditioner switch ● Knock sensor ● EGR temperature sensor*1 ● Crankshaft position sensor (OBD)*1 ● EVAP control system pressure sensor*1 ● Fuel tank temperature sensor*1 ● Battery voltage ● Power steering oil pressure switch ● Vehicle speed sensor ● Intake air temperature sensor ● Heated oxygen sensor 2 (rear)*3 ● TCM (Transmission control module)*2 ● Closed throttle position switch*4 ● Electrical load ● Fuel level sensor*1 ● Refrigerant pressure sensor 	Fuel injection & mixture ratio control	Injectors
	Distributor ignition system	Power transistor
	Idle air control system	IACV-AAC valve
	Fuel pump control	Fuel pump relay
	On board diagnostic system	Malfunction indicator lamp (On the instrument panel)
	EGR control	EGR volume control valve
	Heated oxygen sensor 1 heater (front) control	Heated oxygen sensor 1 heater (front)
	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)
	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
	Cooling fan control	Cooling fan relays
	Air conditioning cut control	Air conditioner relay
	ON BOARD DIAGNOSIS for EVAP system	<ul style="list-style-type: none"> ● EVAP canister vent control valve ● Vacuum cut valve bypass valve

*1: These sensors are not used to control the engine system. They are used only for the on board diagnosis.

*2: The DTC related to A/T will be sent to ECM.

*3: Under normal conditions, this sensor is not for engine control operation.

*4: This switch will operate in place of the throttle position sensor to control EVAP parts if the sensor malfunctions.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Multiport Fuel Injection (MFI) System

Multiport Fuel Injection (MFI) System

DESCRIPTION

Input/Output Signal Chart

NIEC0736

NIEC0736S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed and piston position	Fuel injection & mixture ratio control	Injector
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas		
Throttle position sensor	Throttle position Throttle valve idle position		
PNP switch	Gear position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Air conditioner switch	Air conditioner operation		
Knock sensor	Engine knocking condition		
Electrical load	Electrical load signal		
Battery	Battery voltage		
Power steering oil pressure switch	Power steering operation		
Heated oxygen sensor 2 (rear)*	Density of oxygen in exhaust gas		

* Under normal conditions, this sensor is not for engine control operation.

Basic Multiport Fuel Injection System

NIEC0736S02

The amount of fuel injected from the fuel injector is determined by the ECM. The ECM controls the length of time the valve remains open (injection pulse duration). The amount of fuel injected is a program value in the ECM memory. The program value is preset by engine operating conditions. These conditions are determined by input signals (for engine speed and intake air) from both the camshaft position sensor and the mass air flow sensor.

Various Fuel Injection Increase/Decrease Compensation

NIEC0736S03

In addition, the amount of fuel injected is compensated to improve engine performance under various operating conditions as listed below.

<Fuel increase>

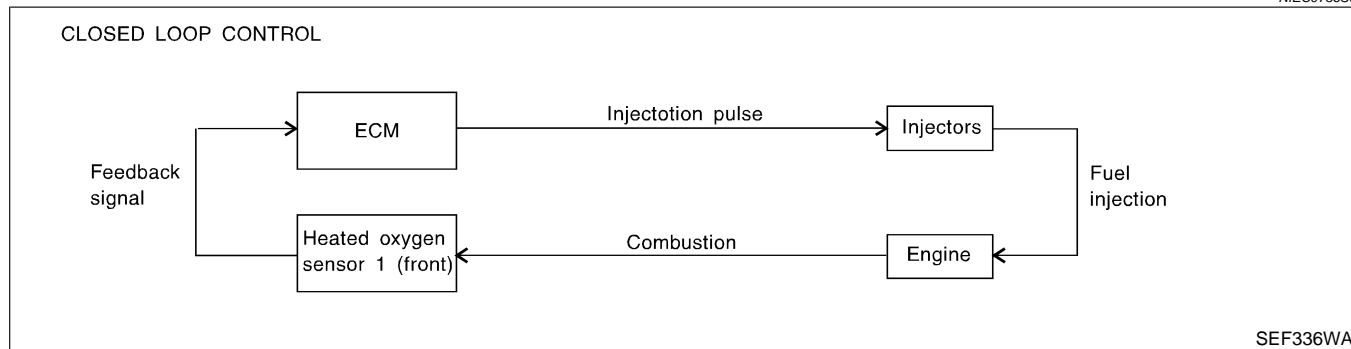
- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- When selector lever is changed from "N" to "D" (A/T models only)
- High-load, high-speed operation

<Fuel decrease>

- During deceleration
- During high engine speed operation
- During high vehicle speed operation (M/T models)
- Extremely high engine coolant temperature

Mixture Ratio Feedback Control (Closed loop control)

NIEC0736S04



The mixture ratio feedback system provides the best air-fuel mixture ratio for driveability and emission control. The three way catalyst can then better reduce CO, HC and NOx emissions. This system uses a heated oxygen sensor 1 (front) in the exhaust manifold to monitor if the engine operation is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about the heated oxygen sensor 1 (front), refer to EC-1545. This maintains the mixture ratio within the range of stoichiometric (ideal air-fuel mixture).

This stage is referred to as the closed loop control condition.

Heated oxygen sensor 2 (rear) is located downstream of the three way catalyst. Even if the switching characteristics of the heated oxygen sensor 1 (front) shift, the air-fuel ratio is controlled to stoichiometric by the signal from the heated oxygen sensor 2 (rear).

Open Loop Control

NIEC0736S05

The open loop system condition refers to when the ECM detects any of the following conditions. Feedback control stops in order to maintain stabilized fuel combustion.

- Deceleration and acceleration
- High-load, high-speed operation
- Malfunction of heated oxygen sensor 1 (front) or its circuit
- Insufficient activation of heated oxygen sensor 1 (front) at low engine coolant temperature
- High engine coolant temperature
- During warm-up
- When starting the engine

Mixture Ratio Self-learning Control

NIEC0736S06

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the heated oxygen sensor 1 (front). This feedback signal is then sent to the ECM. The ECM controls the basic mixture ratio as close to the theoretical mixture ratio as possible. However, the basic mixture ratio is not necessarily controlled as originally designed. Both manufacturing differences (i.e., mass air flow sensor hot film) and characteristic changes during operation (i.e., injector clogging) directly affect mixture ratio.

Accordingly, the difference between the basic and theoretical mixture ratios is monitored in this system. This is then computed in terms of "injection pulse duration" to automatically compensate for the difference between the two ratios.

"Fuel trim" refers to the feedback compensation value compared against the basic injection duration. Fuel trim includes short term fuel trim and long term fuel trim.

"Short term fuel trim" is the short-term fuel compensation used to maintain the mixture ratio at its theoretical value. The signal from the heated oxygen sensor 1 (front) indicates whether the mixture ratio is RICH or LEAN compared to the theoretical value. The signal then triggers a reduction in fuel volume if the mixture ratio is rich, and an increase in fuel volume if it is lean.

"Long term fuel trim" is overall fuel compensation carried out long-term to compensate for continual deviation of the short term fuel trim from the central value. Such deviation will occur due to individual engine differences, wear over time and changes in the usage environment.

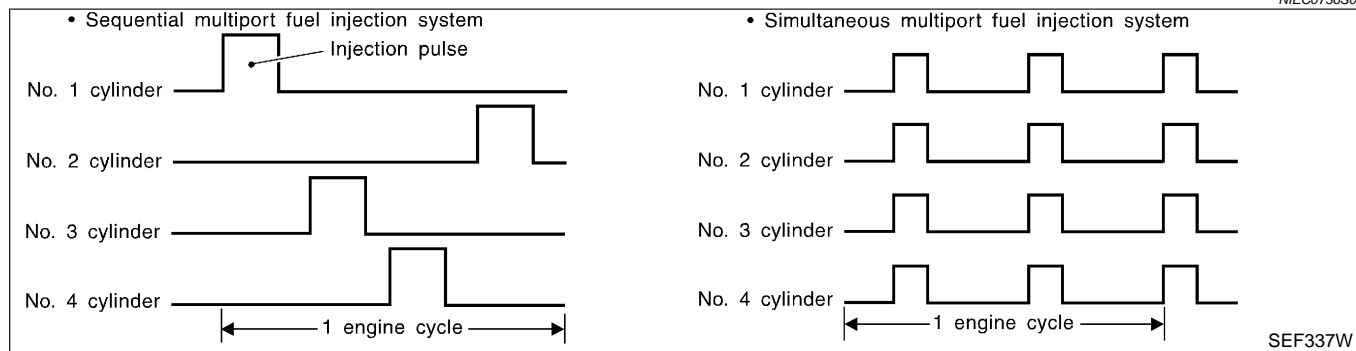
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Multiport Fuel Injection (MFI) System (Cont'd)

Fuel Injection Timing

NIEC0736S07



SEF337W

Two types of systems are used.

Sequential Multiport Fuel Injection System

NIEC0736S0701

Fuel is injected into each cylinder during each engine cycle according to the firing order. This system is used when the engine is running.

Simultaneous Multiport Fuel Injection System

NIEC0736S0702

Fuel is injected simultaneously into all four cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The four injectors will then receive the signals two times for each engine cycle.

This system is used when the engine is being started and/or if the fail-safe system (CPU) is operating.

Fuel Shut-off

NIEC0736S08

Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.

Distributor Ignition (DI) System

DESCRIPTION

NIEC0737

Input/Output Signal Chart

NIEC0737S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed and piston position	Ignition timing control	Power transistor
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Throttle position sensor	Throttle position Throttle valve idle position		
Vehicle speed sensor	Vehicle speed		
Ignition switch	Start signal		
Knock sensor	Engine knocking		
PNP switch	Gear position		
Battery	Battery voltage		

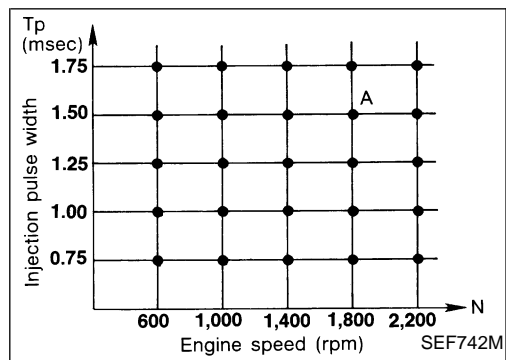
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Distributor Ignition (DI) System (Cont'd)

System Description

NIEC0737S02



The ignition timing is controlled by the ECM to maintain the best air-fuel ratio for every running condition of the engine. The ignition timing data is stored in the ECM. This data forms the map shown above.

The ECM receives information such as the injection pulse width and camshaft position sensor signal. Computing this information, ignition signals are transmitted to the power transistor.

e.g., N: 1,800 rpm, Tp: 1.50 msec
A°BTDC

During the following conditions, the ignition timing is revised by the ECM according to the other data stored in the ECM.

- At starting
- During warm-up
- At idle
- At low battery voltage
- During acceleration

The knock sensor retard system is designed only for emergencies. The basic ignition timing is programmed within the anti-knocking zone, if recommended fuel is used under dry conditions. The retard system does not operate under normal driving conditions.

If engine knocking occurs, the knock sensor monitors the condition. The signal is transmitted to the ECM. The ECM retards the ignition timing to eliminate the knocking condition.

Air Conditioning Cut Control

DESCRIPTION

Input/Output Signal Chart

NIEC0738

NIEC0738S01

Sensor	Input Signal to ECM	ECM function	Actuator
Air conditioner switch	Air conditioner "ON" signal	Air conditioner cut control	Air conditioner relay
PNP switch	Neutral position		
Throttle position sensor	Throttle valve opening angle		
Camshaft position sensor	Engine speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		

System Description

NIEC0738S02

This system improves engine operation when the air conditioner is used.

Under the following conditions, the air conditioner is turned off.

- When the accelerator pedal is fully depressed.
- When cranking the engine.
- At high engine speeds.
- When the engine coolant temperature becomes excessively high.
- When operating power steering during low engine speed or low vehicle speed.
- When engine speed is excessively low.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Fuel Cut Control (at no load & high engine speed)

Fuel Cut Control (at no load & high engine speed)

DESCRIPTION

Input/Output Signal Chart

NIEC0739

NIEC0739S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Fuel cut control	Injectors
PNP switch	Neutral position		
Throttle position sensor	Throttle position		
Engine coolant temperature sensor	Engine coolant temperature		
Camshaft position sensor	Engine speed		

If the engine speed is above 3,950 rpm with no load, (for example, in Neutral and engine speed over 4,000 rpm) fuel will be cut off after some time. The exact time when the fuel is cut off varies based on engine speed. Fuel cut will operate until the engine speed reaches 1,150 rpm, then fuel cut is cancelled.

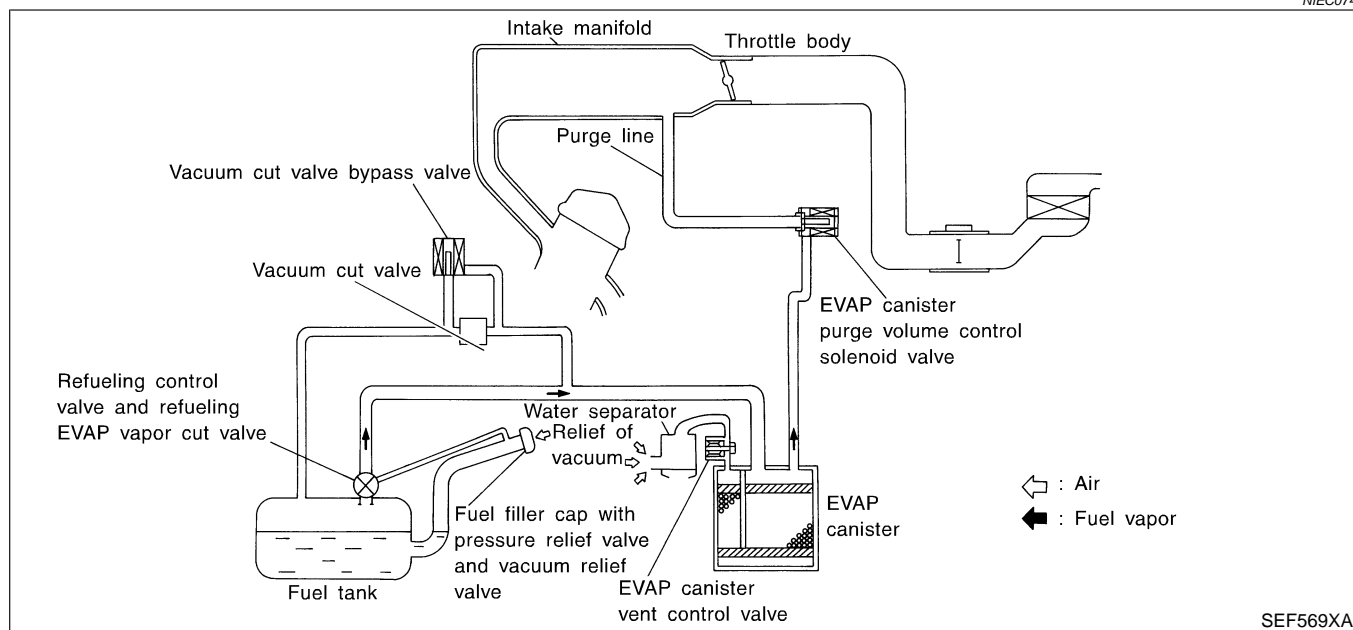
NOTE:

This function is different from deceleration control listed under “Multiport Fuel Injection (MFI) System”, EC-1381.

Evaporative Emission System

DESCRIPTION

NIEC0740

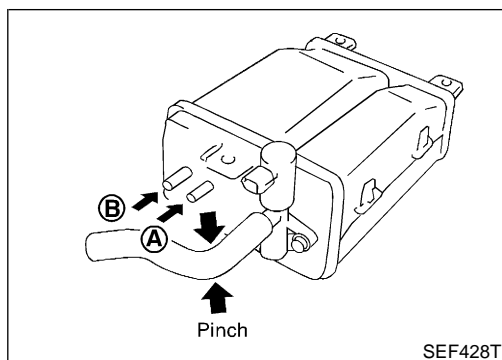


SEF569XA

The evaporative emission system is used to reduce hydrocarbons emitted into the atmosphere from the fuel system. This reduction of hydrocarbons is accomplished by activated charcoals in the EVAP canister. The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating or when refueling to the fuel tank. The vapor in the EVAP canister is purged by the air through the purge line to the intake manifold when the engine is operating.

EVAP canister purge volume control solenoid valve is controlled by ECM. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control solenoid valve is proportionally regulated as the air flow increases.

EVAP canister purge control solenoid valve also shuts off the vapor purge line during decelerating and idling.



INSPECTION

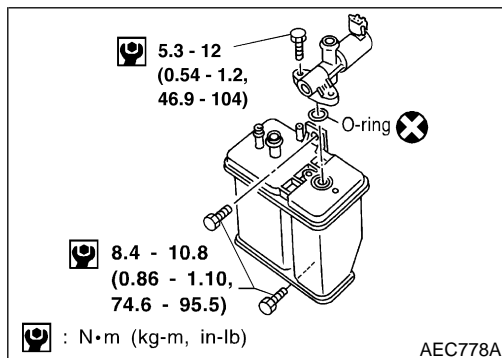
EVAP Canister

Check EVAP canister as follows:

1. Pinch the fresh air hose.
2. Blow air into port A and check that air flows freely through port B.

NIEC0741

NIEC0741S01

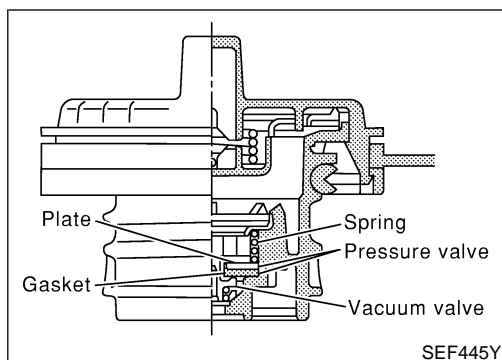


Tightening Torque

Tighten EVAP canister as shown in the figure.

Make sure new O-ring is installed properly between EVAP canister and EVAP canister vent control valve.

NIEC0741S02



Fuel Tank Vacuum Relief Valve (Built into fuel filler cap)

NOTE:

Refer to fuel filler cap adapter instruction manual before performing following inspection.

1. Wipe clean valve housing.
2. Check valve opening pressure and vacuum.

Pressure:

15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)

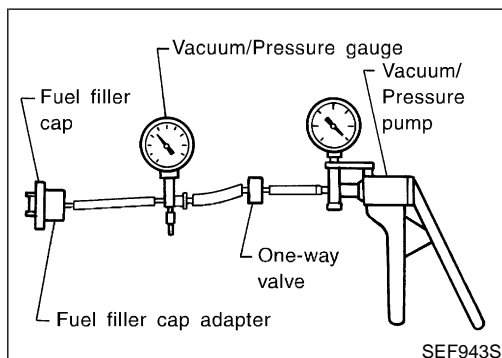
Vacuum:

-6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.50 psi)

3. If out of specification, replace fuel filler cap as an assembly.

CAUTION:

Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.



Vacuum Cut Valve and Vacuum Cut Valve Bypass Valve

Refer to EC-1879.

Evaporative Emission (EVAP) Canister Purge Volume Control Solenoid Valve

Refer to EC-1714.

Fuel Tank Temperature Sensor

Refer to EC-1633.

NIEC0741S04

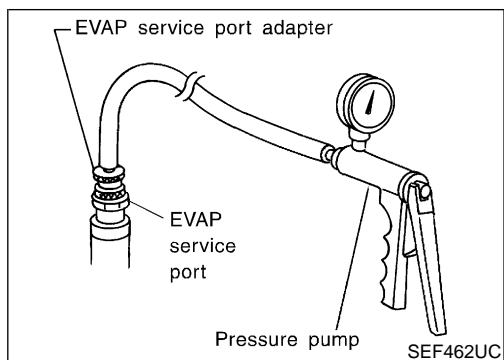
NIEC0741S05

NIEC0741S06

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Evaporative Emission System (Cont'd)



EVAP Service Port

NIEC0741S07

Positive pressure is delivered to the EVAP system through the EVAP service port. If fuel vapor leakage in the EVAP system occurs, use a leak detector to locate the leak.

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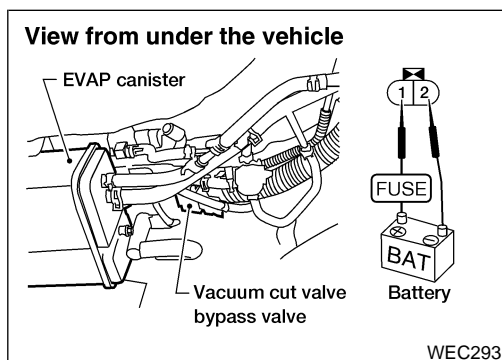
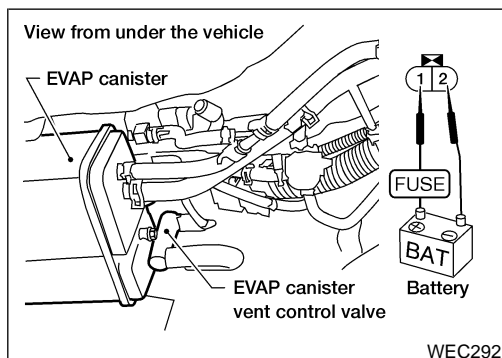
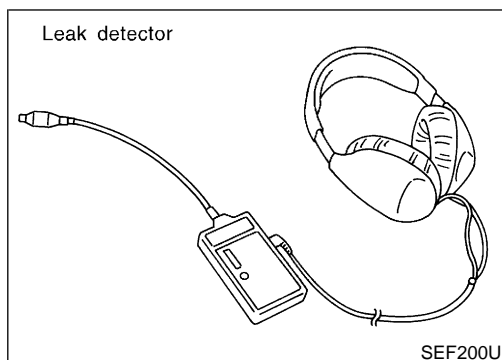
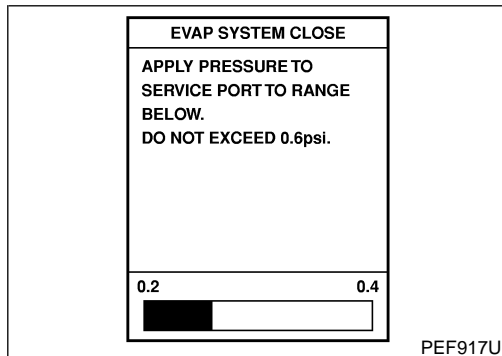
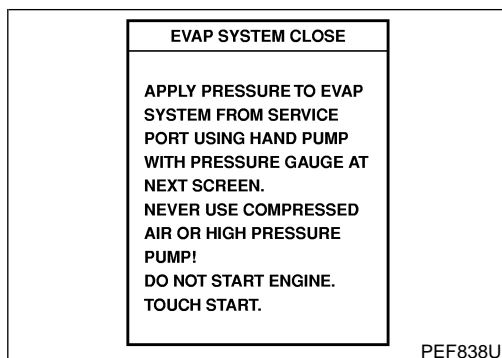
EL

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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Evaporative Emission System (Cont'd)



How to Detect Fuel Vapor Leakage

NIEC0741S08

CAUTION:

- Never use compressed air or a high pressure pump.
- Do not start engine.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in EVAP system.

NOTE:

Improper installation of adapter to the service port may cause a leak.

With CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port.
- 2) Also attach the pressure pump and hose.
- 3) Turn ignition switch "ON".
- 4) Select the "EVAP SYSTEM CLOSE" of "WORK SUPPORT MODE" with CONSULT-II.
- 5) Touch "START". A bar graph (Pressure indicating display) will appear on the screen.
- 6) Apply positive pressure to the EVAP system until the pressure indicator reaches the middle of the bar graph.
- 7) Remove the EVAP service port adapter and hose with pressure pump.
- 8) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.
- 9) If the check result is NG, repair or replace the malfunctioning parts. If OK, touch "BACK" on CONSULT-II screen.
- 10) Start engine and warm it up to normal operating temperature.
- 11) Turn ignition switch "OFF" and wait at least 10 seconds.
- 12) Restart engine and let it idle for 90 seconds.
- 13) Keep engine speed at 2,000 rpm for 30 seconds.
- 14) Turn ignition switch "OFF".

Without CONSULT-II

- 1) Attach the EVAP service port adapter securely to the EVAP service port and pressure pump with pressure gauge to the EVAP service port.
- 2) Apply battery voltage to between the terminals of both EVAP canister vent control valve and vacuum cut valve bypass valve to make a closed EVAP system.
- 3) To locate the leak, deliver positive pressure to the EVAP system until pressure gauge points reach 1.38 to 2.76 kPa (0.014 to 0.028 kg/cm², 0.2 to 0.4 psi).
- 4) Remove the EVAP service port adapter and hose with pressure pump.
- 5) Locate the leak using a leak detector. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.
- 6) If the check result is NG, repair or replace the malfunctioning parts. If OK, stop applying battery voltage to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 7) Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve.
- 8) Start engine and warm it up to normal operating temperature.
- 9) Turn ignition switch "OFF" and wait at least 10 seconds.
- 10) Restart engine and let it idle for 90 seconds.
- 11) Keep engine speed at 2,000 rpm for 30 seconds.
- 12) Turn ignition switch "OFF".

EC-1388

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Evaporative Emission System (Cont'd)

EVAPORATIVE EMISSION LINE DRAWING

NIEC0742

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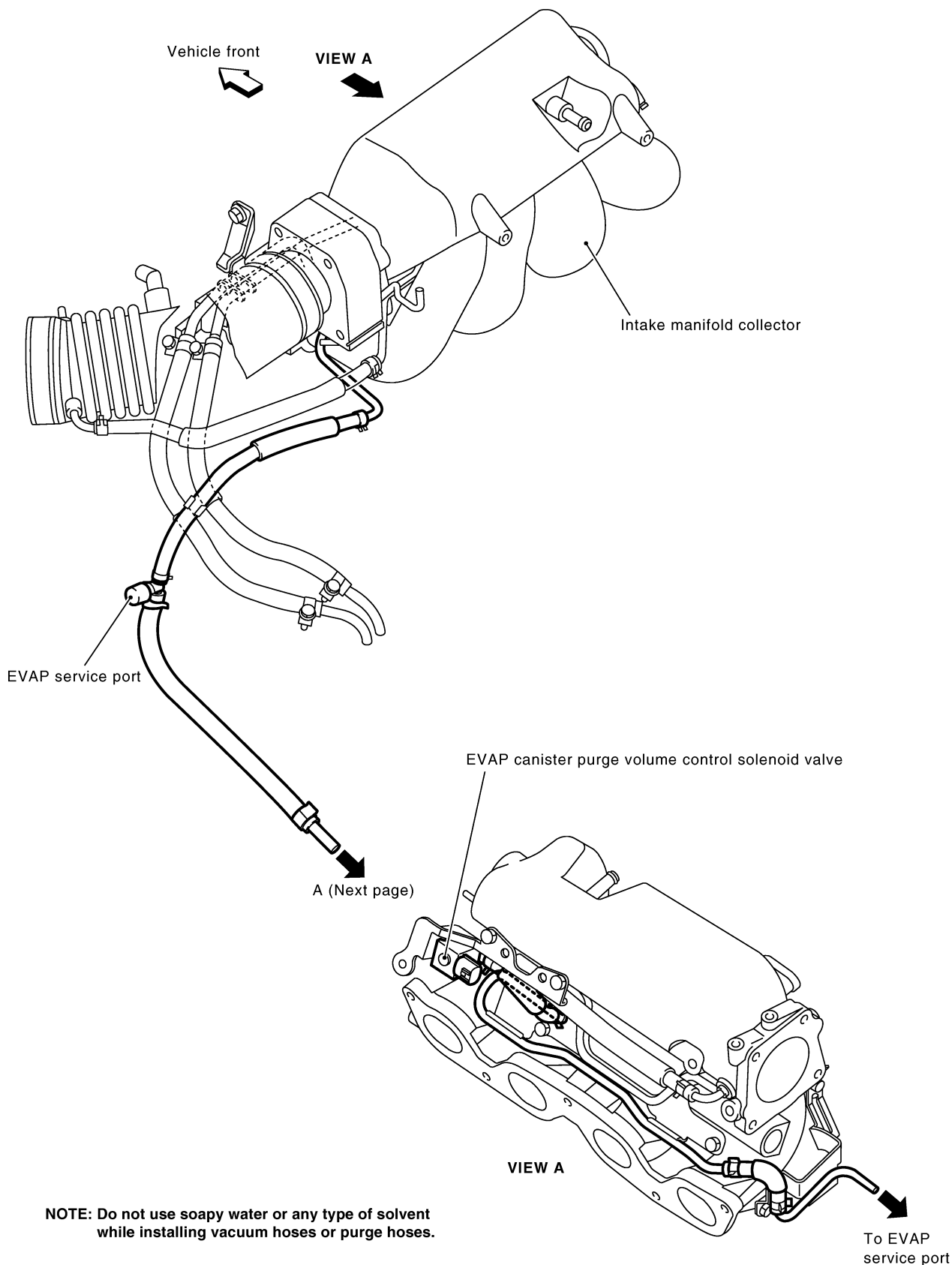
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NOTE: Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.

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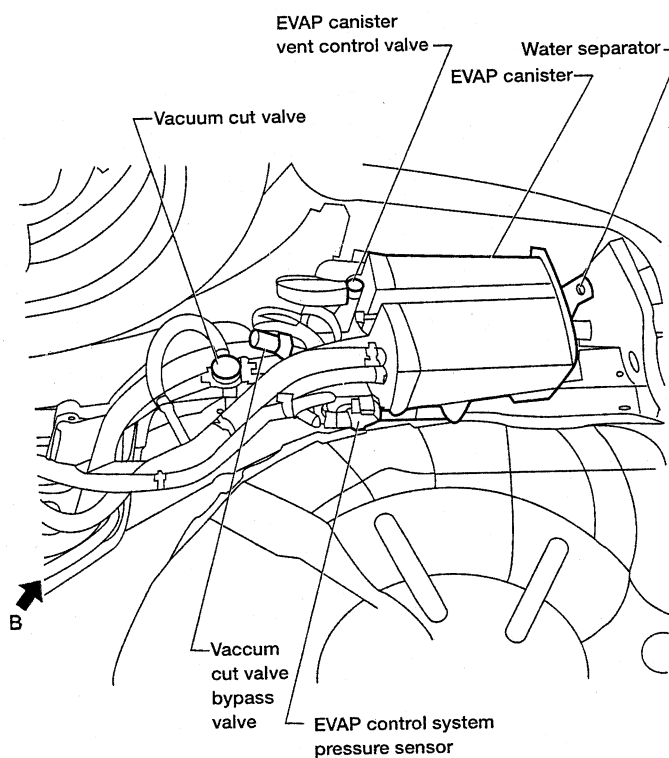
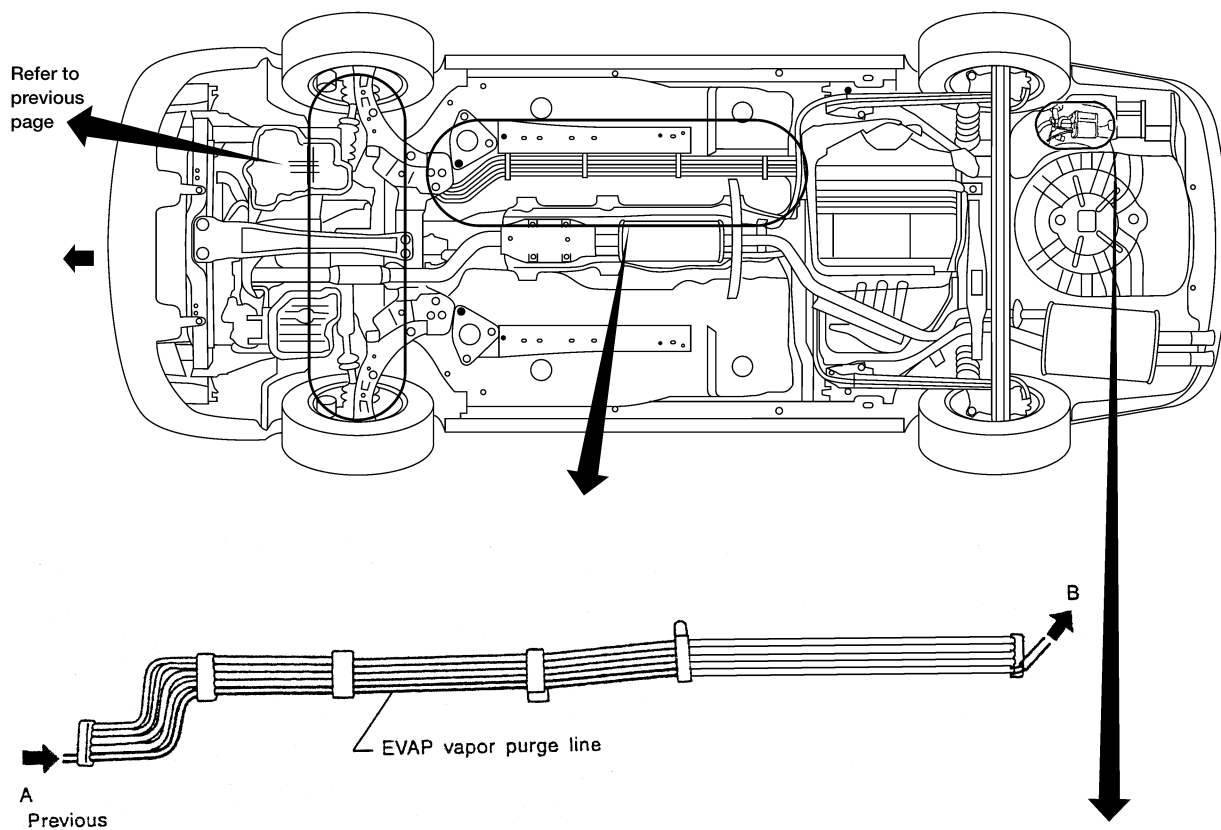
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Evaporative Emission System (Cont'd)

NOTE:

Do not use soapy water or any type of solvent while installing vacuum hoses or purge hoses.



WEC362

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

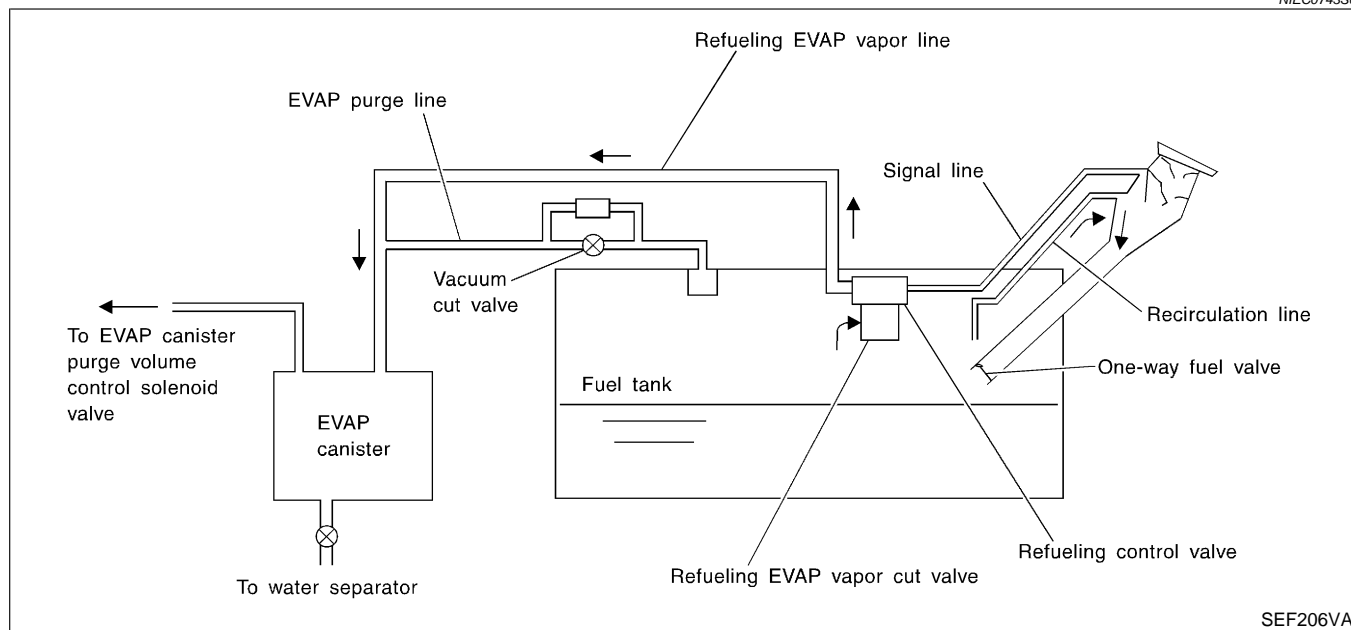
On Board Refueling Vapor Recovery (ORVR)

On Board Refueling Vapor Recovery (ORVR)

NIEC0743

SYSTEM DESCRIPTION

NIEC0743S01



From the beginning of refueling, the fuel tank pressure goes up. When the pressure reaches the setting value of the refueling control valve (RCV) opening pressure, the RCV is opened. After RCV opens, the air and vapor inside the fuel tank go through refueling EVAP vapor cut valve, RCV and refueling vapor line to the EVAP canister. The vapor is absorbed by the EVAP canister and the air is released to the atmosphere.

When the refueling has reached the full level of the fuel tank, the refueling EVAP vapor cut valve is closed and refueling is stopped because of auto shut-off. The vapor which was absorbed by the EVAP canister is purged during driving.

The RCV is always closed during driving and the evaporative emission control system is operated the same as conventional system.

WARNING:

When conducting inspections below, be sure to observe the following:

- Put a "CAUTION: INFLAMMABLE" sign in workshop.
- Do not smoke while servicing fuel system. Keep open flames and sparks away from work area.
- Be sure to furnish the workshop with a CO₂ fire extinguisher.

CAUTION:

- Before removing fuel line parts, carry out the following procedures:
 - a) Put drained fuel in an explosion-proof container and put lid on securely.
 - b) Release fuel pressure from fuel line. Refer to "Fuel Pressure Release", EC-1403.
 - c) Disconnect battery ground cable.
- Always replace O-ring when the fuel gauge retainer is removed.
- Do not kink or twist hose and tube when they are installed.
- Do not tighten hose and clamps excessively to avoid damaging hoses.
- After installation, run engine and check for fuel leaks at connection.
- Do not attempt to top off the fuel tank after the fuel pump nozzle shuts off automatically. Continued refueling may cause fuel overflow, resulting in fuel spray and possibly a fire.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

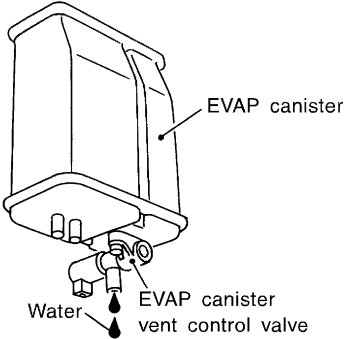
DIAGNOSTIC PROCEDURE

NIEC0743S02

Symptom: Fuel Odor from EVAP Canister Is Strong.

NIEC0743S0201

1	CHECK EVAP CANISTER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

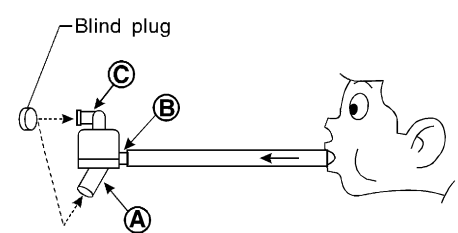
2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 3.
No (With CONSULT-II)	▶	GO TO 6.
No (Without CONSULT-II)	▶	GO TO 7.

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
	▶	GO TO 4.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

4	CHECK WATER SEPARATOR	<p>1. Check visually for insect nests in the water separator air inlet.</p> <p>2. Check visually for cracks or flaws in the appearance.</p> <p>3. Check visually for cracks or flaws in the hose.</p> <p>4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT	
	OK	▶	GO TO 5.	
	NG	▶	Replace water separator.	

5	DETECT MALFUNCTIONING PART	<p>Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.</p> <p style="text-align: center;">▶</p> <p>Repair or replace EVAP hose.</p>	AT AX SU BR ST RS BT HA SC EL IDX
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ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

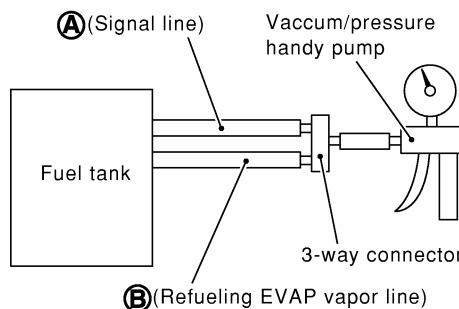
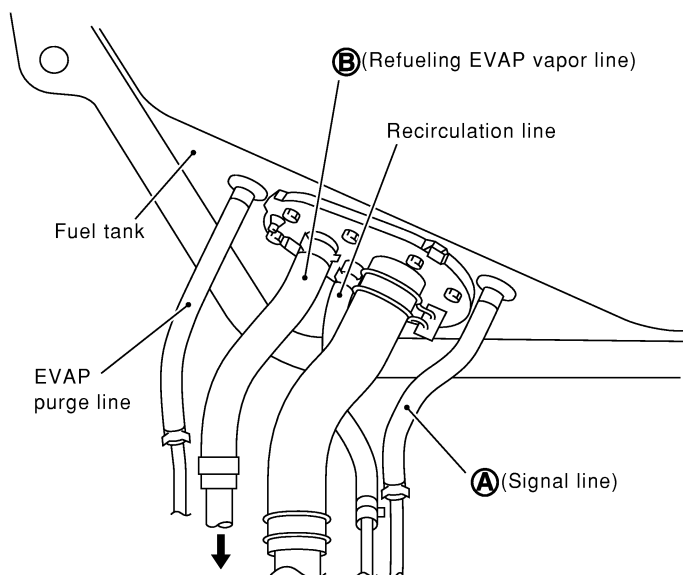
6 CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit and fuel pump.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit and fuel pump where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit and fuel pump.

Always replace O-ring with new one.

 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit and fuel pump remaining removed and check that the pressure is applicable.



SEF246Y

OK or NG

OK



GO TO 8.

NG



Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

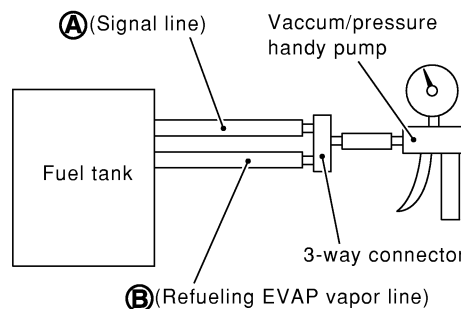
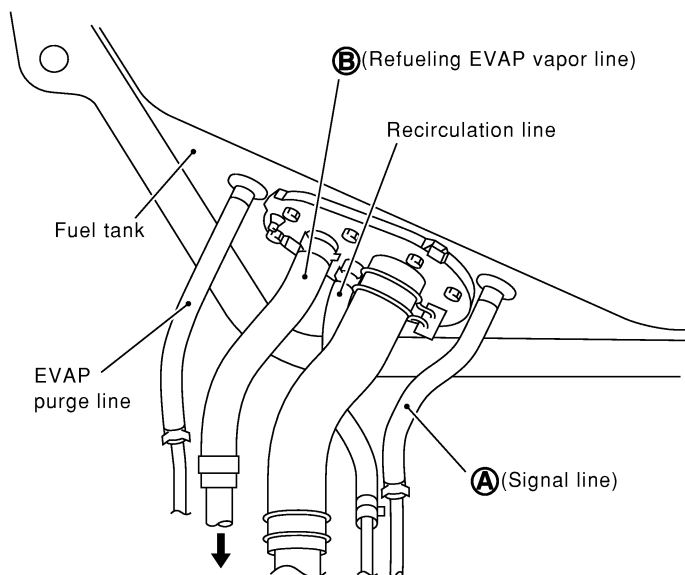
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

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7 CHECK REFUELING EVAP VAPOR CUT VALVE

⊗ Without CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel level sensor unit and fuel pump.
Always replace O-ring with new one.
 - b. Drain fuel from the tank using a hand pump into a fuel container.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follow.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Put fuel tank upside down.
 - c. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit and fuel pump remaining removed and check that the pressure is applicable.



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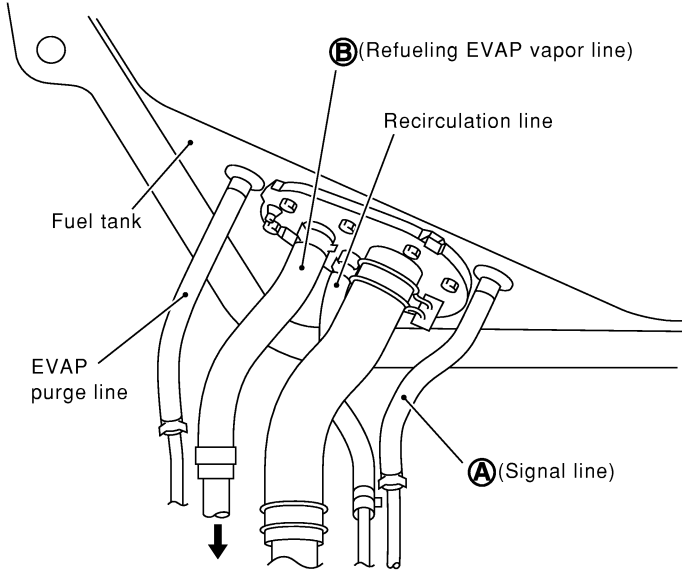
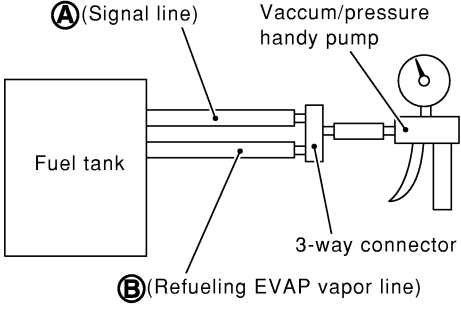
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

8	CHECK REFUELING CONTROL VALVE	<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage.
		
		
		SEF246Y
OK or NG		
OK	▶	INSPECTION END
NG	▶	Replace refueling control valve with fuel tank.

Symptom: Cannot Refuel/Fuel Odor From The Fuel Filler Opening Is Strong While Refueling.

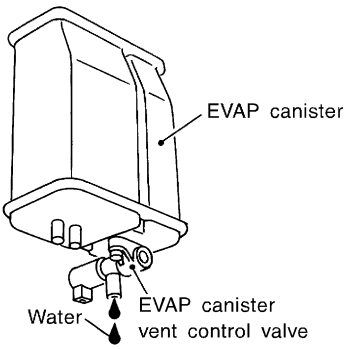
NIEC0743S0202

1	CHECK EVAP CANISTER	<ol style="list-style-type: none"> 1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Weigh the EVAP canister with EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).
OK or NG		
OK	▶	GO TO 2.
NG	▶	GO TO 3.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

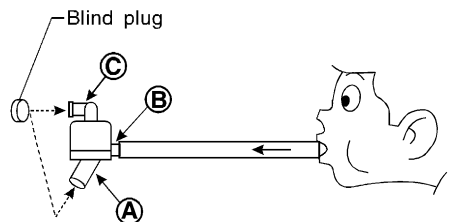
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

2	CHECK IF EVAP CANISTER SATURATED WITH WATER	
Does water drain from the EVAP canister?		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 3.
No	▶	GO TO 6.

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EC

3	REPLACE EVAP CANISTER	
Replace EVAP canister with a new one.		
▶		
GO TO 4.		

CL
MT

4	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
● Do not disassemble water separator.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace water separator.

AT
AX
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5	DETECT MALFUNCTIONING PART	
Check the EVAP hose between EVAP canister and water separator for clogging or poor connection.		
▶		
Repair or replace EVAP hose.		

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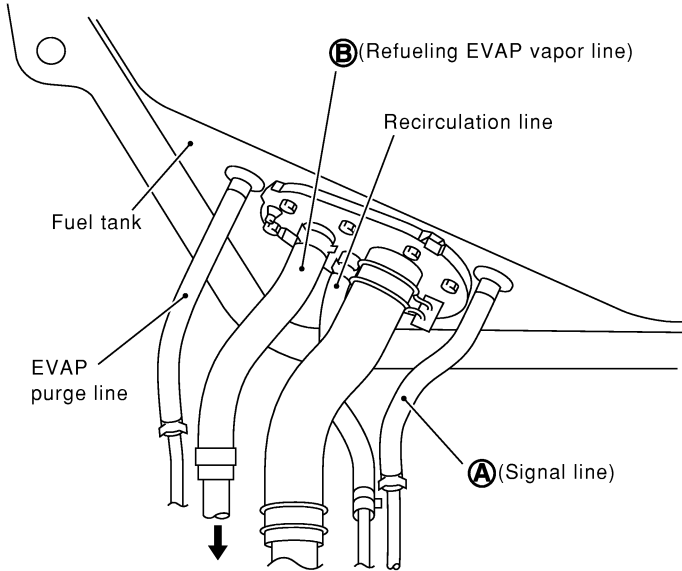
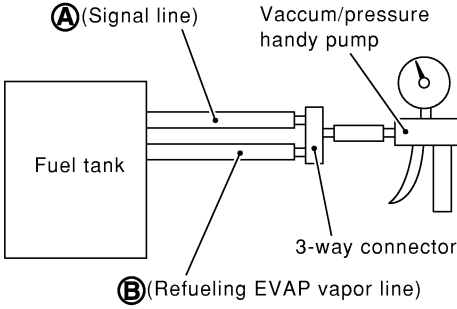
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

6	CHECK VENT HOSES AND VENT TUBES	
Check hoses and tubes between EVAP canister and refueling control valve for clogging, kink, looseness and improper connection.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace hoses and tubes.

7	CHECK FILLER NECK TUBE	
Check signal line and recirculation line for clogging, dents and cracks.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace filler neck tube.

8	CHECK REFUELING CONTROL VALVE	
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 		
<div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  </div> <div style="text-align: center;">  </div> </div>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 9.
OK (Without CONSULT-II)	▶	GO TO 10.
NG	▶	Replace refueling control valve with fuel tank.

SEF246Y

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

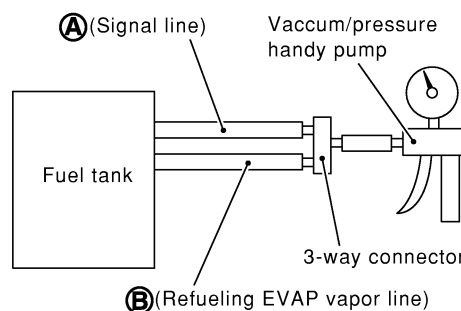
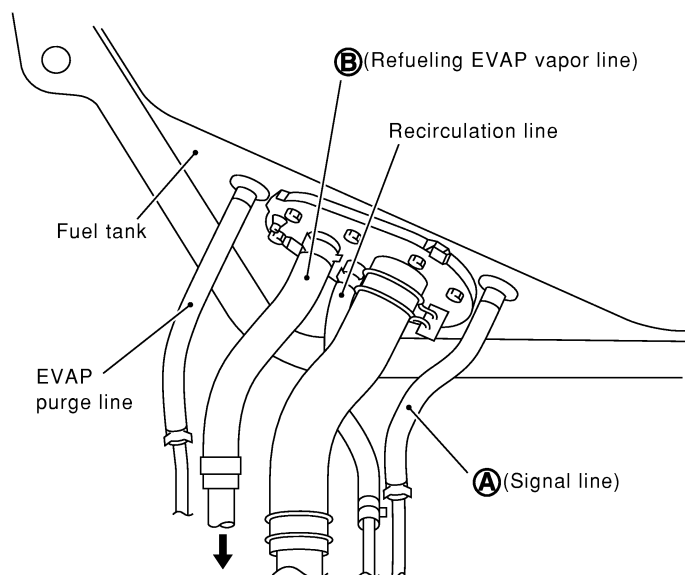
9 CHECK REFUELING EVAP VAPOR CUT VALVE

With CONSULT-II

1. Remove fuel tank. Refer to **FE-5**, "FUEL SYSTEM".
2. Drain fuel from the tank as follows:
 - a. Remove fuel feed hose located on the fuel level sensor unit and fuel pump.
 - b. Connect a spare fuel hose, one side to fuel level sensor unit and fuel pump where the hose was removed and the other side to a fuel container.
 - c. Drain fuel using "FUEL PUMP RELAY" in "ACTIVE TEST" mode with CONSULT-II.
3. Check refueling EVAP vapor cut valve for being stuck to close as follows.
Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank.
4. Check EVAP vapor cut valve for being stuck to open as follows.
 - a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector.
 - b. Remove fuel level sensor unit and fuel pump.

Always replace O-ring with new one.

 - c. Put fuel tank upside down.
 - d. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit and fuel pump remaining removed and check that the pressure is applicable.



SEF246Y

OK or NG

OK	▶	GO TO 11.
NG	▶	Replace refueling EVAP vapor cut valve with fuel tank.

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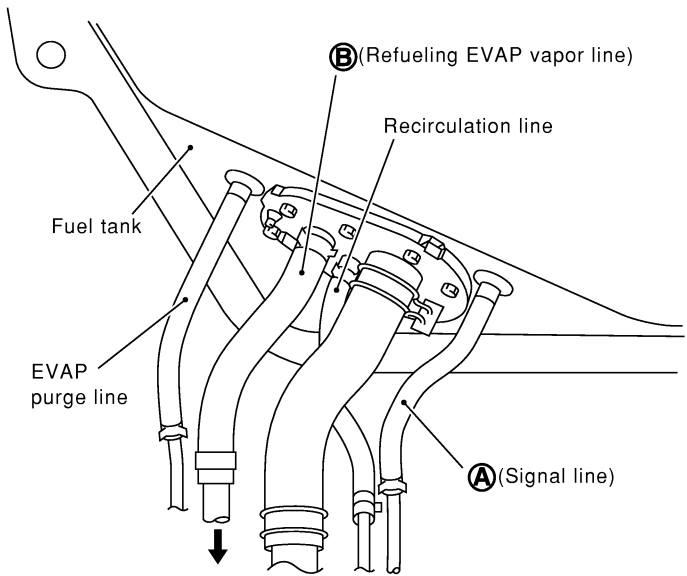
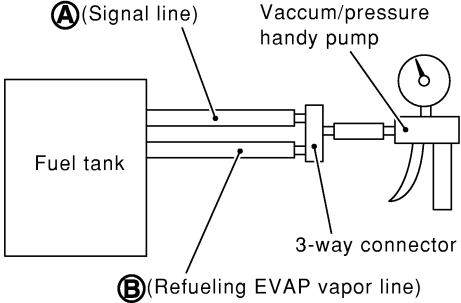
EL

IDX

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

On Board Refueling Vapor Recovery (ORVR) (Cont'd)

10	CHECK REFUELING EVAP VAPOR CUT VALVE
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove fuel tank. Refer to FE-5, "FUEL SYSTEM". 2. Drain fuel from the tank as follows: <ol style="list-style-type: none"> a. Remove fuel level sensor unit and fuel pump. Always replace O-ring with new one. b. Drain fuel from the tank using a hand pump into a fuel container. 3. Check refueling EVAP vapor cut valve for being stuck to close as follows. Blow air into the refueling EVAP vapor cut valve (from hose end B), and check that the air flows freely into the tank. 4. Check EVAP vapor cut valve for being stuck to open as follows. <ol style="list-style-type: none"> a. Connect vacuum pump to hose ends A and B using a suitable 3-way connector. b. Put fuel tank upside down. c. Apply vacuum pressure to both hose ends A and B [-13.3 kPa (-100 mmHg, -3.94 inHg)] with fuel level sensor unit and fuel pump remaining removed and check that the pressure is applicable. 	
 	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace refueling EVAP vapor cut valve with fuel tank.

SEF246Y

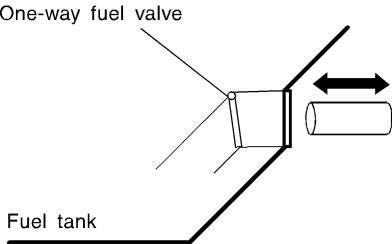
11	CHECK FUEL FILLER TUBE
Check filler neck tube and hose connected to the fuel tank for clogging, dents and cracks.	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace fuel filler tube.

12	CHECK ONE-WAY FUEL VALVE-I
Check one-way valve for clogging.	
OK or NG	
OK	▶ GO TO 13.
NG	▶ Repair or replace one-way fuel valve with fuel tank.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

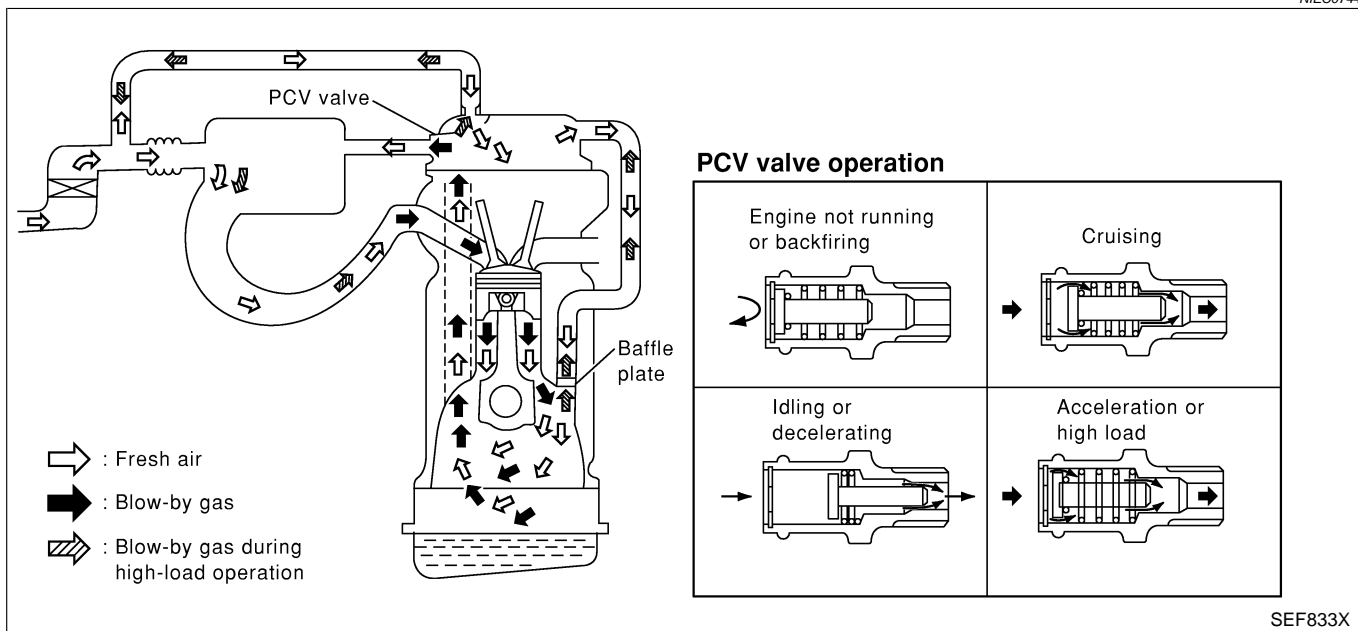
On Board Refueling Vapor Recovery (ORVR) (Cont'd)

13	CHECK ONE-WAY FUEL VALVE-II	<p>1. Make sure that fuel is drained from the tank.</p> <p>2. Remove fuel filler tube and hose.</p> <p>3. Check one-way fuel valve for operation as follows. When a stick is inserted, the valve should open, when removing stick it should close.</p> <p style="text-align: center;">After removing filler tube</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF665U</p> <p>Do not drop any material into the tank.</p> <p style="text-align: center;">OK or NG</p>
OK	▶	INSPECTION END
NG	▶	Replace fuel filler tube or replace one-way fuel valve with fuel tank.

Positive Crankcase Ventilation

DESCRIPTION

NIEC0744



This system returns blow-by gas to the intake collector.

The positive crankcase ventilation (PCV) valve is provided to conduct crankcase blow-by gas to the intake manifold.

During partial throttle operation of the engine, the intake manifold sucks the blow-by gas through the PCV valve.

Normally, the capacity of the valve is sufficient to handle any blow-by and a small amount of ventilating air. The ventilating air is then drawn from the air duct into the crankcase. In this process the air passes through the hose connecting air inlet tubes to rocker cover.

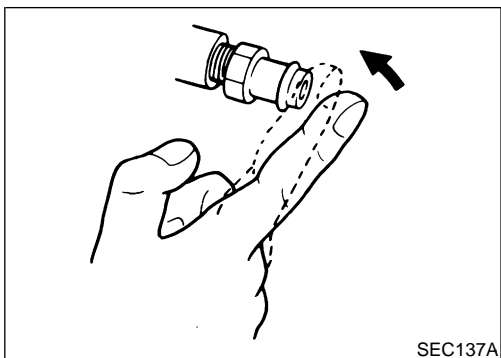
Under full-throttle condition, the manifold vacuum is insufficient to draw the blow-by flow through the valve. The flow goes through the hose connection in the reverse direction.

On vehicles with an excessively high blow-by, the valve does not meet the requirement. This is because some of the flow will go through the hose connection to the intake collector under all conditions.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

SR20DE

Positive Crankcase Ventilation (Cont'd)



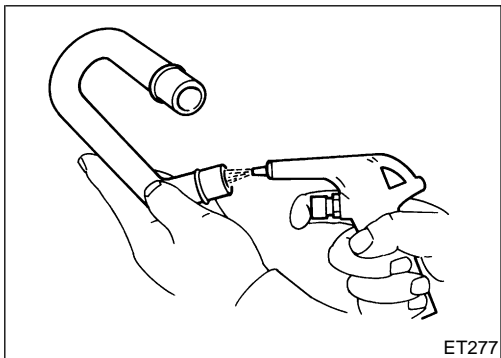
INSPECTION

PCV (Positive Crankcase Ventilation) Valve

NIEC0745

NIEC0745S01

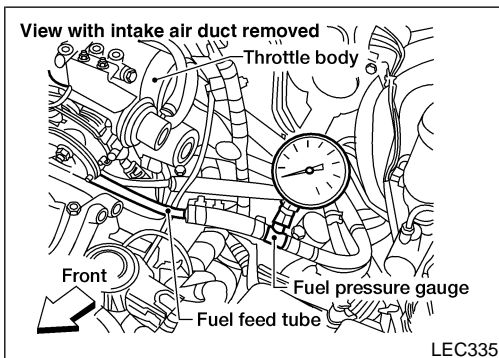
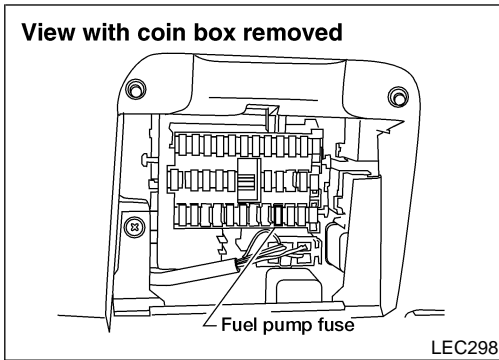
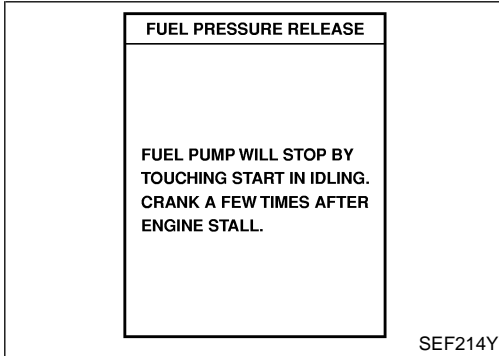
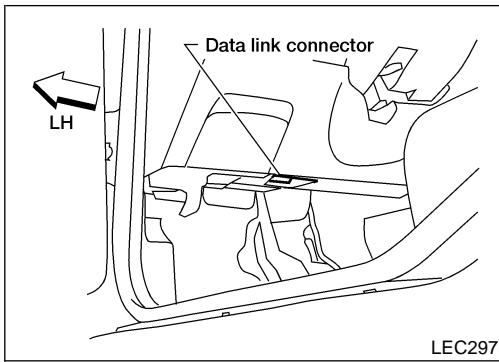
With engine running at idle, remove PCV valve from rocker cover. A properly working valve makes a hissing noise as air passes through it. A strong vacuum should be felt immediately when a finger is placed over the valve inlet.



Ventilation Hose

NIEC0745S02

1. Check hoses and hose connections for leaks.
2. Disconnect all hoses and clean with compressed air. If any hose cannot be freed of obstructions, replace.



Fuel Pressure Release

Before disconnecting fuel line, release fuel pressure from fuel line to eliminate danger.

NIEC0746

Ⓜ WITH CONSULT-II

NIEC0746S01

1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT-II.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF.

ⓧ WITHOUT CONSULT-II

NIEC0746S02

1. Remove fuse for fuel pump.
2. Start engine.
3. After engine stalls, crank it two or three times to release all fuel pressure.
4. Turn ignition switch OFF and reconnect fuel pump fuse.

Fuel Pressure Check

NIEC0747

- When reconnecting fuel line, always use new clamps.
- Make sure that clamp screw does not contact adjacent parts.
- Use a torque driver to tighten clamps.
- Use Pressure Gauge to check fuel pressure.
- Do not perform fuel pressure check with system operating. Fuel pressure gauge may indicate false readings.

1. Release fuel pressure to zero.
2. Disconnect fuel hose from fuel feed tube (engine side).
3. Install pressure gauge between fuel hose and fuel feed tube.
4. Start engine and check for fuel leakage.
5. Read the indication of fuel pressure gauge.

At idle speed:

With vacuum hose connected

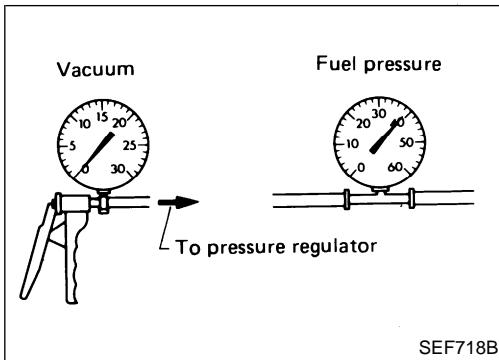
Approximately 235 kPa (2.4 kg/cm², 34 psi)

With vacuum hose disconnected

Approximately 294 kPa (3.0 kg/cm², 43 psi)

If results are unsatisfactory, perform Fuel Pressure Regulator Check, EC-1404.

Fuel Pressure Regulator Check



Fuel Pressure Regulator Check

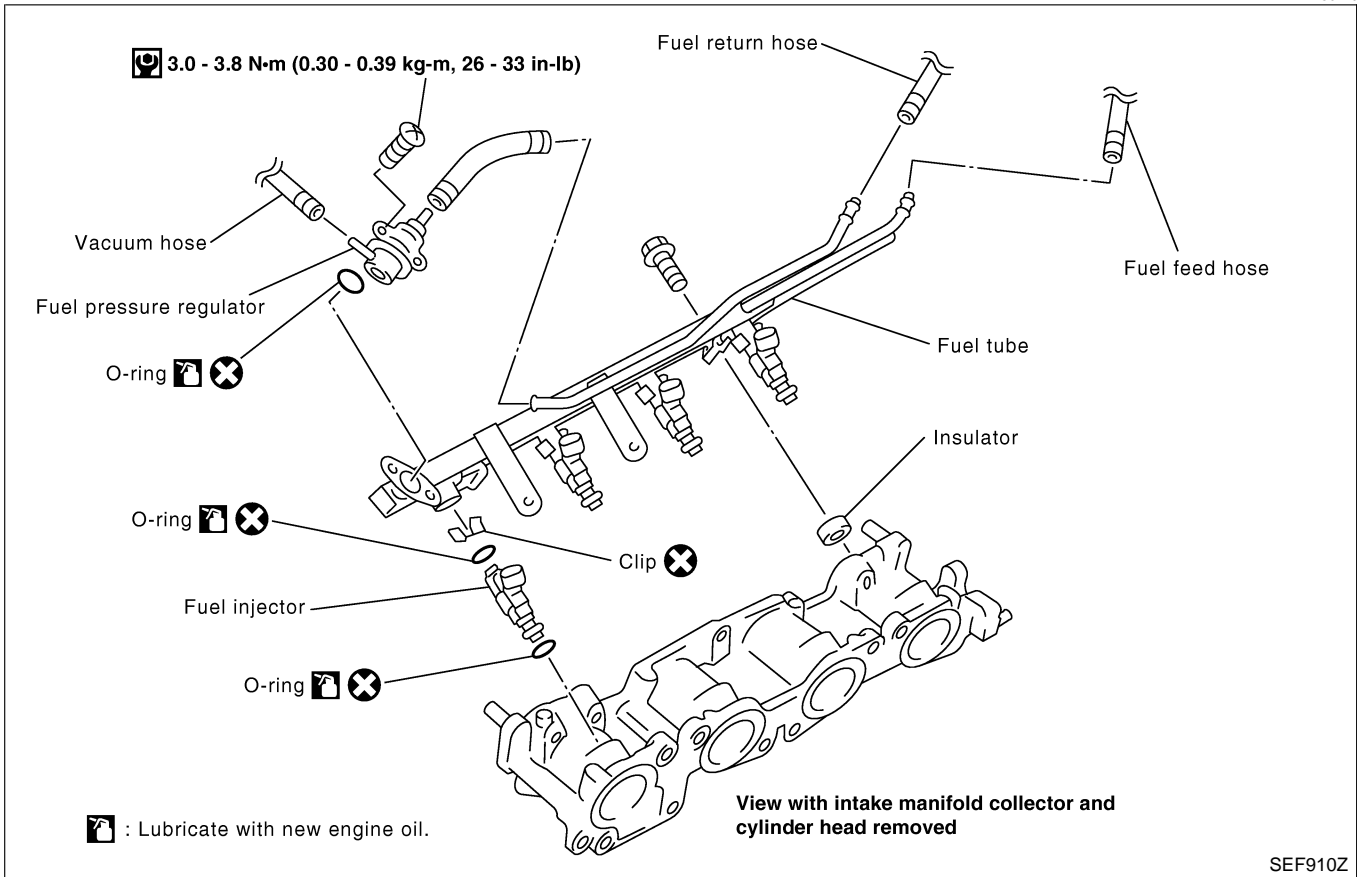
NIEC0748

1. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold collector.
2. Plug intake manifold collector with a rubber cap.
3. Connect variable vacuum source to fuel pressure regulator.
4. Start engine and read indication of fuel pressure gauge as vacuum is changed.

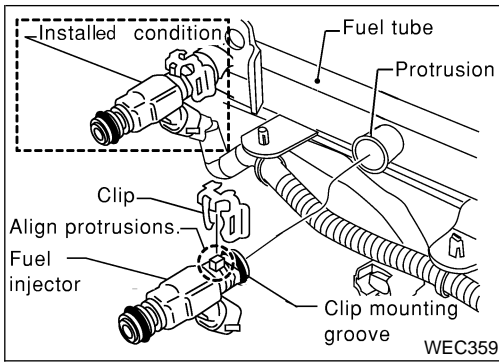
Fuel pressure should decrease as vacuum increases. If results are unsatisfactory, replace fuel pressure regulator.

Injector REMOVAL AND INSTALLATION

NIEC0749



1. Release fuel pressure to zero.
2. Remove accelerator wire bracket.
3. Remove EVAP canister purge volume control solenoid valve and the bracket.
4. Remove ventilation hose.
5. Disconnect injector harness connectors.
6. Disconnect fuel pressure regulator vacuum hose from intake manifold collector.
7. Disconnect fuel hoses from fuel tube assembly.
8. Remove injectors with fuel tube assembly.



9. Expand and remove clips securing fuel injectors.
10. Extract fuel injectors straight from fuel tubes.
 - **Be careful not to damage injector nozzles during removal.**
 - **Do not bump or drop fuel injectors.**
11. Carefully install O-rings, including the one used with the pressure regulator.
 - **Lubricate O-rings with a smear of engine oil.**
 - **Be careful not to damage O-rings with service tools or finger nails or clips. Do not expand or twist O-rings.**
 - **Discard old clips; replace with new ones.**
12. Position clips in grooves on fuel injectors.
 - **Make sure that protrusions of fuel injectors are aligned with cutouts of clips after installation.**
13. Align protrusions of fuel tubes with those of fuel injectors.
14. After properly inserting fuel injectors, check to make sure that fuel tube protrusions are engaged with those of fuel injectors, and that flanges of fuel tubes are engaged with clips.

GI

MA

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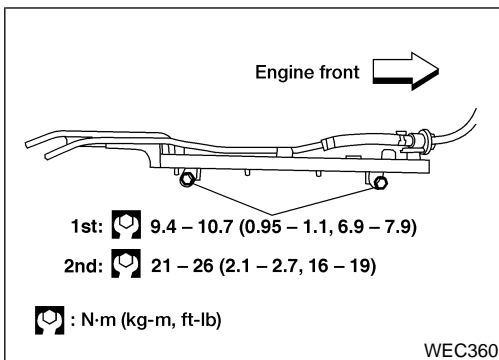
LC

EC

FE

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MT



15. Tighten fuel tube assembly mounting nuts in two stages.

: Tightening torque N·m (kg·m, ft·lb)

1st stage:

9.4 - 10.7 (0.95 - 1.1, 6.9 - 7.9)

2nd stage:

21 - 26 (2.1 - 2.7, 16 - 19)

AT

AX

SU

16. Install all removed parts in the reverse order of removal.

CAUTION:

After properly connecting fuel tube assembly to injector and fuel hose, check connection for fuel leakage.

BR

ST

RS

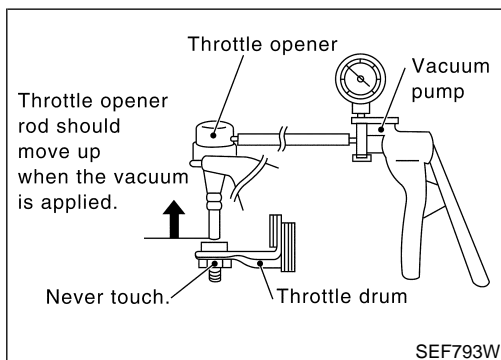
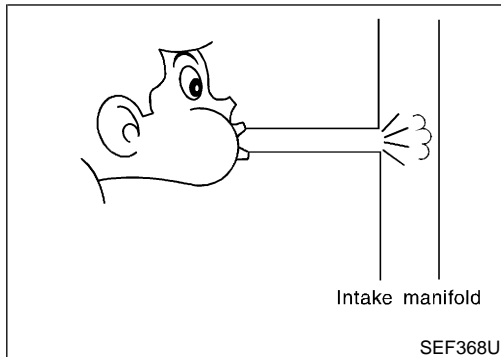
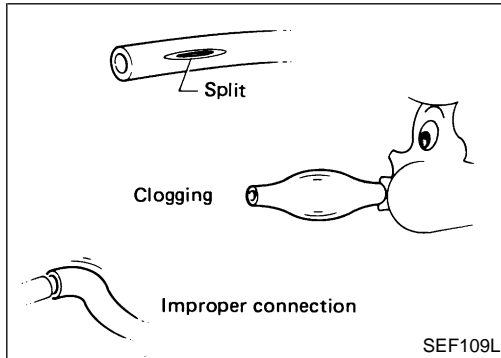
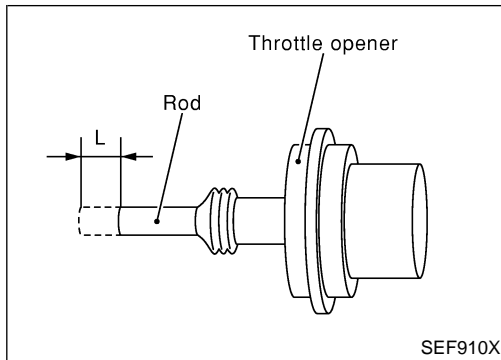
BT

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IDX



Throttle Opener INSPECTION

=NIEC0750

1. Start engine and let it idle.
2. Confirm the amount of the rod moves "L" more than 3.0 mm (0.118 in), the throttle drum becomes free from the rod of the throttle opener.
If NG, go to next step.
If OK, inspection is complete.
3. Turn ignition switch "OFF".
4. Check vacuum source to throttle opener.
 - a. Check vacuum hose for disconnection or improper connection.
 - b. Remove vacuum hose connected to throttle opener.
 - c. Attach a vacuum gauge to vacuum hose, which is disconnected.
 - d. Start engine and let it idle.
 - e. Make sure that the vacuum is more than -40.0 kPa (-300 mmHg, -11.81 inHg).
 - f. Remove the vacuum gauge.
If NG, go to next step.
If OK, go to step 7.
5. Check vacuum hose for clogging and cracks.
If NG, replace or clean vacuum hose.
If OK, go to next step.
6. Blow air into the throttle chamber and make sure air flows freely.
If NG, replace or clean throttle chamber.
If OK, go to next step.
7. Check throttle opener.
 - a. Connect suitable vacuum hose to vacuum pump as shown at left.
 - b. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
 - c. Confirm the amount of the rod moves more than 3.0 mm (0.118 in), and also the throttle drum becomes free from the rod of the throttle opener.
If NG, go to next step.
8. Check visually for cracking and/or distortion of throttle opener and rod.
If NG, replace throttle opener.
If OK, install the vacuum hose and repeat from step 1 to 2.

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

=NIEC0751

NIEC0751S01

PREPARATION

- 1) Make sure that the following parts are in good order.
 - Battery
 - Ignition system
 - Engine oil and coolant levels
 - Fuses
 - ECM harness connector
 - Vacuum hoses
 - Air intake system
(Oil filler cap, oil level gauge, etc.)
 - Fuel pressure
 - Engine compression
 - EGR valve operation
 - Throttle valve
 - EVAP system
- 2) On models equipped with air conditioner, checks should be carried out while the air conditioner is "OFF".
- 3) On models equipped with automatic transaxle, when checking idle speed, ignition timing and mixture ratio, checks should be carried out while shift lever is in "P" or "N" position.
- 4) When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- 5) Turn off headlamps, heater blower, rear window defogger.
- 6) Keep front wheels pointed straight ahead.
- 7) Make the check after the cooling fan has stopped.

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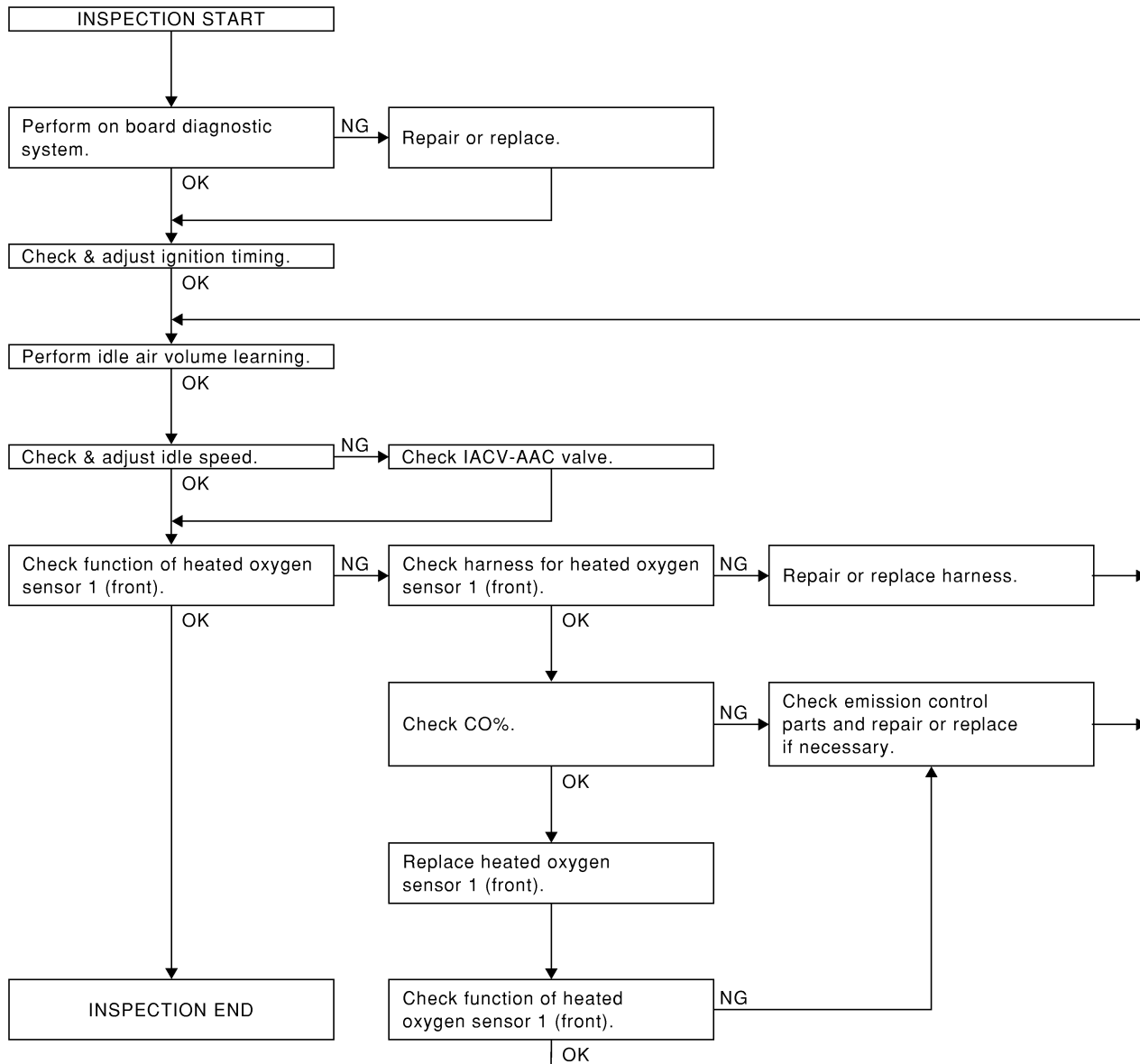
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Overall Inspection Sequence

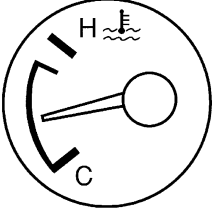
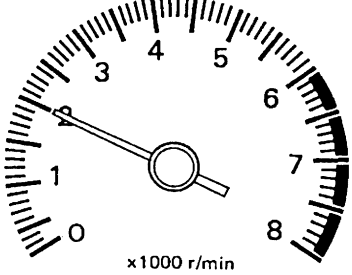
NIEC0751S0101



SEF906XA

-NIEC0751S02

INSPECTION PROCEDURE

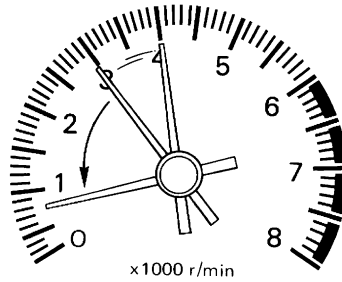
1	INSPECTION START	<p>1. Visually check the following:</p> <ul style="list-style-type: none"> ● Air cleaner clogging ● Hoses and ducts for leaks ● EGR valve operation ● Electrical connectors ● Gasket ● Throttle valve and throttle position sensor operation <p>2. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge. Ensure engine stays below 1,000 rpm.</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>3. Open engine hood and run engine at about 2,000 rpm for about 2 minutes under no-load.</p> <div style="text-align: center; margin: 20px 0;">  </div> <p>4. Make sure that no DTC is displayed with CONSULT-II or GST.</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>									
		<p>AEC692</p> <p>SEF977U</p>										
		<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK (With CONSULT-II)</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>OK (Without CONSULT-II)</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 2.</td> </tr> </table>	OK (With CONSULT-II)	▶	GO TO 3.	OK (Without CONSULT-II)	▶	GO TO 4.	NG	▶	GO TO 2.	
OK (With CONSULT-II)	▶	GO TO 3.										
OK (Without CONSULT-II)	▶	GO TO 4.										
NG	▶	GO TO 2.										

2	REPAIR OR REPLACE	<p>Repair or replace components as necessary according to corresponding "Diagnostic Procedure".</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">With CONSULT-II</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>Without CONSULT-II</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>	With CONSULT-II	▶	GO TO 3.	Without CONSULT-II	▶	GO TO 4.	
With CONSULT-II	▶	GO TO 3.							
Without CONSULT-II	▶	GO TO 4.							

3 CHECK IGNITION TIMING

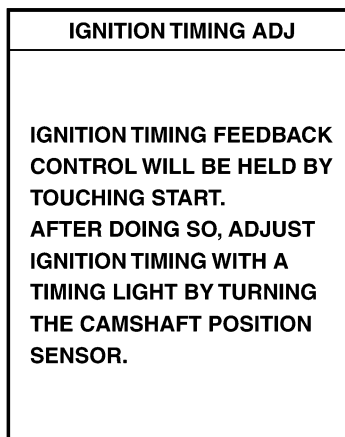
With CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



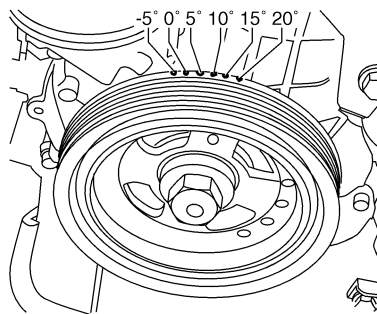
3. Select "IGNITION TIMING ADJ" in WORK SUPPORT mode.
4. Touch "START".

SEF978U



PEF546N

5. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
6. Check ignition timing with a timing light.



LEC300

M/T: 15°±2° BTDC
A/T: 15°±2° BTDC (in "P" or "N" position)

OK or NG

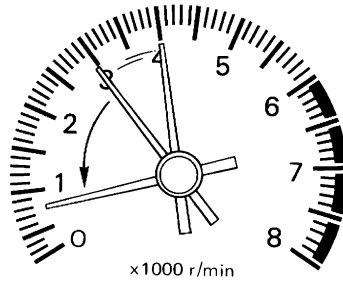
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
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4 CHECK IGNITION TIMING

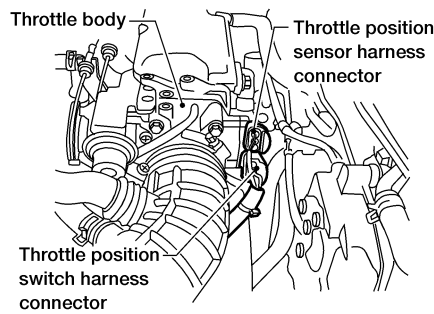
⊗ Without CONSULT-II

1. Run engine at about 2,000 rpm for about 2 minutes under no-load.
2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed for about 1 minute.



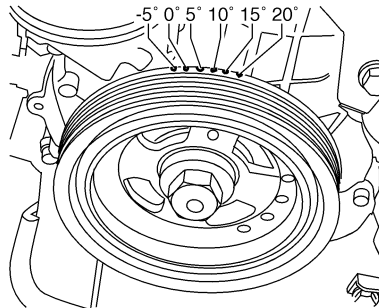
SEF978U

3. Turn off engine and disconnect throttle position sensor harness connector.



LEC279

4. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run at idle speed.
5. Check ignition timing with a timing light.



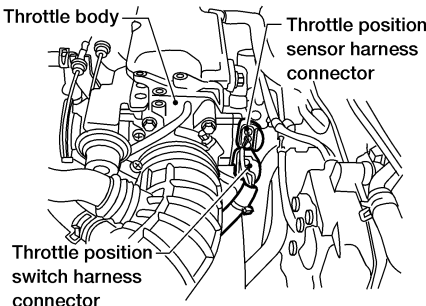
LEC300

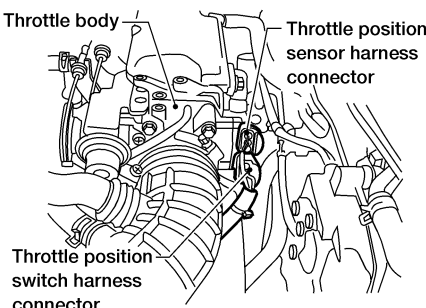
M/T: 15°±2° BTDC

A/T: 15°±2° BTDC (in "P" or "N" position)

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	ADJUST IGNITION TIMING	
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <p>1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor.</p>		
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>1. Adjust ignition timing to the specified value by turning distributor after loosening bolts which secure distributor.</p> <p>2. Turn off engine and connect throttle position sensor harness connector to throttle position sensor.</p>		
		
LEC279		
With CONSULT-II		▶ GO TO 3.
Without CONSULT-II		▶ GO TO 4.

6	PERFORM IDLE AIR VOLUME LEARNING	
<p><input checked="" type="checkbox"/> With CONSULT-II</p> <p>1. Start and rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run it at idle speed.</p> <p>2. Perform "Idle Air Volume Learning", EC-1419.</p>		
<p><input checked="" type="checkbox"/> Without CONSULT-II</p> <p>1. Turn off engine and connect throttle position sensor harness connector.</p>		
		
LEC279		
		▶ GO TO 7.

7	CHECK TARGET IDLE SPEED							
<p><input checked="" type="checkbox"/> With CONSULT-II 1. Read idle speed in "DATA MONITOR" mode with CONSULT-II.</p> <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse;"> <tr><th colspan="2" style="padding: 2px;">DATA MONITOR</th></tr> <tr><th style="padding: 2px;">MONITOR</th><th style="padding: 2px;">NO DTC</th></tr> <tr><td style="padding: 2px;">ENG SPEED</td><td style="padding: 2px;">XXX rpm</td></tr> </table> </div> <p style="text-align: right; margin-top: 10px;">SEF058Y</p> <p style="margin-top: 10px;">M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm
DATA MONITOR								
MONITOR	NO DTC							
ENG SPEED	XXX rpm							
<p><input type="checkbox"/> Without CONSULT-II 1. Check idle speed.</p> <p style="margin-left: 20px;">M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center; margin-top: 10px;">OK or NG</p>								
OK (With CONSULT-II) ▶		GO TO 9.						
OK (Without CONSULT-II) ▶		GO TO 10.						
NG ▶		GO TO 8.						

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8	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check IACV-AAC valve and replace if necessary. Refer to EC-1764. ● Check IACV-AAC valve harness and repair if necessary. Refer to EC-1764. ● Check ECM function by substituting another known-good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 		
With CONSULT-II ▶		GO TO 9.
Without CONSULT-II ▶		GO TO 10.

BASIC SERVICE PROCEDURE

SR20DE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

9	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL									
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 										
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> </table>			DATA MONITOR		MONITOR	NO DTC	ENG SPEED	XXX rpm	HO2S1 MNTR (B1)	RICH
DATA MONITOR										
MONITOR	NO DTC									
ENG SPEED	XXX rpm									
HO2S1 MNTR (B1)	RICH									
SEF820Y										
<p>1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH</p> <p style="text-align: center;">OK or NG</p>										
OK	▶	INSPECTION END								
NG (Monitor does not fluctuate.)	▶	GO TO 13.								
NG (Monitor fluctuates less than 5 times.)	▶	GO TO 11.								

10	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> Set voltmeter probe between ECM terminal 62 and ground. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. <p>1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	INSPECTION END
NG (Voltage does not fluctuate.)	▶	GO TO 13.
NG (Voltage fluctuates less than 5 times.)	▶	GO TO 11.

BASIC SERVICE PROCEDURE

SR20DE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

11	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH 		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 62 and ground. 6. Make sure that the voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V <p style="text-align: center;">OK or NG</p>		
OK		▶ INSPECTION END
NG		▶ GO TO 12.

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12	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Check fuel pressure regulator. Refer to EC-1404. ● Check mass air flow sensor and its circuit. Refer to EC-1507. ● Check injector and its circuit. Refer to EC-1905. Clean or replace if necessary. ● Check engine coolant temperature sensor and its circuit. Refer to EC-1524. ● Check ECM function by substituting another known good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 		
		▶ GO TO 6.

AX
 SU
 BR
 ST

13	CHECK HEATED OXYGEN SENSOR 1 (FRONT) HARNESS	
<ol style="list-style-type: none"> 1. Turn off engine and disconnect battery ground cable. 2. Disconnect ECM harness connector. 3. Disconnect heated oxygen sensor 1 (front) harness connector. 4. Check harness continuity between ECM terminal 62 and HO2S1 (front) harness connector terminal 2. Refer to Wiring Diagram, EC-1548. Continuity should exist. <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 15.
NG		▶ GO TO 14.

RS
 BT
 HA
 SC

14	REPAIR OR REPLACE	
<p>Repair or replace harness between ECM and heated oxygen sensor 1 (front).</p>		
		▶ GO TO 6.

EL
 IDX

15 PREPARATION FOR "CO" % CHECK

With CONSULT-II

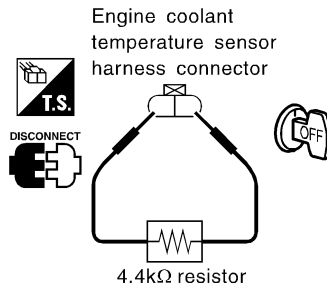
1. Reconnect ECM harness connector.
2. Turn ignition switch "ON".
3. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
4. Set "ENG COOLANT TEMP" to 5°C (41°F) by touching "DWN" and "Qd".

ACTIVE TEST	
ENG COOLANT TEMP	XXX °C
MONITOR	
ENG SPEED	XXX rpm
INJ PULSE-B1	XXX msec
IGN TIMING	XXX BTDC

SEF172Y

Without CONSULT-II

1. Disconnect ECM harness connector.
2. Disconnect engine coolant temperature sensor harness connector.
3. Connect a resistor (4.4 kΩ) between terminals of engine coolant temperature sensor harness connector.



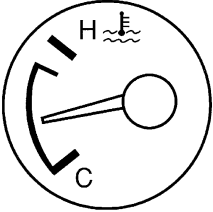
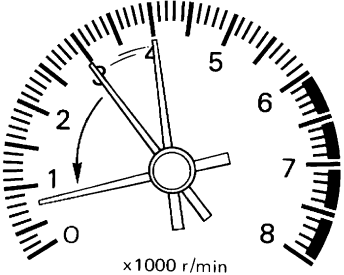
SEF982UA

▶ GO TO 16.

BASIC SERVICE PROCEDURE

SR20DE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

16	CHECK "CO" %
<p>1. Start engine and warm it up until engine coolant temperature indicator points to the middle of gauge.</p>	
<div style="text-align: center;">  </div>	
<p>2. Rev engine (2,000 to 3,000 rpm) two or three times under no-load, then run engine at idle speed.</p>	
<div style="text-align: center;">  </div>	
<p>3. Check "CO" %. Idle CO: Less than 11%</p> <p>4. <input checked="" type="checkbox"/> Without CONSULT-II After checking CO%,</p> <p>a. Disconnect the resistor from terminals of engine coolant temperature sensor.</p> <p>b. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 17.
NG	▶ GO TO 18.

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AEC692

SEF978U

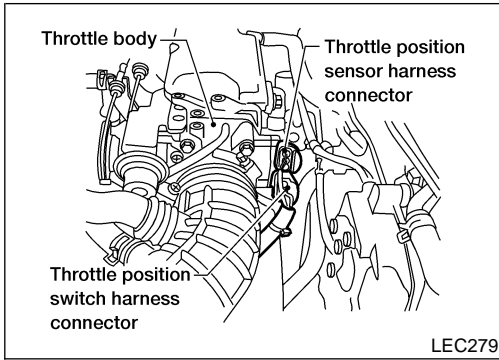
BASIC SERVICE PROCEDURE

SR20DE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

17	CHECK HEATED OXYGEN SENSOR 1 (FRONT) SIGNAL
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. See "HO2S1 MNTR (B1)" in "DATA MONITOR" mode. 6. Maintaining engine at 2,000 rpm under no-load (engine is warmed up to normal operating temperature), check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds. 1 time: RICH → LEAN → RICH 2 times: RICH → LEAN → RICH → LEAN → RICH 	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop engine. 2. Replace heated oxygen sensor 1 (front). 3. Start engine and warm it up to normal operating temperature. 4. Run engine at approx. 2,000 rpm for approx. 2 minutes under no-load. 5. Set voltmeter probe between ECM terminal 62 and ground. 6. Make sure that voltage fluctuates between 0 - 0.3V and 0.6 - 1.0V more than 5 times during 10 seconds at 2,000 rpm. 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ GO TO 18.

18	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Connect HO2S1 (front) harness connector to HO2S1 (front). ● Check fuel pressure regulator. Refer to EC-1404. ● Check mass air flow sensor and its circuit. Refer to EC-1507. ● Check injector and its circuit. Refer to EC-1905. Clean or replace if necessary. ● Check engine coolant temperature sensor and its circuit. Refer to EC-1524. ● Check ECM function by substituting another known good ECM. (ECM may be the cause of a problem, but this is rarely the case.) 	
	▶ GO TO 6.



⊗ Without CONSULT-II

NIEC0752S0302

1. Turn ignition switch "ON" and wait at least 1 second.
2. Turn ignition switch "OFF" and wait at least 10 seconds.
3. Start engine and warm it up to normal operating temperature.
4. Check that all items listed under the topic "PRE-CONDITIONING", EC-1419 (previously mentioned) are in good order.
5. Turn ignition switch "OFF" and wait at least 10 seconds.
6. Start the engine and let it idle for at least 15 seconds.
7. Disconnect throttle position sensor harness connector (brown), then reconnect it within 5 seconds.
8. Wait 15 seconds.
9. Make sure that idle speed is within specifications. If not, the result will be incomplete. In this case, find the cause of the problem by referring to the NOTE below.
10. Rev up the engine two or three times. Make sure that idle speed and ignition timing are within specifications.

ITEM	SPECIFICATION
Idle speed	M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)
Ignition timing	M/T: 15°±2° BTDC A/T: 15°±2° BTDC (in "P" or "N" position)

NOTE:

If idle air volume learning cannot be performed successfully, proceed as follows:

- 1) **Check that throttle valve is fully closed.**
- 2) **Check that downstream of throttle valve is free from air leakage.**
- 3) **Adjust closed throttle position switch and reset memory. (Refer to Basic Inspection, EC-1461.)**
- 4) **When the above three items check out OK, engine component parts and their installation condition are questionable. Check and eliminate the cause of the problem.**
- 5) **If any of the following conditions occur after the engine has started, eliminate the cause of the problem and perform "Idle air volume learning" again:**
 - Engine stalls.
 - Erroneous idle.
 - Blown fuses related to the IACV-AAC valve system.

Introduction

NIEC0753

The ECM has an on board diagnostic system, which detects malfunctions related to engine sensors or actuators. The ECM also records various emission-related diagnostic information including:

Emission-related diagnostic information	SAE Mode
Diagnostic Trouble Code (DTC)	Mode 3 of SAE J1979
Freeze Frame data	Mode 2 of SAE J1979
System Readiness Test (SRT) code	Mode 1 of SAE J1979
1st Trip Diagnostic Trouble Code (1st Trip DTC)	Mode 7 of SAE J1979
1st Trip Freeze Frame data	
Test values and Test limits	Mode 6 of SAE J1979

The above information can be checked using procedures listed in the table below.

X: Applicable —: Not applicable

	DTC	1st trip DTC	Freeze Frame data	1st trip Freeze Frame data	SRT code	Test value
CONSULT-II	X	X	X	X	X	—
GST	X	X*1	X	—	X	X

*1: 1st trip DTCs for self-diagnoses concerning SRT items cannot be shown on the GST display.

The malfunction indicator lamp (MIL) on the instrument panel lights up when the same malfunction is detected in two consecutive trips (Two trip detection logic), or when the ECM enters fail-safe mode. (Refer to EC-1476.)

Two Trip Detection Logic

NIEC0754

When a malfunction is detected for the first time, 1st trip DTC and 1st trip Freeze Frame data are stored in the ECM memory. The MIL will not light up at this stage. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and Freeze Frame data are stored in the ECM memory, and the MIL lights up. The MIL lights up at the same time when the DTC is stored. <2nd trip> The “trip” in the “Two Trip Detection Logic” means a driving mode in which self-diagnosis is performed during vehicle operation. Specific on board diagnostic items will cause the ECM to light up or blink the MIL, and store DTC and Freeze Frame data, even in the 1st trip, as shown below.

X: Applicable —: Not applicable

Items	MIL				DTC		1st trip DTC	
	1st trip		2nd trip		1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying
	Blinking	Lighting up	Blinking	Lighting up				
Coolant overtemperature enrichment protection — DTC: P0217	—	X	—	—	X	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	X	—	—	—	—	—	X	—
Misfire (Possible three way catalyst damage) — DTC: P0300 - P0304 is being detected	—	—	X	—	—	X	—	—
Closed loop control — DTC: P1148	—	X	—	—	X	—	X	—
Fail-safe items (Refer to EC-1476.)	—	X	—	—	X*1	—	X*1	—
Except above	—	—	—	X	—	X	X	—

*1: Except “ECM”

Emission-related Diagnostic Information

NIEC0755

DTC AND 1ST TRIP DTC

NIEC0755S01

The 1st trip DTC (whose number is the same as the DTC number) is displayed for the latest self-diagnostic result obtained. If the ECM memory was cleared previously, and the 1st trip DTC did not reoccur, the 1st trip DTC will not be displayed.

If a malfunction is detected during the 1st trip, the 1st trip DTC is stored in the ECM memory. The MIL will not light up (two trip detection logic). If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the ECM memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are stored in the ECM memory and the MIL lights up. In other words, the DTC is stored in the ECM memory and the MIL lights up when the same malfunction occurs in two consecutive trips. If a 1st trip DTC is stored and a non-diagnostic operation is performed between the 1st and 2nd trips, only the 1st trip DTC will continue to be stored. For malfunctions that blink or light up the MIL during the 1st trip, the DTC and 1st trip DTC are stored in the ECM memory.

Procedures for clearing the DTC and the 1st trip DTC from the ECM memory are described in "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433.

For malfunctions in which 1st trip DTCs are displayed, refer to EC-1431. These items are required by legal regulations to continuously monitor the system/component. In addition, the items monitored non-continuously are also displayed on CONSULT-II.

1st trip DTC is specified in Mode 7 of SAE J1979. 1st trip DTC detection occurs without lighting up the MIL and therefore does not warn the driver of a problem. However, 1st trip DTC detection will not prevent the vehicle from being tested, for example during Inspection/Maintenance (I/M) tests.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in "Work Flow" procedure Step II, refer to EC-1459. Then perform "DTC Confirmation Procedure" or "Overall Function Check" to try to duplicate the problem. If the malfunction is duplicated, the item requires repair.

How to Read DTC and 1st Trip DTC

NIEC0755S0101

DTC and 1st trip DTC can be read by the following methods.

☐ With CONSULT-II

⊗ With GST

CONSULT-II or GST (Generic Scan Tool) Examples: P0340, P1320, P0705, P0750, etc.

These DTCs are prescribed by SAE J2012.

(CONSULT-II also displays the malfunctioning component or system.)

- 1st trip DTC No. is the same as DTC No.
- Output of a DTC indicates a malfunction. However, GST does not indicate whether the malfunction is still occurring or has occurred in the past and has returned to normal. CONSULT-II can identify malfunction status as shown below. Therefore, using CONSULT-II (if available) is recommended.

A sample of CONSULT-II display for DTC and 1st trip DTC is shown below. DTC or 1st trip DTC of a malfunction is displayed in SELF-DIAGNOSTIC RESULTS mode of CONSULT-II. Time data indicates how many times the vehicle was driven after the last detection of a DTC.

If the DTC is being detected currently, the time data will be "0".

If a 1st trip DTC is stored in the ECM, the time data will be "[1t]".

DTC display	SELF DIAG RESULTS		1st trip DTC display	SELF DIAG RESULTS	
	DTC RESULTS			DTC RESULTS	
	MAF SEN/CIRCUIT [P0100]	0		MAF SEN/CIRCUIT [P0100]	1t

SEF992X

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

NIEC0755S02

The ECM records the driving conditions such as fuel system status, calculated load value, engine coolant temperature, short term fuel trim, long term fuel trim, engine speed, vehicle speed and absolute pressure at the moment a malfunction is detected.

Data which are stored in the ECM memory, along with the 1st trip DTC, are called 1st trip freeze frame data.

The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT-II or GST. The 1st trip freeze frame data can only be displayed on the CONSULT-II screen, not on the GST. For details, see EC-1447.

Only one set of freeze frame data (either 1st trip freeze frame data or freeze frame data) can be stored in the ECM. 1st trip freeze frame data is stored in the ECM memory along with the 1st trip DTC. There is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the ECM memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the ECM. The ECM has the following priorities to update the data.

Priority	Items	
1	Freeze frame data	Misfire — DTC: P0300 - P0304 Fuel Injection System Function — DTC: P0171, P0172
2		Except the above items (Includes A/T related items)
3	1st trip freeze frame data	

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 2nd trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction to the misfire. The 1st trip freeze frame data is updated each time a different malfunction is detected. There is no priority for 1st trip freeze frame data. However, once freeze frame data is stored in the ECM memory, 1st trip freeze data is no longer stored (because only one freeze frame data or 1st trip freeze frame data can be stored in the ECM). If freeze frame data is stored in the ECM memory and freeze frame data with the same priority occurs later, the first (original) freeze frame data remains unchanged in the ECM memory.

Both 1st trip freeze frame data and freeze frame data (along with the DTCs) are cleared when the ECM memory is erased. Procedures for clearing the ECM memory are described in “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-1433.

SYSTEM READINESS TEST (SRT) CODE

NIEC0755S03

System Readiness Test (SRT) code is specified in Mode 1 of SAE J1979.

As part of an enhanced emissions test for Inspection & Maintenance (I/M), certain states require the status of SRT be used to indicate whether the ECM has completed self-diagnosis of major emission systems and components. Completion must be verified in order for the emissions inspection to proceed.

If a vehicle is rejected for a State emissions inspection due to one or more SRT items indicating “INCMP”, use the information in this Service Manual to set the SRT to “CMPLT”.

In most cases the ECM will automatically complete its self-diagnosis cycle during normal usage, and the SRT status will indicate “CMPLT” for each application system. Once set as “CMPLT”, the SRT status remains “CMPLT” until the self-diagnosis memory is erased.

Occasionally, certain portions of the self-diagnostic test may not be completed as a result of the customer’s normal driving pattern; the SRT will indicate “INCMP” for these items.

NOTE:

The SRT will also indicate “INCMP” if the self-diagnosis memory is erased for any reason or if the ECM memory power supply is interrupted for several hours.

If, during the state emissions inspection, the SRT indicates “CMPLT” for all test items, the inspector will continue with the emissions test. However, if the SRT indicates “INCMP” for one or more of the SRT items the vehicle is returned to the customer untested.

NOTE:

If MIL is “ON” during the state emissions inspection, the vehicle is also returned to the customer untested even though the SRT indicates “CMPLT” for all test items. Therefore, it is important to check SRT (“CMPLT”) and DTC (No DTCs) before the inspection.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

Emission-related Diagnostic Information (Cont'd)

SRT Item

=NIEC0755S0301

The table below shows required self-diagnostic items to set the SRT to "CMPLT".

SRT item (CONSULT-II indication)	Performance Priority*2	Required self-diagnostic items to set the SRT to "CMPLT"	Corresponding DTC No.
CATALYST	3	Three way catalyst function	P0420
EVAP SYSTEM	2	EVAP control system (small leak) (negative pressure)	P0440
	—	EVAP control system (small leak) (positive pressure)	P1440*1
	3	EVAP control system purge flow monitoring	P1447
O2 SENSOR	3	Heated oxygen sensor 1 (front) (circuit)	P0130
		Heated oxygen sensor 1 (front) (lean shift monitoring)	P0131
		Heated oxygen sensor 1 (front) (rich shift monitoring)	P0132
		Heated oxygen sensor 1 (front) (response monitoring)	P0133
		Heated oxygen sensor 1 (front) (high voltage)	P0134
		Heated oxygen sensor 2 (rear) (min. voltage monitoring)	P0137
		Heated oxygen sensor 2 (rear) (max. voltage monitoring)	P0138
		Heated oxygen sensor 2 (rear) (response monitoring)	P0139
		Heated oxygen sensor 2 (rear) (high voltage)	P0140
O2 SEN HEATER	3	Heated oxygen sensor 1 heater (front)	P0135
		Heated oxygen sensor 2 heater (rear)	P0141
EGR SYSTEM	3	EGR function (close)	P0400
	1	EGR function (open)	P1402

*1: P1440 [EVAP control system (small leak) (positive pressure) diagnosis] is one type of SRT related diagnosis. This diagnosis, however, does not contribute to setting the SRT as "CMPLT", when no malfunction exists in the EVAP system. Therefore, P0440 must be used instead of P1440.

*2: If completion of several SRTs is required, perform driving patterns (DTC confirmation procedure), one by one based on the priority for models with CONSULT-II.

—NIEC0755S0302

SRT Set Timing

SRT is set as “CMPLT” after self-diagnosis has been performed one or more times. Completion of SRT is done regardless of whether the result is OK or NG. The set timing is different between OK and NG results and is shown in the table below.

Self-diagnosis result		Example						
		Diagnosis	Ignition cycle					
	← ON →		OFF	← ON →	OFF	← ON →	OFF	← ON →
All OK	Case 1	P0400	OK (1)	— (1)	OK (2)	— (2)		
		P0402	OK (1)	— (1)	— (1)	OK (2)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	“CMPLT”	“CMPLT”	“CMPLT”	“CMPLT”		
	Case 2	P0400	OK (1)	— (1)	— (1)	— (1)		
		P0402	— (0)	— (0)	OK (1)	— (1)		
		P1402	OK (1)	OK (2)	— (2)	— (2)		
		SRT of EGR	“INCMP”	“INCMP”	“CMPLT”	“CMPLT”		
NG exists	Case 3	P0400	OK	OK	—	—		
		P0402	—	—	—	—		
		P1402	NG	—	NG	NG (Consecutive NG)		
		(1st trip) DTC	1st trip DTC	—	1st trip DTC	DTC (= MIL “ON”)		
		SRT of EGR	“INCMP”	“INCMP”	“INCMP”	“CMPLT”		

OK: Self-diagnosis is carried out and the result is OK.

NG: Self-diagnosis is carried out and the result is NG.

—: Self-diagnosis is not carried out.

When all SRT related self-diagnoses showed OK results in a single cycle (Ignition OFF-ON-OFF), the SRT will indicate “CMPLT”. → Case 1 above

When all SRT related self-diagnoses showed OK results through several different cycles, the SRT will indicate “CMPLT” at the time the respective self-diagnoses have at least one OK result. → Case 2 above

If one or more SRT related self-diagnoses showed NG results in 2 consecutive cycles, the SRT will also indicate “CMPLT”. → Case 3 above

The table above shows that the minimum number of cycles for setting SRT as “INCMP” is one (1) for each self-diagnosis (Case 1 & 2) or two (2) for one of self-diagnoses (Case 3). However, in preparation for the state emissions inspection, it is unnecessary of each self-diagnosis to be executed twice (Case 3) for the following reasons:

- The SRT will indicate “CMPLT” at the time the respective self-diagnoses have one (1) OK result.
- The emissions inspection requires “CMPLT” of the SRT only with OK self-diagnosis results.
- When, during SRT driving pattern, 1st trip DTC (NG) is detected prior to “CMPLT” of SRT, the self-diagnosis memory must be erased from ECM after repair.
- If the 1st trip DTC is erased, all the SRT will indicate “INCMP”.

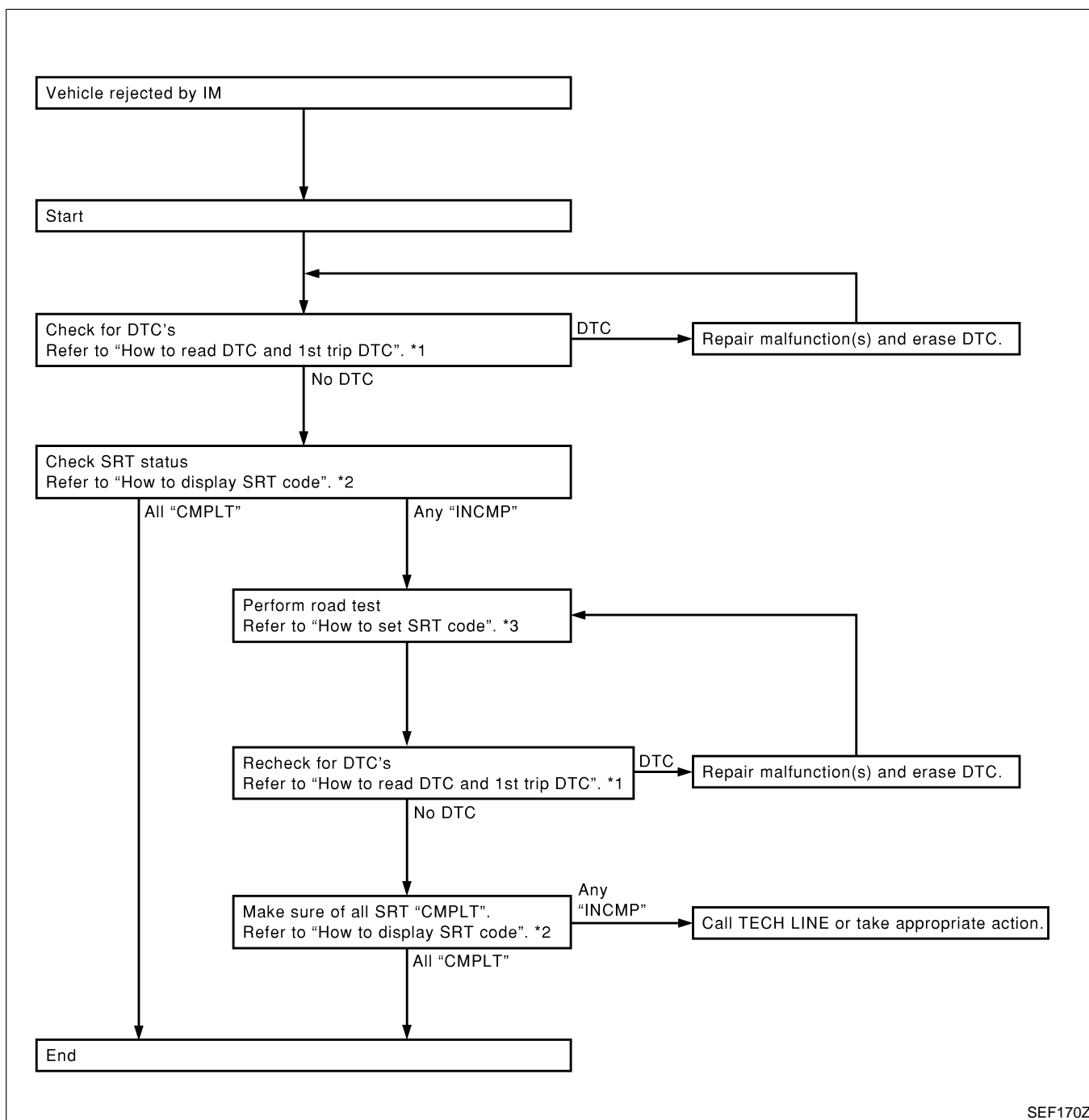
NOTE:

SRT can be set as “CMPLT” together with the DTC(s). Therefore, DTC check must always be carried out prior to the state emission inspection even though the SRT indicates “CMPLT”.

SRT Service Procedure

If a vehicle has failed the state emissions inspection due to one or more SRT items indicating “INCMP”, review the flowchart diagnostic sequence on the next page.

NIEC0755S0303



SEF170Z

*1 EC-1422

*2 EC-1426

*3 EC-1427

How to Display SRT Code

With CONSULT-II

Selecting "SRT STATUS" in "DTC CONFIRMATION" mode with CONSULT-II.

For items whose SRT codes are set, a "CMPLT" is displayed on the CONSULT-II screen; for items whose SRT codes are not set, "INCMP" is displayed.

With GST

Selecting Mode 1 with GST (Generic Scan Tool)

A sample of CONSULT-II display for SRT code is shown below.

"INCMP" means the self-diagnosis is incomplete and SRT is not set. "CMPLT" means the self-diagnosis is complete and SRT is set.

NIEC0755S0304

SRT STATUS	
CATALYST	CMLPT
EVAP SYSTEM	INCMP
HO2S HTR	CMLPT
HO2S	CMLPT
EGR SYSTEM	INCMP

SEF713Y

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

How to Set SRT Code

To set all SRT codes, self-diagnosis for the items indicated above must be performed one or more times. Each diagnosis may require a long period of actual driving under various conditions. NIEC0755S0305

With CONSULT-II

Perform corresponding DTC Confirmation Procedure one by one based on "Performance Priority" in the table on EC-1424.

Without CONSULT-II

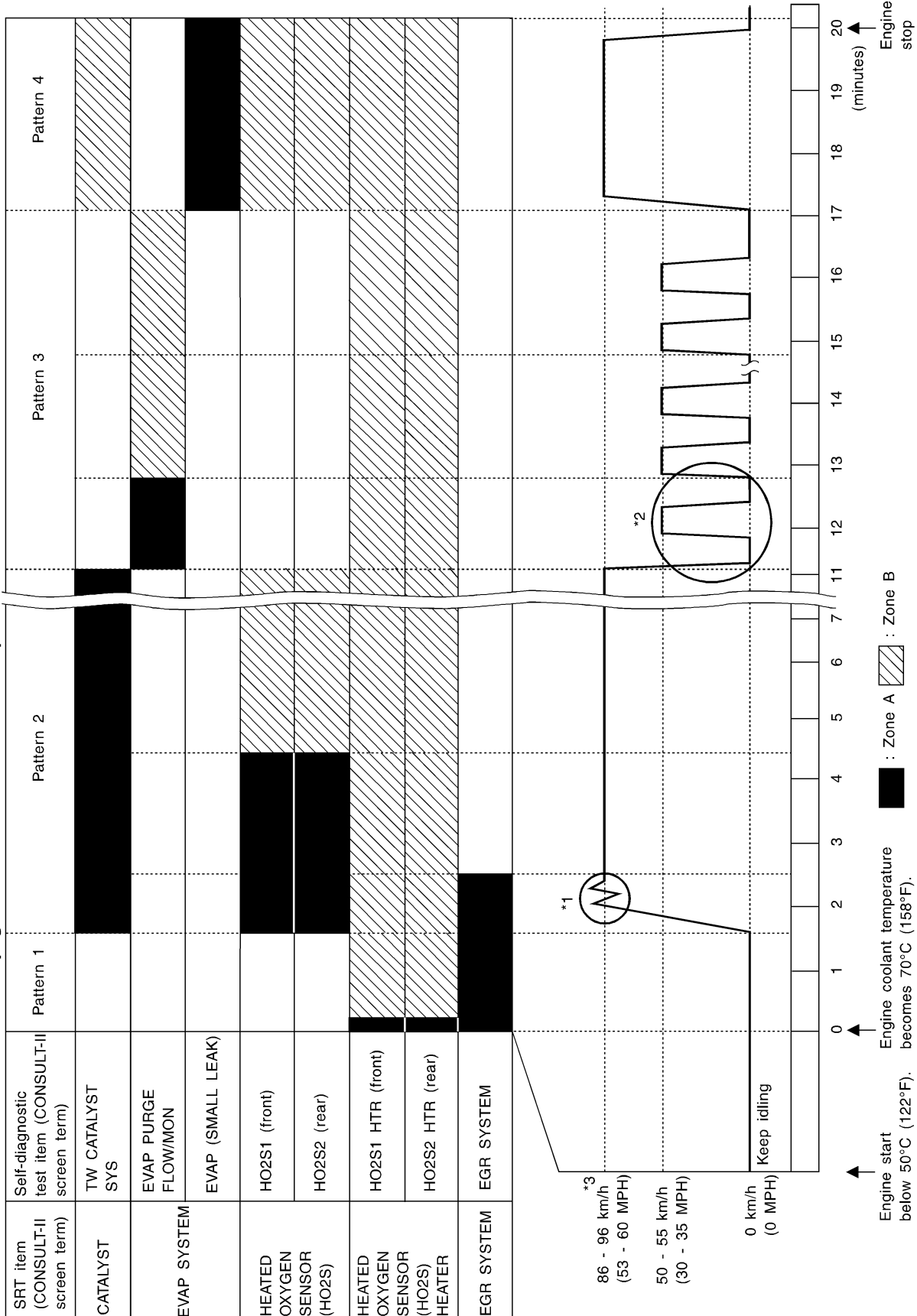
The most efficient driving pattern in which SRT codes can be properly set is explained on the next page. The driving pattern should be performed one or more times to set all SRT codes.

Driving Pattern

NIEC0755S0306

Note: Always drive vehicle in safe manner according to traffic conditions and obey all traffic laws. Refer to next page for more information and explanation of chart.

Driving pattern



- The time required for each diagnosis varies with road surface conditions, weather, altitude, individual driving habits, etc.
Zone A refers to the range where the time required, for the diagnosis under normal conditions*, is the shortest.
Zone B refers to the range where the diagnosis can still be performed if the diagnosis is not completed within zone A.

*: Normal conditions refer to the following:

- Sea level
- Flat road
- Ambient air temperature: 20 - 30°C (68 - 86°F)
- Diagnosis is performed as quickly as possible under normal conditions.
Under different conditions [For example: ambient air temperature other than 20 - 30°C (68 - 86°F)], diagnosis may also be performed.

Pattern 1:

- **The engine is started at the engine coolant temperature of -10 to 35°C (14 to 95°F) (where the voltage between the ECM terminal 70 and ground is 3.0 - 4.3V).**
- **The engine must be operated at idle speed until the engine coolant temperature is greater than 70°C (158°F) (where the voltage between the ECM terminal 70 and ground is lower than 1.4V).**
- **The engine is started at the fuel tank temperature of warmer than 0°C (32°F) (where the voltage between the ECM terminal 82 and ground is less than 4.1V).**

Pattern 2:

- When steady-state driving is performed again even after it is interrupted, each diagnosis can be conducted. In this case, the time required for diagnosis may be extended.

Pattern 3:

- The driving pattern outlined in *2 must be repeated at least 3 times.

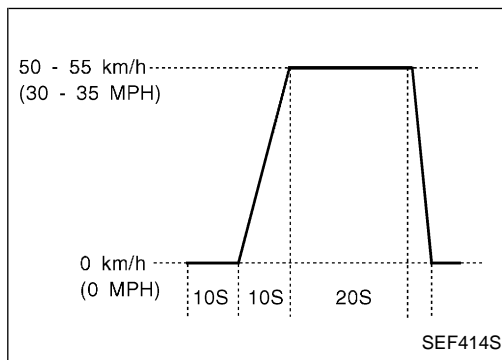
Pattern 4:

- Tests are performed after the engine has been operated for at least 17 minutes.
- The accelerator pedal must be held very steady during steady-state driving.
- If the accelerator pedal is moved, the test must be conducted all over again.

*1: Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH), then release the accelerator pedal and keep it released for more than 10 seconds. Depress the accelerator pedal until vehicle speed is 90 km/h (56 MPH) again.

*2: Operate the vehicle in the following driving pattern.

- 1) Decelerate vehicle to 0 km/h (0 MPH) and let engine idle.
- 2) Repeat driving pattern shown below at least 10 times.
- **During acceleration, hold the accelerator pedal as steady as possible.**
- 3) Repeat steps 1 and 2 until the EGR system SRT is set.



*3: Checking the vehicle speed with GST is advised.

Suggested Transmission Gear Position for A/T Models

Set the selector lever in the "D" position with the overdrive switch turned ON.

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

Emission-related Diagnostic Information (Cont'd)

Suggested upshift speeds for M/T models

Shown below are suggested vehicle speeds for shifting into a higher gear. These suggestions relate to fuel economy and vehicle performance. Actual upshift speeds will vary according to road conditions, the weather and individual driving habits.

	For normal acceleration in low altitude areas [less than 1,219 m (4,000 ft)]:	For quick acceleration in low altitude areas and high altitude areas [over 1,219 m (4,000 ft)]:
Gear change	ACCEL shift point km/h (MPH)	km/h (MPH)
1st to 2nd	24 (15)	25 (15)
2nd to 3rd	40 (25)	40 (25)
3rd to 4th	65 (40)	65 (40)
4th to 5th	75 (45)	75 (45)

Suggested Maximum Speed in Each Gear

Downshift to a lower gear if the engine is not running smoothly, or if you need to accelerate. Do not exceed the maximum suggested speed (shown below) in any gear. For level road driving, use the highest gear suggested for that speed. Always observe posted speed limits and drive according to the road conditions to ensure safe operation. Do not over-rev the engine when shifting to a lower gear as it may cause engine damage or loss of vehicle control.

Gear	km/h (MPH)
1st	55 (35)
2nd	95 (60)
3rd	135 (85)
4th	—
5th	—

TEST VALUE AND TEST LIMIT (GST ONLY — NOT APPLICABLE TO CONSULT-II)

NIEC0755S04

The following is the information specified in Mode 6 of SAE J1979. The test value is a parameter used to determine whether a system/circuit diagnostic test is “OK” or “NG” while being monitored by the ECM during self-diagnosis. The test limit is a reference value which is specified as the maximum or minimum value and is compared with the test value being monitored.

Items for which these data (test value and test limit) are displayed are the same as SRT code items (9 test items).

These data (test value and test limit) are specified by Test ID (TID) and Component ID (CID) and can be displayed on the GST screen.

X: Applicable —: Not applicable

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
CATALYST	Three way catalyst function	01H	01H	Max.	X
		02H	81H	Min.	X
EVAP SYSTEM	EVAP control system (Small leak)	05H	03H	Max.	X
	EVAP control system purge flow monitoring	06H	83H	Min.	X

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

Emission-related Diagnostic Information (Cont'd)

SRT item	Self-diagnostic test item	Test value (GST display)		Test limit	Application
		TID	CID		
O2 SENSOR	Heated oxygen sensor 1 (front)	09H	04H	Max.	X
		0AH	84H	Min.	X
		0BH	04H	Max.	X
		0CH	04H	Max.	X
		0DH	04H	Max.	X
	Heated oxygen sensor 2 (rear)	19H	86H	Min.	X
		1AH	86H	Min.	X
		1BH	06H	Max.	X
1CH		06H	Max.	X	
O2 SENSOR HEATER	Heated oxygen sensor 1 heater (front)	29H	08H	Max.	X
		2AH	88H	Min.	X
	Heated oxygen sensor 2 heater (rear)	2DH	0AH	Max.	X
		2EH	8AH	Min.	X
EGR SYSTEM	EGR function	31H	8CH	Min.	X
		32H	8CH	Min.	X
		33H	8CH	Min.	X
		34H	8CH	Min.	X
		35H	0CH	Max.	X

EMISSION-RELATED DIAGNOSTIC INFORMATION ITEMS

X: Applicable —: Not applicable NIEC0755S05

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	P0000	—	—	—	—
MAF SEN/CIRCUIT	P0100	—	—	X	EC-1507
ABSL PRES SEN/CIRC	P0105	—	—	X	EC-1516
AIR TEMP SEN/CIRC	P0110	—	—	X	EC-1518
COOLANT T SEN/CIRC	P0115	—	—	X	EC-1524
THRTL POS SEN/CIRC	P0120	—	—	X	EC-1529
*COOLAN T SEN/CIRC	P0125	—	—	X	EC-1540
HO2S1 (B1)	P0130	X	X	X*2	EC-1545
HO2S1 (B1)	P0131	X	X	X*2	EC-1552
HO2S1 (B1)	P0132	X	X	X*2	EC-1558
HO2S1 (B1)	P0133	X	X	X*2	EC-1564
HO2S1 (B1)	P0134	X	X	X*2	EC-1573
HO2S1 HTR (B1)	P0135	X	X	X*2	EC-1579

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
HO2S2 (B1)	P0137	X	X	X*2	EC-1584
HO2S2 (B1)	P0138	X	X	X*2	EC-1592
HO2S2 (B1)	P0139	X	X	X*2	EC-1600
HO2S2 (B1)	P0140	X	X	X*2	EC-1608
HO2S2 HTR (B1)	P0141	X	X	X*2	EC-1614
FUEL SYS-LEAN/BK1	P0171	—	—	X	EC-1619
FUEL SYS-RICH/BK1	P0172	—	—	X	EC-1626
FUEL TEMP SEN/CIRC	P0180	—	—	X	EC-1633
ENG OVER TEMP	P0217	—	—	X	EC-1638
MULTI CYL MISFIRE	P0300	—	—	X	EC-1656
CYL 1 MISFIRE	P0301	—	—	X	EC-1656
CYL 2 MISFIRE	P0302	—	—	X	EC-1656
CYL 3 MISFIRE	P0303	—	—	X	EC-1656
CYL 4 MISFIRE	P0304	—	—	X	EC-1656
KNOCK SEN/CIRC-B1	P0325	—	—	—	EC-1663
CKP SEN/CIRCUIT	P0335	—	—	X	EC-1667
CMP SEN/CIRCUIT	P0340	—	—	X	EC-1672
EGR SYSTEM	P0400	X	X	X*2	EC-1679
EGR VOL CONT/V CIR	P0403	—	—	X	EC-1688
TW CATALYST SYS-B1	P0420	X	X	X*2	EC-1695
EVAP SMALL LEAK	P0440	X	X	X*2	EC-1699
PURG VOLUME CONT/V	P0443	—	—	X	EC-1714
VENT CONTROL VALVE	P0446	—	—	X	EC-1720
EVAP SYS PRES SEN	P0450	—	—	X	EC-1727
EVAP GROSS LEAK	P0455	—	X	X*2	EC-1739
FUEL LEV SEN SLOSH	P0460	—	—	X	EC-1750
FUEL LEVEL SENSOR	P0461	—	—	X	EC-1754
FUEL LEVL SEN/CIRC	P0464	—	—	X	EC-1756
VEH SPEED SEN/CIRC	P0500	—	—	X	EC-1760
IACV/AAC VLV/CIRC	P0505	—	—	X	EC-1764
CLOSED TP SW/CIRC	P0510	—	—	X	EC-1773
A/T COMM LINE	P0600	—	—	—	EC-1781
ECM	P0605	—	—	X	EC-1784
PNP SW/CIRC	P0705	—	—	X	AT-110
ATF TEMP SEN/CIRC	P0710	—	—	X	AT-115
VEH SPD SEN/CIR AT	P0720	—	—	X	AT-121
ENGINE SPEED SIG	P0725	—	—	X	AT-126

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

Emission-related Diagnostic Information (Cont'd)

Items (CONSULT-II screen terms)	DTC*1	SRT code	Test value/ Test limit (GST only)	1st trip DTC*1	Reference page
A/T 1ST GR FNCTN	P0731	—	—	X	AT-130
A/T 2ND GR FNCTN	P0732	—	—	X	AT-137
A/T 3RD GR FNCTN	P0733	—	—	X	AT-143
A/T 4TH GR FNCTN	P0734	—	—	X	AT-149
TCC SOLENOID/CIRC	P0740	—	—	X	AT-158
A/T TCC S/V FNCTN	P0744	—	—	X	AT-162
L/PRESS SOL/CIRC	P0745	—	—	X	AT-173
SFT SOL A/CIRC	P0750	—	—	X	AT-178
SFT SOL B/CIRC	P0755	—	—	X	AT-182
THERMOSTAT FNCTN	P1126	—	—	X	EC-1786
CLOSED LOOP-B1	P1148	—	—	X	EC-1788
ENG OVER TEMP	P1217	—	—	X	EC-1790
CKP SENSOR (COG)	P1336	—	—	X	EC-1808
EGR TEMP SEN/CIRC	P1401	—	—	X	EC-1813
EGR SYSTEM	P1402	X	X	X*2	EC-1820
EVAP SMALL LEAK	P1440	X	X	X*2	EC-1827
PURG VOLUME CONT/V	P1444	—	—	X	EC-1829
VENT CONTROL VALVE	P1446	—	—	X	EC-1841
EVAP PURG FLOW/MON	P1447	X	X	X*2	EC-1849
VENT CONTROL VALVE	P1448	—	—	X	EC-1861
FUEL LEVL SEN/CIRC	P1464	—	—	X	EC-1870
VC/V BYPASS/V	P1490	—	—	X	EC-1873
VC CUT/V BYPASS/V	P1491	—	—	X	EC-1879
A/T DIAG COMM LINE	P1605	—	—	X	EC-1891
TP SEN/CIRC A/T	P1705	—	—	X	AT-186
P-N POS SW/CIRCUIT	P1706	—	—	X	EC-1894
O/R CLTCH SOL/CIRC	P1760	—	—	X	AT-194

*1: 1st trip DTC No. is the same as DTC No.

*2: These are not displayed with GST.

HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION

How to Erase DTC (Ⓜ With CONSULT-II)

NOTE:

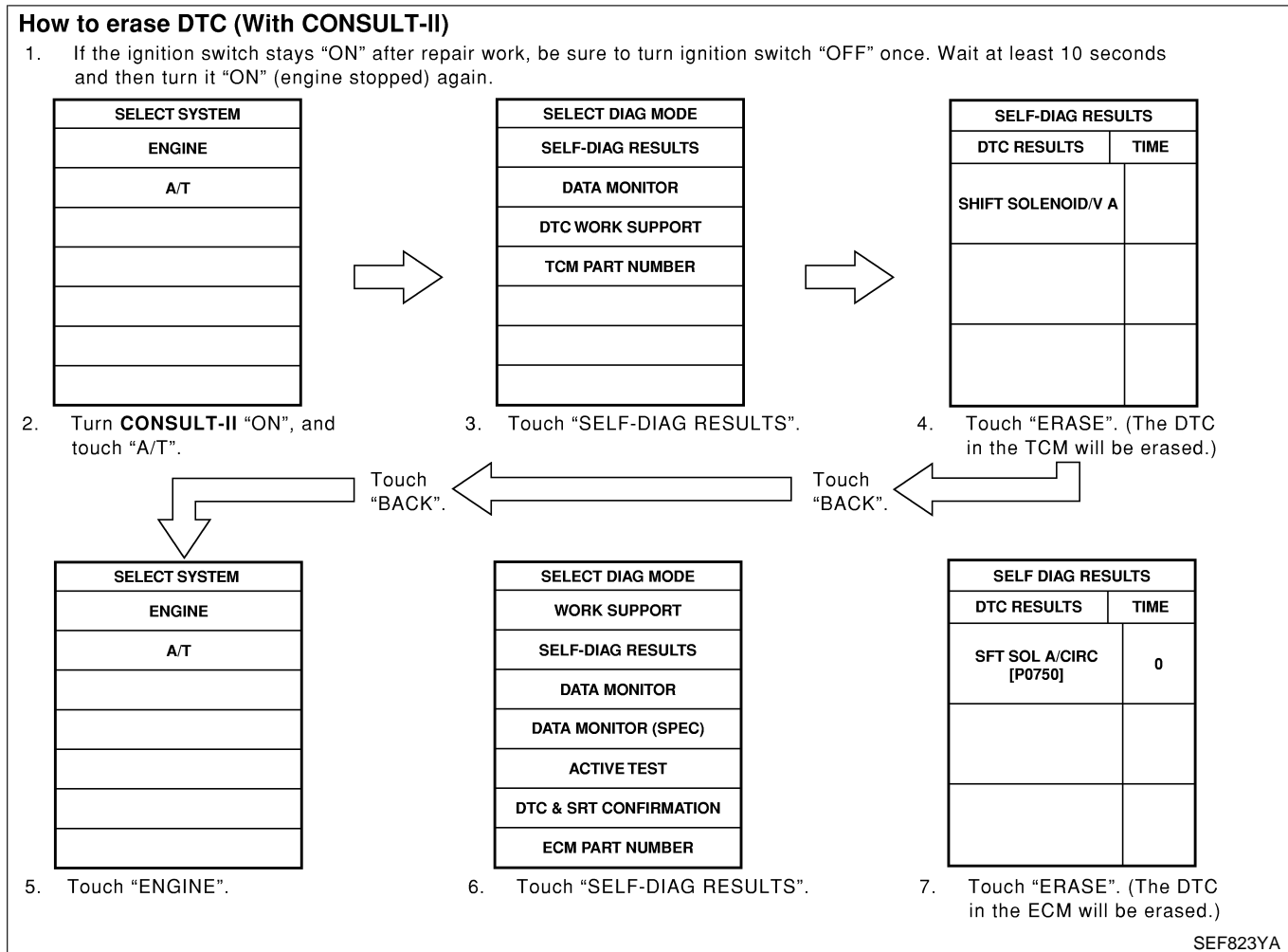
If the DTC is not for A/T related items (see EC-1361), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Turn CONSULT-II "ON" and touch "A/T".
3. Touch "SELF-DIAG RESULTS".
4. Touch "ERASE". [The DTC in the TCM (Transmission control module) will be erased.] Then touch "BACK" twice.
5. Touch "ENGINE".

GI
MA
EM
LC
EC
FE
CL
MT
AT
AX
SU
BR
ST
RS
BT
HA
SC
EL
IDX

NIEC0755S06
NIEC0755S0601

6. Touch "SELF-DIAG RESULTS".
7. Touch "ERASE". (The DTC in the ECM will be erased.)
- If DTCs are displayed for both ECM and TCM (Transmission control module), they need to be erased individually from the ECM and TCM (Transmission control module).



The emission related diagnostic information in the ECM can be erased by selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT-II.

How to Erase DTC (GST) With GST

NOTE:

If the DTC is not for A/T related items (see EC-1361), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait at least 10 seconds and then turn it "ON" (engine stopped) again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT-II)" in AT section titled "TROUBLE DIAGNOSIS", "Self-diagnosis". (The engine warm-up step can be skipped when performing the diagnosis only to erase the DTC.)
3. Select Mode 4 with GST (Generic Scan Tool).

The emission related diagnostic information in the ECM can be erased by selecting Mode 4 with GST.

- If the battery is disconnected, the emission-related diagnostic information will be lost after approx. 24 hours.
- The following data are cleared when the ECM memory is erased.
 - 1) Diagnostic trouble codes
 - 2) 1st trip diagnostic trouble codes
 - 3) Freeze frame data
 - 4) 1st trip freeze frame data
 - 5) System readiness test (SRT) codes

- 6) Test values
- 7) Others

Actual work procedures are explained using a DTC as an example. Be careful so that not only the DTC, but all of the data listed above, are cleared from the ECM memory during work procedures.

NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)

NIEC0755S07

SELF DIAG RESULTS	
DTC RESULTS	TIME
NATS MALFUNCTION [P1610]	0

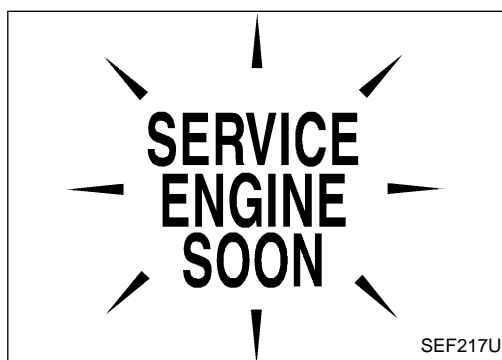
SEF515Y

- If the security indicator lights up with the ignition switch in the “ON” position or “NATS MALFUNCTION” is displayed on “SELF-DIAG RESULTS” screen, perform self-diagnostic results mode with CONSULT-II using NATS program card. Refer to *EL-301*, “NVIS (NISSAN Vehicle Immobilizer System — NATS)”.
- Confirm no self-diagnostic results of NVIS (NATS) is displayed before touching “ERASE” in “SELF-DIAG RESULTS” mode with CONSULT-II.
- When replacing ECM, initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs must be carried out with CONSULT-II using NATS program card. Therefore, be sure to receive all keys from vehicle owner. Regarding the procedures of NVIS (NATS) initialization and NVIS (NATS) ignition key ID registration, refer to **CONSULT-II OPERATION MANUAL, IVIS/NVIS**.

Malfunction Indicator Lamp (MIL)

DESCRIPTION

NIEC0756



The MIL is located on the instrument panel.

1. The MIL will light up when the ignition switch is turned ON without the engine running. This is a bulb check.
 - If the MIL does not light up, refer to **EL-103**, “WARNING LAMPS” or see EC-1942.
2. When the engine is started, the MIL should go off. If the MIL remains on, the on board diagnostic system has detected an engine system malfunction.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION




SR20DE

Malfunction Indicator Lamp (MIL) (Cont'd)

On Board Diagnostic System Function

—NIEC0756S01

The on board diagnostic system has the following two functions.

Diagnostic Test Mode	KEY and ENG. Status	Function	Explanation of Function
Mode I	Ignition switch in "ON" position  Engine stopped 	BULB CHECK	This function checks the MIL bulb for damage (blown, open circuit, etc.). If the MIL does not come on, check MIL circuit.
	Engine running 	MALFUNCTION WARNING	This is a usual driving condition. When a malfunction is detected twice in two consecutive driving cycles (two trip detection logic), the MIL will light up to inform the driver that a malfunction has been detected. The following malfunctions will light up or blink the MIL in the 1st trip. <ul style="list-style-type: none"> ● Coolant overtemperature enrichment protection ● "Misfire (Possible three way catalyst damage)" ● "Closed loop control" ● Fail-safe mode

Diagnostic Test Mode I — Bulb Check

In this mode, the MIL on the instrument panel should stay ON. If it remains OFF, check the bulb. Refer to ^{NIEC0756S0101}**EL-103**, "WARNING LAMPS" or see EC-1942.

Diagnostic Test Mode I — Malfunction Warning

NIEC0756S0102

MIL	Condition
ON	When the malfunction is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction.

OBD System Operation Chart

=NIEC0757

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

NIEC0757S01

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the ECM memory. GI
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are stored in the ECM memory, and the MIL will come on. For details, refer to “Two Trip Detection Logic” on EC-1421. MA
- The MIL will go off after the vehicle is driven 3 times with no malfunction. The drive is counted only when the recorded driving pattern is met (as stored in the ECM). If another malfunction occurs while counting, the counter will reset. EM
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A) without the same malfunction recurring (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data will be stored until the vehicle is driven 80 times (driving pattern C) without the same malfunction recurring. The “TIME” in “SELF-DIAGNOSTIC RESULTS” mode of CONSULT-II will count the number of times the vehicle is driven. LC
- The 1st trip DTC is not displayed when the self-diagnosis results in “OK” for the 2nd trip. EC

SUMMARY CHART

NIEC0757S02

Items	Fuel Injection System	Misfire	Other
MIL (goes off)	3 (pattern B)	3 (pattern B)	3 (pattern B)
DTC, Freeze Frame Data (no display)	80 (pattern C)	80 (pattern C)	40 (pattern A)
1st Trip DTC (clear)	1 (pattern C), *1	1 (pattern C), *1	1 (pattern B)
1st Trip Freeze Frame Data (clear)	*1, *2	*1, *2	1 (pattern B)

For details about patterns “B” and “C” under “Fuel Injection System” and “Misfire”, see EC-1439.

For details about patterns “A” and “B” under “Other”, see EC-1441.

*1: Clear timing is at the moment OK is detected.

*2: Clear timing is when the same malfunction is detected in the 2nd trip.

EXPLANATION FOR DRIVING PATTERNS FOR “MISFIRE <EXHAUST QUALITY DETERIORATION>”, “FUEL INJECTION SYSTEM”

Driving Pattern B

=NIEC0757S04

NIEC0757S0401

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunction.
- The MIL will go off when the B counter reaches 3. (*2 in “OBD SYSTEM OPERATION CHART”)

Driving Pattern C

NIEC0757S0402

Driving pattern C means the vehicle operation as follows:

1) The following conditions should be satisfied at the same time:

Engine speed: (Engine speed in the freeze frame data) ± 375 rpm

Calculated load value: (Calculated load value in the freeze frame data) $\times (1 \pm 0.1)$ [%]

Engine coolant temperature (T) condition:

- When the freeze frame data shows lower than 70°C (158°F), “T” should be lower than 70°C (158°F).
- When the freeze frame data shows higher than or equal to 70°C (158°F), “T” should be higher than or equal to 70°C (158°F).

Example:

If the stored freeze frame data is as follows:

Engine speed: 850 rpm, Calculated load value: 30%, Engine coolant temperature: 80°C (176°F)

To be satisfied with driving pattern C, the vehicle should run under the following conditions:

Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of (1).
- The C counter will be counted up when (1) is satisfied without the same malfunction.
- The DTC will not be displayed after C counter reaches 80.
- The 1st trip DTC will be cleared when C counter is counted once without the same malfunction after DTC is stored in ECM.

GI

MA

EM

LC

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BR

ST

RS

BT

HA

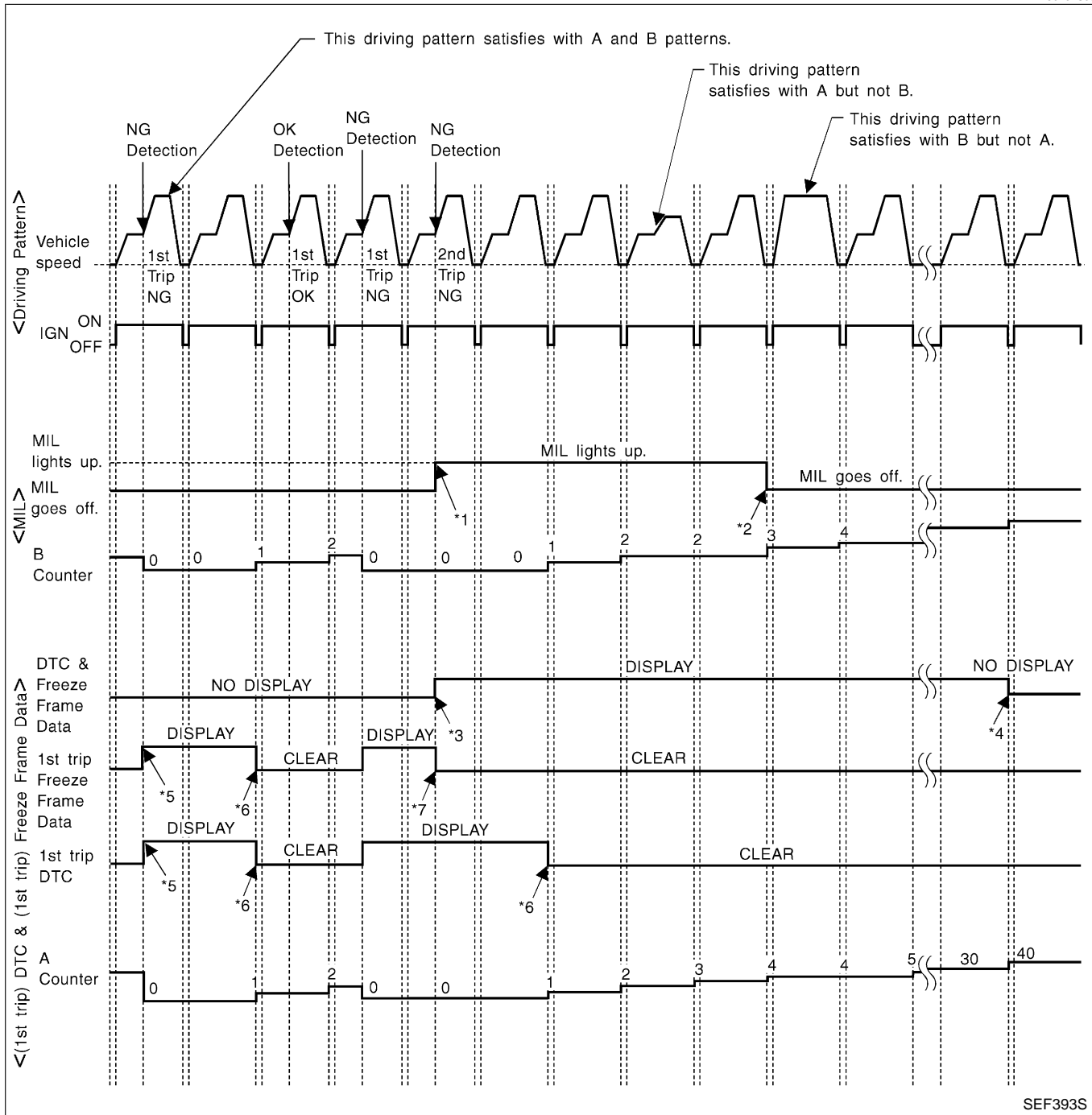
SC

EL

IDX

RELATIONSHIP BETWEEN MIL, DTC, 1ST TRIP DTC AND DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

NIEC0757S05



- *1: When the same malfunction is detected in two consecutive trips, MIL will light up.
- *2: MIL will go off after vehicle is driven 3 times (pattern B) without any malfunctions.
- *3: When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data will be stored in ECM.

- *4: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 40 times (pattern A) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: When a malfunction is detected for the first time, the 1st trip DTC

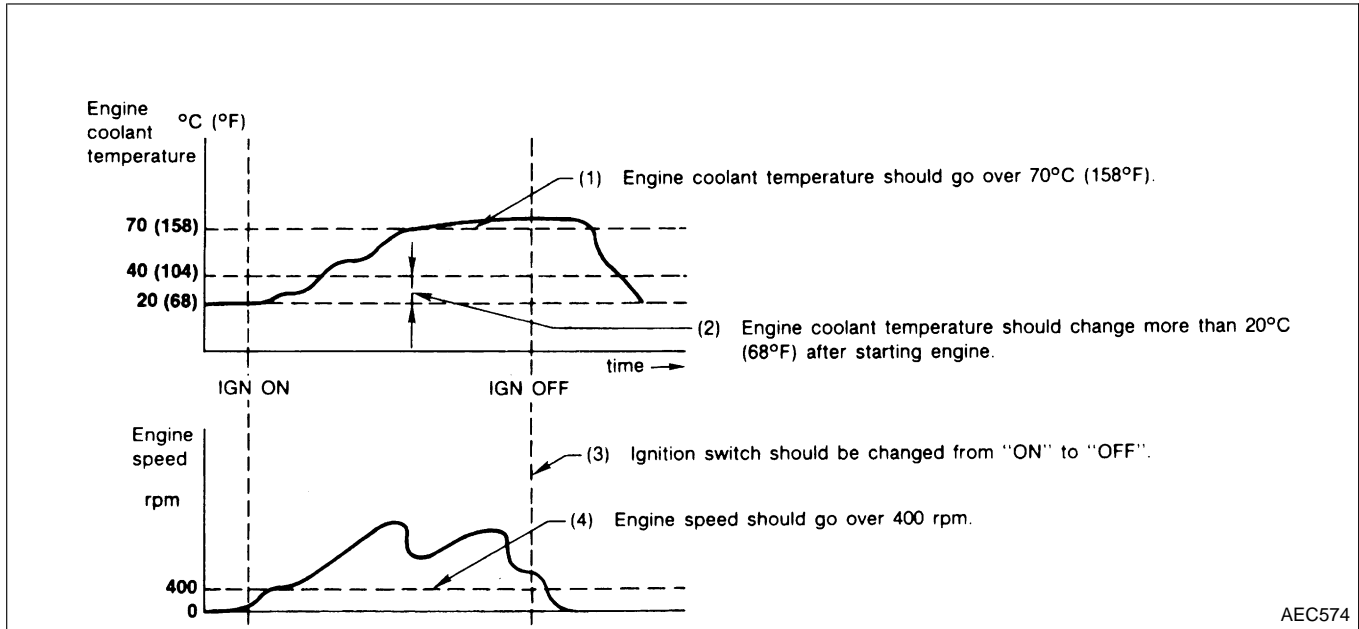
- and the 1st trip freeze frame data will be stored in ECM.
- *6: 1st trip DTC will be cleared after vehicle is driven once (pattern B) without the same malfunction.
- *7: When the same malfunction is detected in the 2nd trip, the 1st trip freeze frame data will be cleared.

EXPLANATION FOR DRIVING PATTERNS EXCEPT FOR "MISFIRE <EXHAUST QUALITY DETERIORATION>", "FUEL INJECTION SYSTEM"

Driving Pattern A

NIEC0757S06

NIEC0757S0601



- The A counter will be cleared when the malfunction is detected regardless of (1) - (4).
- The A counter will be counted up when (1) - (4) are satisfied without the same malfunction.
- The DTC will not be displayed after the A counter reaches 40.

Driving Pattern B

NIEC0757S0602

Driving pattern B means the vehicle operation as follows:

All components and systems should be monitored at least once by the OBD system.

- The B counter will be cleared when the malfunction is detected once regardless of the driving pattern.
- The B counter will be counted up when driving pattern B is satisfied without any malfunctions.
- The MIL will go off when the B counter reaches 3 (*2 in "OBD SYSTEM OPERATION CHART").

GI

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LC

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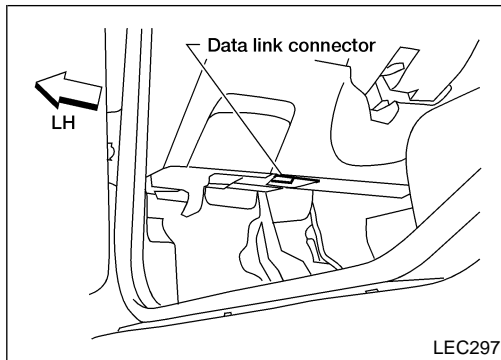
HA

SC

EL

IDX

CONSULT-II



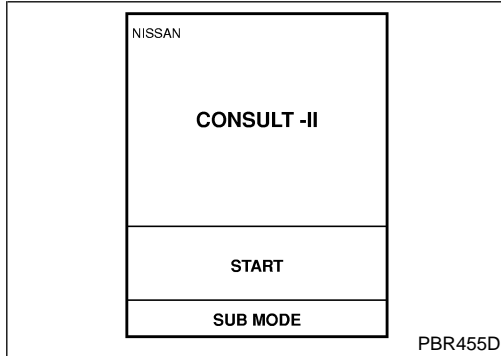
CONSULT-II

CONSULT-II INSPECTION PROCEDURE

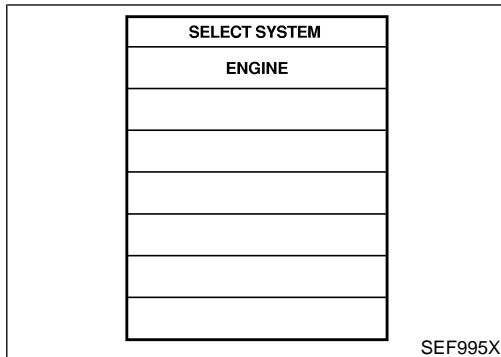
=NIEC0758

NIEC0758S01

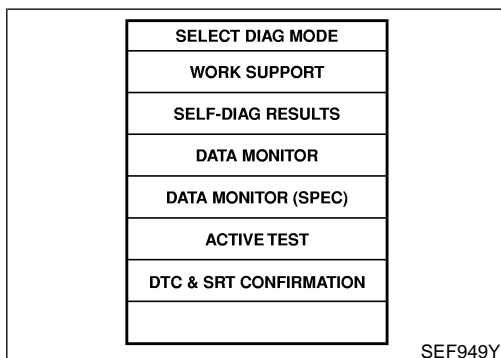
1. Turn ignition switch OFF.
2. Connect "CONSULT-II" to data link connector, which is located under LH dash panel near the fuse box cover.



3. Turn ignition switch ON.
4. Touch "START".



5. Touch "ENGINE".



6. Perform each diagnostic test mode according to each service procedure.

For further information, see the CONSULT-II Operation Manual.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

ENGINE CONTROL COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

NIEC0758S02

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS INPUT	Camshaft position sensor		X	X	X	X			GI
	Crankshaft position sensor (OBD)		X						MA
	Mass air flow sensor		X		X	X			EM
	Engine coolant temperature sensor		X	X	X	X	X		LC
	Heated oxygen sensor 1 (front)		X		X	X		X	EC
	Heated oxygen sensor 2 (rear)		X		X	X		X	FE
	Vehicle speed sensor		X	X	X	X			CL
	Throttle position sensor		X	X	X	X			MT
	Fuel tank temperature sensor		X		X	X	X		AT
	EVAP control system pressure sensor		X		X	X			AX
	Absolute pressure sensor (Built into ECM)		X		X	X			SU
	EGR temperature sensor		X		X	X			BR
	Intake air temperature sensor		X	X	X	X			ST
	Knock sensor		X						RS
	Ignition switch (start signal)				X	X			BT
	Closed throttle position switch		X		X	X			HA
	Closed throttle position switch (throttle position sensor signal)				X	X			SC
	Air conditioner switch				X	X			EL
	Park/neutral position (PNP) switch		X		X	X			IDX
	Power steering oil pressure switch				X	X			
Battery voltage				X	X				
Load signal				X	X				
Fuel level sensor		X		X	X				

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

Item		DIAGNOSTIC TEST MODE							
		WORK SUP-PORT	SELF-DIAGNOSTIC RESULTS		DATA MONI-TOR	DATA MONI-TOR (SPEC)	ACTIVE TEST	DTC & SRT CONFIRMATION	
			DTC*1	FREEZE FRAME DATA*2				SRT STATUS	DTC WORK SUP-PORT
ENGINE CONTROL COMPONENT PARTS OUTPUT	Injectors				X	X	X		
	Power transistor (Ignition timing)	X			X	X	X		
	IACV-AAC valve		X		X	X	X		
	EVAP canister purge volume control solenoid valve		X		X	X	X		X
	Air conditioner relay				X	X			
	Fuel pump relay	X			X	X	X		
	Cooling fan		X		X	X	X		
	EGR volume control valve		X		X	X	X		
	Heated oxygen sensor 1 heater (front)		X		X	X		X	
	Heated oxygen sensor 2 heater (rear)		X		X	X		X	
	EVAP canister vent control valve		X		X	X	X		
	Vacuum cut valve bypass valve		X		X	X	X		X
	Calculated load value			X	X	X			

X: Applicable

*1: This item includes 1st trip DTCs.

*2: This mode includes 1st trip freeze frame data or freeze frame data. The items appear on CONSULT-II screen in freeze frame data mode only if a 1st trip DTC or DTC is detected. For details, refer to EC-1422.

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

FUNCTION

-NIEC0758S03

Diagnostic test mode	Function	
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT-II unit.	GI
Self-diagnostic results	Self-diagnostic results such as 1st trip DTC, DTCs and 1st trip freeze frame data or freeze frame data can be read and erased quickly.*1	MA
Data monitor	Input/Output data in the ECM can be read.	EM
Data monitor (SPEC)	Input/Output specification of the Basic fuel schedule, AFM, A/F feedback control value and the other data monitor items can be read.	LC
Active test	Diagnostic Test Mode in which CONSULT-II drives some actuators apart from the ECMs and also shifts some parameters in a specified range.	EC
DTC & SRT confirmation	The status of system monitoring tests and the self-diagnosis status/result can be confirmed.	
ECM part number	ECM part number can be read.	FE

*1 The following emission-related diagnostic information is cleared when the ECM memory is erased.

- 1) Diagnostic trouble codes
- 2) 1st trip diagnostic trouble codes
- 3) Freeze frame data
- 4) 1st trip freeze frame data
- 5) System readiness test (SRT) codes
- 6) Test values
- 7) Others

GI

MA

EM

LC

EC

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CL

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HA

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EL

IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

WORK SUPPORT MODE

-NIEC0758S04

WORK ITEM	CONDITION	USAGE
TP SW/TP SEN IDLE POSI ADJ	<ul style="list-style-type: none"> ● FOLLOW THE BASIC INSPECTION IN THE SERVICE MANUAL. 	When adjusting the idle throttle position.
IGNITION TIMING ADJ	<ul style="list-style-type: none"> ● IGNITION TIMING FEEDBACK CONTROL WILL BE HELD BY TOUCHING "START". AFTER DOING SO, ADJUST IGNITION TIMING WITH A TIMING LIGHT BY TURNING THE CAMSHAFT POSITION SENSOR. 	When adjusting initial ignition timing
FUEL PRESSURE RELEASE	<ul style="list-style-type: none"> ● FUEL PUMP WILL STOP BY TOUCHING "START" DURING IDLING. CRANK A FEW TIMES AFTER ENGINE STALLS. 	When releasing fuel pressure from fuel line
IDLE AIR VOL LEARN	<ul style="list-style-type: none"> ● THE IDLE AIR VOLUME THAT KEEPS THE ENGINE WITHIN THE SPECIFIED RANGE IS MEMORIZED IN ECM. 	When learning the idle air volume
SELF-LEARNING CONT	<ul style="list-style-type: none"> ● THE COEFFICIENT OF SELF-LEARNING CONTROL MIXTURE RATIO RETURNS TO THE ORIGINAL COEFFICIENT. 	When clearing the coefficient of self-learning control value
EVAP SYSTEM CLOSE	<p>OPEN THE VACUUM CUT VALVE BYPASS VALVE AND CLOSE THE EVAP CANISTER VENT CONTROL VALVE IN ORDER TO MAKE EVAP SYSTEM CLOSE UNDER THE FOLLOWING CONDITIONS.</p> <ul style="list-style-type: none"> ● IGN SW "ON" ● ENGINE NOT RUNNING ● AMBIENT TEMPERATURE IS ABOVE 0°C (32°F). ● NO VACUUM AND NO HIGH PRESSURE IN EVAP SYSTEM ● TANK FUEL TEMP. IS MORE THAN 0°C (32°F). ● WITHIN 10 MINUTES AFTER STARTING "EVAP SYSTEM CLOSE" ● WHEN TRYING TO EXECUTE "EVAP SYSTEM CLOSE" UNDER THE CONDITION EXCEPT ABOVE, CONSULT-II WILL DISCONTINUE IT AND DISPLAY APPROPRIATE INSTRUCTION. <p>NOTE: WHEN STARTING ENGINE, CONSULT-II MAY DISPLAY "BATTERY VOLTAGE IS LOW. CHARGE BATTERY", EVEN IN USING CHARGED BATTERY.</p>	When detecting EVAP vapor leak point of EVAP system
TARGET IDLE RPM ADJ*	<ul style="list-style-type: none"> ● IDLE CONDITION 	When setting target idle speed

*: This function is not necessary in the usual service procedure.

SELF-DIAGNOSTIC MODE

-NIEC0758S05

DTC and 1st Trip DTC

NIEC0758S0501

Regarding items of "DTC and 1st trip DTC", refer to "TROUBLE DIAGNOSIS — INDEX" (See EC-1361.)

Freeze Frame Data and 1st Trip Freeze Frame Data

NIEC0758S0502

Freeze frame data item*1	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> The engine control component part/control system has a trouble code, it is displayed as "PXXXX". (Refer to "TROUBLE DIAGNOSIS — INDEX", EC-1361.)
FUEL SYS-B1	<ul style="list-style-type: none"> "Fuel injection system status" at the moment a malfunction is detected is displayed. One mode in the following is displayed. <ul style="list-style-type: none"> "MODE 2": Open loop due to detected system malfunction "MODE 3": Open loop due to driving conditions (power enrichment, deceleration enrichment) "MODE 4": Closed loop - using oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
CAL/LD VALUE [%]	<ul style="list-style-type: none"> The calculated load value at the moment a malfunction is detected is displayed.
COOLANT TEMP [°C] or [°F]	<ul style="list-style-type: none"> The engine coolant temperature at the moment a malfunction is detected is displayed.
S-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> "Short-term fuel trim" at the moment a malfunction is detected is displayed. The short-term fuel trim indicates dynamic or instantaneous feedback compensation to the base fuel schedule.
L-FUEL TRIM-B1 [%]	<ul style="list-style-type: none"> "Long-term fuel trim" at the moment a malfunction is detected is displayed. The long-term fuel trim indicates much more gradual feedback compensation to the base fuel schedule than short-term fuel trim.
ENGINE SPEED [rpm]	<ul style="list-style-type: none"> The engine speed at the moment a malfunction is detected is displayed.
VEHICLE SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
ABSOL TH-P/S [%]	<ul style="list-style-type: none"> The throttle valve opening angle at the moment a malfunction is detected is displayed.
B/FUEL SCHDL [msec]	<ul style="list-style-type: none"> The base fuel schedule at the moment a malfunction is detected is displayed.
INT/A TEMP SE [°C] or [°F]	<ul style="list-style-type: none"> The intake air temperature at the moment a malfunction is detected is displayed.

*1: The items are the same as those of 1st trip freeze frame data.

GI
 MA
 EM
 LC
 EC
 FE
 CL
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 AT
 AX
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 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

DATA MONITOR MODE

-NIEC0758S06

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ENG SPEED [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the REF signal (180° signal) of the camshaft position sensor. 	
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor is displayed. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> "Base fuel schedule" indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. This data also includes the data for the air-fuel ratio learning control.
COOLAN TEMP/S [°C] or [°F]	○	○	<ul style="list-style-type: none"> The engine coolant temperature (determined by the signal voltage of the engine coolant temperature sensor) is displayed. 	<ul style="list-style-type: none"> When the engine coolant temperature sensor is open or short-circuited, ECM enters fail-safe mode. The engine coolant temperature determined by the ECM is displayed.
HO2S1 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 1 (front) is displayed. 	
HO2S2 (B1) [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the heated oxygen sensor 2 (rear) is displayed. 	
HO2S1 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 1 (front) signal during air-fuel ratio feedback control: RICH ... means the mixture became "rich", and control is being affected toward a leaner mixture. LEAN ... means the mixture became "lean", and control is being affected toward a rich mixture. 	<ul style="list-style-type: none"> After turning ON the ignition switch, "RICH" is displayed until air-fuel mixture ratio feedback control begins. When the air-fuel ratio feedback is clamped, the value just before the clamping is displayed continuously.
HO2S2 MNTR (B1) [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of heated oxygen sensor 2 (rear) signal: RICH ... means the amount of oxygen after three way catalyst is relatively small. LEAN ... means the amount of oxygen after three way catalyst is relatively large. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated.
VHCL SPEED SE [km/h] or [mph]	○	○	<ul style="list-style-type: none"> The vehicle speed computed from the vehicle speed sensor signal is displayed. 	
BATTERY VOLT [V]	○	○	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 	
THRTL POS SEN [V]	○	○	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 	
FUEL T/TMP SE [°C] or [°F]	○		<ul style="list-style-type: none"> The fuel temperature judged from the tank fuel temperature sensor signal voltage is displayed. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
INT/A TEMP SE [°C] or [°F]	○	○	<ul style="list-style-type: none"> The intake air temperature determined by the signal voltage of the intake air temperature sensor is indicated. 		GI
EGR TEMP SEN [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the EGR temperature sensor is displayed. 		MA
EVAP SYS PRES [V]	○		<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 		EM
ABSOL PRES/SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the absolute pressure sensor is displayed. 		LC
FUEL LEVEL SE [V]	○		<ul style="list-style-type: none"> The signal voltage of the fuel level sensor is displayed. 		EC
START SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the starter signal. 	<ul style="list-style-type: none"> After starting the engine, [OFF] is displayed regardless of the starter signal. 	FE
CLSD THL POS [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates idle position [ON/OFF] computed by ECM according to the throttle position sensor signal. 		CL
CLSD THL/P SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates mechanical contact [ON/OFF] condition of the closed throttle position switch. 		MT
AIR COND SIG [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition of the air conditioner switch as determined by the air conditioner signal. 		AT
P/N POSI SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position (PNP) switch signal. 		AX
PW/ST SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> [ON/OFF] condition of the power steering oil pressure switch determined by the power steering oil pressure signal is indicated. 		SU
LOAD SIGNAL [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the electrical load signal and/or lighting switch. ON ... rear defogger is operating and/or lighting switch is on. OFF ... rear defogger is not operating and lighting switch is not on. 		BR
IGNITION SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		ST
HEATER FAN SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from heater fan switch. 		RS
INJ PULSE-B1 [msec]		○	<ul style="list-style-type: none"> Indicates the actual fuel injection pulse width compensated by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain computed value is indicated. 	BT
IGN TIMING [BTDC]		○	<ul style="list-style-type: none"> Indicates the ignition timing computed by ECM according to the input signals. 	<ul style="list-style-type: none"> When the engine is stopped, a certain value is indicated. 	HA
CAL/LD VALUE [%]			<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 		SC
					EL
					IDX

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
ABSOL TH-P/S [%]			<ul style="list-style-type: none"> • "Absolute throttle position sensor" indicates the throttle valve opening angle computed by ECM according to the signal voltage of the throttle position sensor. 	
MASS AIRFLOW [g·m/s]			<ul style="list-style-type: none"> • Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor. 	
IACV-AAC/V [step]		○	<ul style="list-style-type: none"> • Indicates the IACV-AAC valve control value computed by ECM according to the input signals. 	
PURG VOL C/V [%]			<ul style="list-style-type: none"> • Indicates the EVAP canister purge volume control solenoid valve control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases. 	
EGR VOL CON/V [step]		○	<ul style="list-style-type: none"> • Indicates the EGR volume control value computed by the ECM according to the input signals. • The opening becomes larger as the value increases. 	
AIR COND RLY [ON/OFF]		○	<ul style="list-style-type: none"> • The air conditioner relay control condition (determined by ECM according to the input signal) is indicated. 	
FUEL PUMP RLY [ON/OFF]		○	<ul style="list-style-type: none"> • Indicates the fuel pump relay control condition determined by ECM according to the input signals. 	
VC/V BYPASS/V [ON/OFF]			<ul style="list-style-type: none"> • The control condition of the vacuum cut valve bypass valve (determined by ECM according to the input signal) is indicated. • ON ... Open • OFF ... Closed 	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> • The control condition of the EVAP canister vent control valve (determined by ECM according to the input signal) is indicated. • ON ... Closed • OFF ... Open 	
COOLING FAN [HIGH/LOW/OFF]			<ul style="list-style-type: none"> • Indicates the control condition of the cooling fan (determined by ECM according to the input signal). • HIGH ... High speed operation • LOW ... Low speed operation • OFF ... Stop 	
HO2S1 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> • Indicates [ON/OFF] condition of heated oxygen sensor 1 heater (front) determined by ECM according to the input signals. 	
HO2S2 HTR (B1) [ON/OFF]			<ul style="list-style-type: none"> • Indicates [ON/OFF] condition of heated oxygen sensor 2 heater (rear) determined by ECM according to the input signals. 	

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
IDL A/V LEAN			<ul style="list-style-type: none"> Display the condition of idle air volume learning YET ... Idle air volume learning has not been performed yet. CMPLT ... Idle air volume learning has already been performed successfully. INCMP ... Idle air volume learning has not been performed successfully. 	
TRVL AFTER MIL [km] or [Mile]			<ul style="list-style-type: none"> Distance traveled while MIL is activated 	
Voltage [V]			<ul style="list-style-type: none"> Voltage measured by the voltage probe. 	
Frequency [msec] or [Hz] or [%]			<ul style="list-style-type: none"> Pulse width, frequency or duty cycle measured by the pulse probe. 	<ul style="list-style-type: none"> Only “#” is displayed if item is unable to be measured. Figures with “#”s are temporary ones. They are the same figures as an actual piece of data which was just previously measured.

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

DATA MONITOR (SPEC) MODE

NIEC0758S07

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
MAS A/F SE-B1 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the mass air flow sensor specification is displayed. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
B/FUEL SCHDL [msec]			<ul style="list-style-type: none"> “Base fuel schedule” indicates the fuel injection pulse width programmed into ECM, prior to any learned on board correction. 	<ul style="list-style-type: none"> When engine is running specification range is indicated.
A/F ALPHA-B1 [%]		○	<ul style="list-style-type: none"> The mean value of the air-fuel ratio feedback correction factor per cycle is indicated. 	<ul style="list-style-type: none"> When engine is running specification range is indicated. This data also includes the data for the air-fuel ratio learning control.

NOTE:

- Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically.

ACTIVE TEST MODE

NIEC0758S08

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
FUEL INJECTION	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the amount of fuel injection using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Fuel injectors Heated oxygen sensor 1 (front)
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Adjust initial ignition timing

ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

SR20DE

CONSULT-II (Cont'd)

TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
IACV-AAC/V OPENING	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine. ● Change the IACV-AAC valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● IACV-AAC valve
POWER BAL- ANCE	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine. ● A/C switch "OFF" ● Shift lever "N" ● Cut off each injector signal one at a time using CONSULT-II. 	Engine runs rough or dies.	<ul style="list-style-type: none"> ● Harness and connector ● Compression ● Injectors ● Power transistor ● Spark plugs ● Ignition coils
COOLING FAN	<ul style="list-style-type: none"> ● Ignition switch: ON ● Turn the cooling fan "HIGH", "LOW" and "OFF" using CONSULT-II. 	Cooling fan moves high speed, low speed and stops.	<ul style="list-style-type: none"> ● Harness and connector ● Cooling fan motor ● Cooling fan relay
ENG COOLANT TEMP	<ul style="list-style-type: none"> ● Engine: Return to the original trouble condition ● Change the engine coolant temperature using CONSULT-II. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> ● Harness and connector ● Engine coolant temperature sensor ● Fuel injectors
FUEL PUMP RELAY	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn the fuel pump relay "ON" and "OFF" using CONSULT-II and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Fuel pump relay
EGR VOL CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Change EGR volume control valve opening step using CONSULT-II. 	EGR volume control valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● EGR volume control valve
PURG VOL CONT/V	<ul style="list-style-type: none"> ● Engine: After warming up, run engine at 1,500 rpm. ● Change the EVAP canister purge volume control solenoid valve opening percent using CONSULT-II. 	Engine speed changes according to the opening percent.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
FUEL/T TEMP SEN	<ul style="list-style-type: none"> ● Change the fuel tank temperature using CONSULT-II. 		
VENT CONTROL/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Turn solenoid valve "ON" and "OFF" with the CONSULT-II and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> ● Harness and connector ● Solenoid valve

DTC & SRT CONFIRMATION MODE

SRT STATUS Mode

NIEC0758S09

For details, refer to "SYSTEM READINESS TEST (SRT) CODE", EC-1423.

NIEC0758S0901

SRT Work Support Mode

This mode enables a technician to drive a vehicle to set the SRT while monitoring the SRT status.

NIEC0758S0902

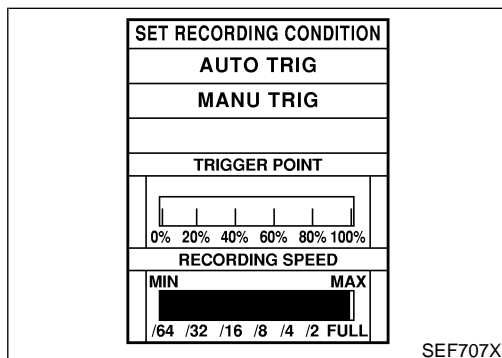
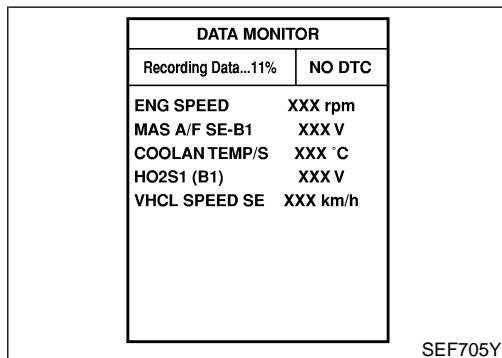
DTC Work Support Mode

NIEC0758S0903

Test mode	Test item	Condition	Reference page
EVAPORATIVE SYSTEM	EVAP SML LEAK P0440	Refer to corresponding trouble diagnosis for DTC.	EC-1699
	EVAP SML LEAK P1440		EC-1827
	PURG VOL CN/V P1444		EC-1829
	PURGE FLOW P1447		EC-1849
	VC CUT/V BP/V P1491		EC-1879
HEATED OXYGEN SENSOR 1 (FRONT)	HO2S1 (B1) P0130		EC-1545
	HO2S1 (B1) P0131		EC-1552
	HO2S1 (B1) P0132		EC-1558
	HO2S1 (B1) P0133		EC-1564
HEATED OXYGEN SENSOR 2 (REAR)	HO2S2 (B1) P0137		EC-1584
	HO2S2 (B1) P0138	EC-1592	
	HO2S2 (B1) P0139	EC-1600	
EGR SYSTEM	EGR SYSTEM P0400	EC-1679	
	EGR SYSTEM P1402	EC-1820	

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REAL TIME DIAGNOSIS IN DATA MONITOR MODE (RECORDING VEHICLE DATA)

NIEC0758S10

CONSULT-II has two kinds of triggers and they can be selected by touching "SETTING" in "DATA MONITOR" mode.

- 1) "AUTO TRIG" (Automatic trigger):
 - The malfunction will be identified on the CONSULT-II screen in real time. In other words, DTC/1st trip DTC and malfunction item will be displayed if the malfunction is detected by ECM. At the moment a malfunction is detected by ECM, "MONITOR" in "DATA MONITOR" screen is changed to "Recording Data ... xx%" as shown at left, and the data after the malfunction detection is recorded. Then when the percentage reached 100%, "REAL-TIME DIAG" screen is displayed. If "STOP" is touched on the screen during "Recording Data ... xx%", "REAL-TIME DIAG" screen is also displayed. The recording time after the malfunction detection and the recording speed can be changed by "TRIGGER POINT" and "Recording Speed". Refer to CONSULT-II OPERATION MANUAL.
- 2) "MANU TRIG" (Manual trigger):
 - DTC/1st trip DTC and malfunction item will not be displayed

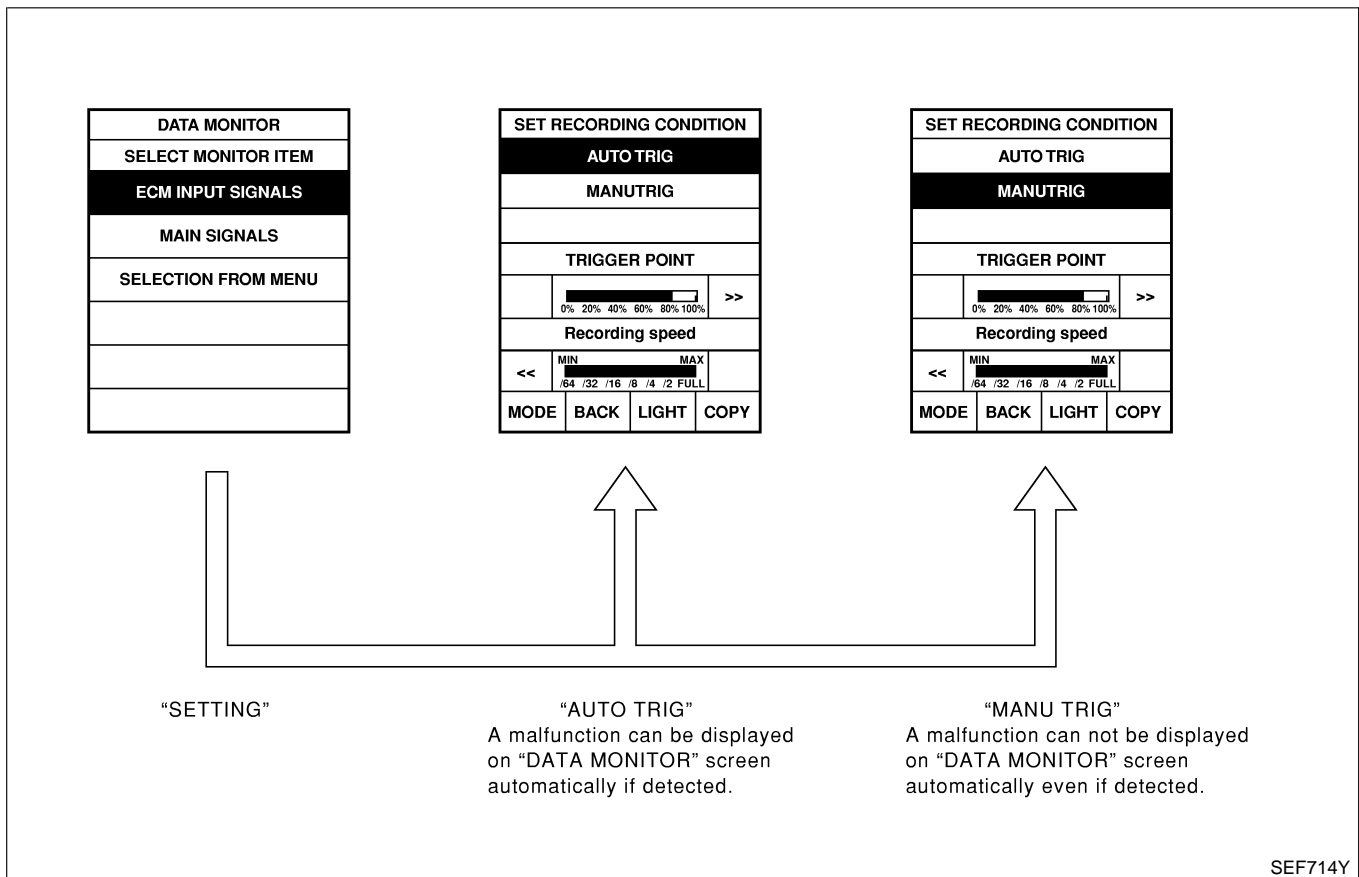
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automatically on CONSULT-II screen even though a malfunction is detected by ECM.

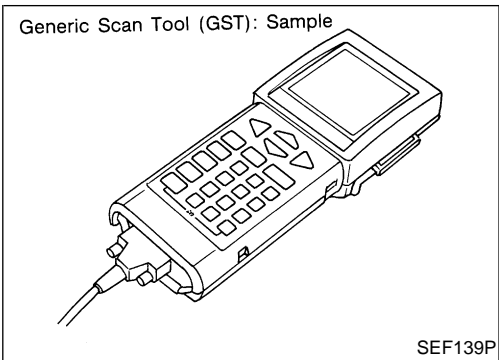
DATA MONITOR can be performed continuously even though a malfunction is detected.

Use these triggers as follows:

- 1) "AUTO TRIG"
 - While trying to detect the DTC/1st trip DTC by performing the "DTC Confirmation Procedure", be sure to select to "DATA MONITOR (AUTO TRIG)" mode. You can confirm the malfunction at the moment it is detected.
 - While narrowing down the possible causes, CONSULT-II should be set in "DATA MONITOR (AUTO TRIG)" mode, especially in case the incident is intermittent. When you are inspecting the circuit by gently shaking (or twisting) the suspicious connectors, components and harness in the "DTC Confirmation Procedure", the moment a malfunction is found the DTC/1st trip DTC will be displayed. (Refer to **GI-25**, "Incident Simulation Tests".)
- 2) "MANU TRIG"
 - If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT-II to "MANU TRIG". By selecting "MANU TRIG" you can monitor and store the data. The data can be utilized for further diagnosis, such as a comparison with the value for the normal operating condition.



SEF714Y



Generic Scan Tool (GST)

-NIEC0759

DESCRIPTION

NIEC0759S01

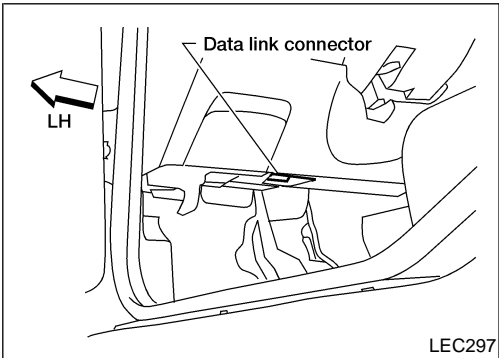
Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has 7 different functions explained on the next page. ISO9141 is used as the protocol. The name "GST" or "Generic Scan Tool" is used in this service manual.

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GST INSPECTION PROCEDURE

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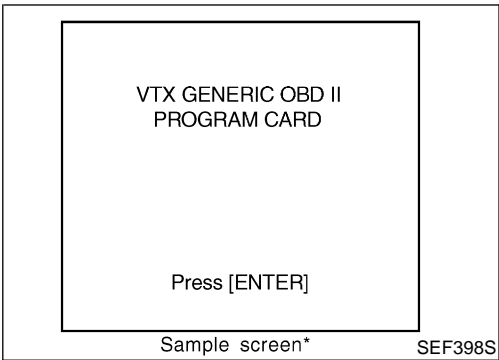
1. Turn ignition switch OFF.
2. Connect "GST" to data link connector, which is located under LH dash panel near the fuse box cover.

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3. Turn ignition switch ON.
4. Enter the program according to instruction on the screen or in the operation manual.

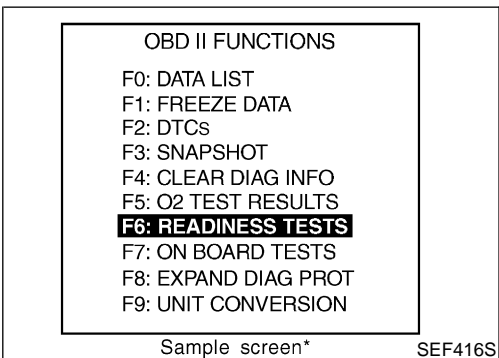
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(*: Regarding GST screens in this section, sample screens are shown.)

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5. Perform each diagnostic mode according to each service procedure.

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For further information, see the GST Operation Manual of the tool maker.

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ON BOARD DIAGNOSTIC SYSTEM DESCRIPTION

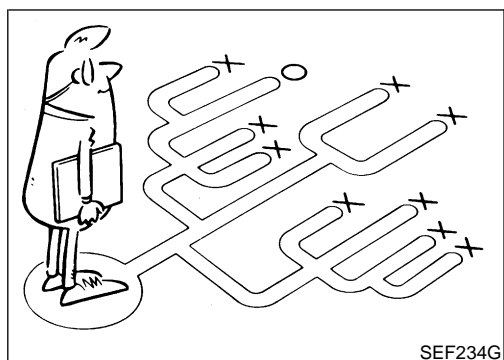
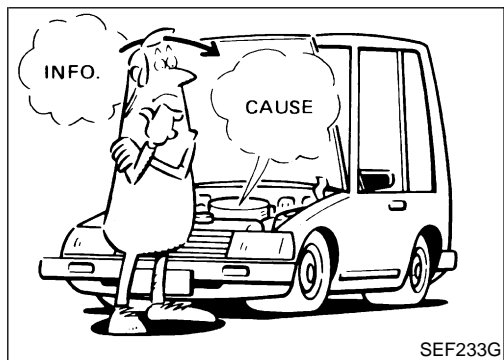
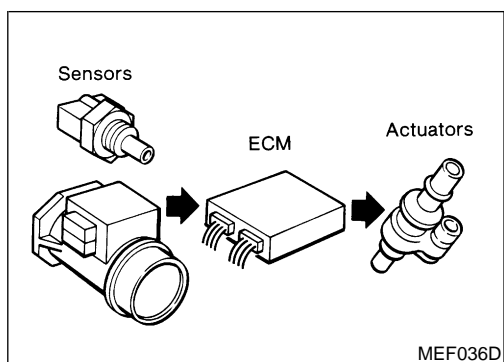
SR20DE

Generic Scan Tool (GST) (Cont'd)

FUNCTION

NIEC0759S03

Diagnostic test mode		Function
MODE 1	READINESS TESTS	This mode gains access to current emission-related data values, including analog inputs and outputs, digital inputs and outputs, and system status information.
MODE 2	(FREEZE DATA)	This mode gains access to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" (EC-1447).]
MODE 3	DTCs	This mode gains access to emission-related power train trouble codes which were stored by ECM.
MODE 4	CLEAR DIAG INFO	This mode can clear all emission-related diagnostic information. This includes: <ul style="list-style-type: none"> ● Clear number of diagnostic trouble codes (MODE 1) ● Clear diagnostic trouble codes (MODE 3) ● Clear trouble code for freeze frame data (MODE 1) ● Clear freeze frame data (MODE 2) ● Reset status of system monitoring test (MODE 1) ● Clear on board monitoring test results (MODE 6 and 7)
MODE 6	(ON BOARD TESTS)	This mode accesses the results of on board diagnostic monitoring tests of specific components/systems that are not continuously monitored.
MODE 7	(ON BOARD TESTS)	This mode enables the off board test drive to obtain test results for emission-related powertrain components/systems that are continuously monitored during normal driving conditions.
MODE 8	—	This mode can close EVAP system in ignition switch "ON" position (Engine stopped). When this mode is performed, following parts can be opened or closed. <ul style="list-style-type: none"> ● EVAP canister vent control valve open ● Vacuum cut valve bypass valve closed In the following conditions, this mode cannot function. <ul style="list-style-type: none"> ● Low ambient temperature ● Low battery voltage ● Engine running ● Ignition switch "OFF" ● Low fuel temperature ● Too much pressure is applied to EVAP system
MODE 9	(CALIBRATION ID)	This mode enables the off-board test device to request specific vehicle information such as Vehicle Identification Number (VIN) and Calibration IDs.



KEY POINTS

WHAT Vehicle & engine model
WHEN Date, Frequencies
WHERE..... Road conditions
HOW Operating conditions,
 Weather conditions,
 Symptoms

SEF907L

Introduction

NIEC0760

The engine has an ECM to control major systems such as fuel control, ignition control, idle air control system, etc. The ECM accepts input signals from sensors and instantly drives actuators. It is essential that both input and output signals are proper and stable. At the same time, it is important that there are no problems such as vacuum leaks, fouled spark plugs, or other problems with the engine.

It is much more difficult to diagnose a problem that occurs intermittently rather than continuously. Most intermittent problems are caused by poor electric connections or improper wiring. In this case, careful checking of suspected circuits may help prevent the replacement of good parts.

A visual check only may not find the cause of the problems. A road test with CONSULT-II (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on EC-1459.

Before undertaking actual checks, take a few minutes to talk with a customer who approaches with a driveability complaint. The customer can supply good information about such problems, especially intermittent ones. Find out what symptoms are present and under what conditions they occur. A "Diagnostic Worksheet" like the example on next page should be used.

Start your diagnosis by looking for "conventional" problems first. This will help troubleshoot driveability problems on an electronically controlled engine vehicle.

DIAGNOSTIC WORKSHEET

NIEC0760S01

There are many operating conditions that lead to the malfunction of engine components. A good grasp of such conditions can make trouble-shooting faster and more accurate.

In general, each customer feels differently about a problem. It is important to fully understand the symptoms or conditions for a customer complaint.

Utilize a diagnostic worksheet like the one on the next page in order to organize all the information for troubleshooting.

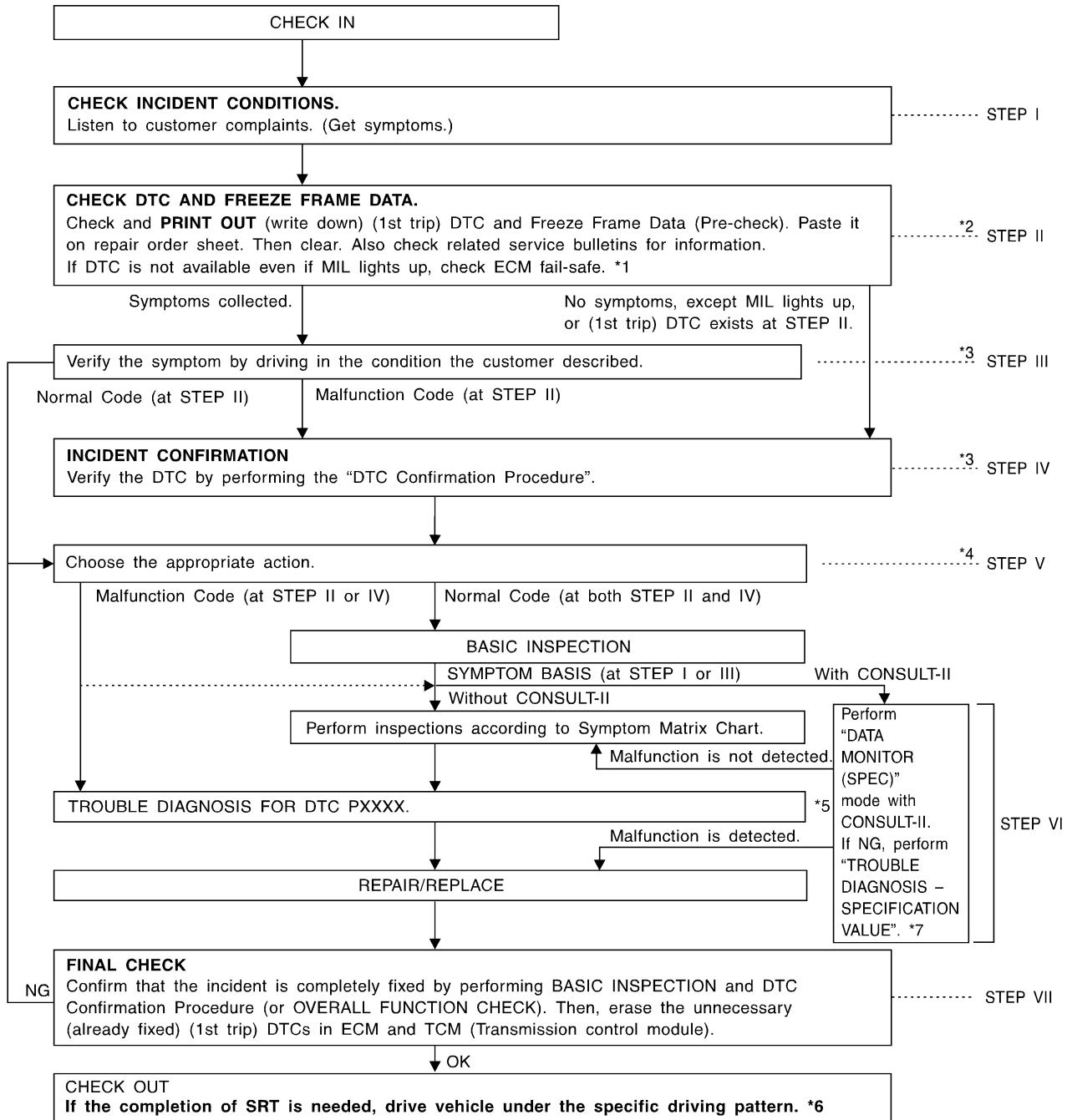
Some conditions may cause the malfunction indicator lamp to come on steady or blink and DTC to be detected. Examples:

- Vehicle ran out of fuel, which caused the engine to misfire.
- Fuel filler cap was left off or incorrectly screwed on, allowing fuel to evaporate into the atmosphere [for the models with EVAP (SMALL LEAK) diagnosis].

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Work Flow

NIEC0761



- *1: EC-1476
- *2: If time data of "SELF-DIAG RESULTS" is other than "0" or "1t", refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT", EC-1499.
- *3: If the incident cannot be duplicated, refer to "TROUBLE

- DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.
- *4: If the on board diagnostic system cannot be performed, check main power supply and ground circuit. Refer to "TROUBLE DIAGNOSIS FOR POWER SUPPLY", EC-1500.

- *5: If the malfunctioning part cannot be found, refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.
- *6: EC-1428
- *7: EC-1495

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DESCRIPTION FOR WORK FLOW

NIEC0761S01

STEP	DESCRIPTION
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET", EC-1458.
STEP II	<p>Before confirming the concern, check and write down (print out using CONSULT-II or Generic Scan Tool) the (1st trip) Diagnostic Trouble Code (DTC) and the (1st trip) freeze frame data, then erase the code and the data. (Refer to EC-1433.) The (1st trip) DTC and the (1st trip) freeze frame data can be used when duplicating the incident at STEP III & IV.</p> <p>Study the relationship between the cause, specified by (1st trip) DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See EC-1477.)</p> <p>Also check related service bulletins for information.</p>
STEP III	<p>Try to confirm the symptom and under what conditions the incident occurs.</p> <p>The "DIAGNOSTIC WORK SHEET" and the freeze frame data are useful to verify the incident. Connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>If the malfunction code is detected, skip STEP IV and perform STEP V.</p>
STEP IV	<p>Try to detect the (1st trip) Diagnostic Trouble Code by driving in (or performing) the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE". Check and read the (1st trip) DTC and (1st trip) freeze frame data by using CONSULT-II or Generic Scan Tool.</p> <p>During the (1st trip) DTC verification, be sure to connect CONSULT-II to the vehicle in DATA MONITOR (AUTO TRIG) mode and check real time diagnosis results.</p> <p>If the incident cannot be verified, perform INCIDENT SIMULATION TESTS. (Refer to GI-25.)</p> <p>In case the "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The (1st trip) DTC cannot be displayed by this check, however, this simplified "check" is an effective alternative.</p> <p>The "NG" result of the "OVERALL FUNCTION CHECK" is the same as the (1st trip) DTC detection.</p>
STEP V	<p>Take the appropriate action based on the results of STEP I through IV.</p> <p>If the malfunction code is indicated, proceed to TROUBLE DIAGNOSIS FOR DTC PXXXX.</p> <p>If the normal code is indicated, proceed to the BASIC INSPECTION. (Refer to EC-1461.) If CONSULT-II is available, perform "DATA MONITOR (SPEC)" mode with CONSULT-II and proceed to the "TROUBLE DIAGNOSIS — SPECIFICATION VALUE". (Refer to EC-1495.) (If malfunction is detected, proceed to "REPAIR/REPLACE".) Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-1477.)</p>
STEP VI	<p>Identify where to begin diagnosis based on the relationship study between symptom and possible causes. Inspect the system for mechanical binding, loose connectors or wiring damage using (tracing) "Harness Layouts". Gently shake the related connectors, components or wiring harness with CONSULT-II set in "DATA MONITOR (AUTO TRIG)" mode.</p> <p>Check the voltage of the related ECM terminals or monitor the output data from the related sensors with CONSULT-II. Refer to EC-1486.</p> <p>The "DIAGNOSTIC PROCEDURE" in EC section contains a description based on open circuit inspection. A short circuit inspection is also required for the circuit check in the DIAGNOSTIC PROCEDURE. For details, refer to GI section ("HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT", "Circuit Inspection").</p> <p>Repair or replace the malfunction parts.</p> <p>If malfunctioning part cannot be detected, perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>
STEP VII	<p>Once you have repaired the circuit or replaced a component, you need to run the engine in the same conditions and circumstances which resulted in the customer's initial complaint.</p> <p>Perform the "DTC CONFIRMATION PROCEDURE" and confirm the normal code [DTC No. P0000 or 0505] is detected. If the incident is still detected in the final check, perform STEP VI by using a different method from the previous one.</p> <p>Before returning the vehicle to the customer, be sure to erase the unnecessary (already fixed) (1st trip) DTC in ECM and TCM (Transmission control module). (Refer to EC-1433.)</p>

Basic Inspection

NIEC0762

Precaution:

Perform Basic Inspection without electrical or mechanical loads applied;

- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear window defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.

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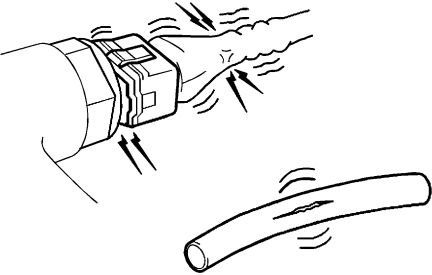
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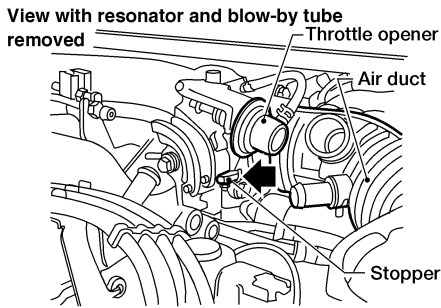
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1	INSPECTION START
<p>1. Check service records for any recent repairs that may indicate a related problem, or a current need for scheduled maintenance.</p> <p>2. Open engine hood and check the following:</p> <ul style="list-style-type: none"> ● Harness connectors for improper connections ● Vacuum hoses for splits, kinks and improper connections ● Wiring for improper connections, pinches and cuts ● Air cleaner clogging ● Hoses and ducts for leaks 	
	
<small>SEF983U</small>	
<p>▶ GO TO 2.</p>	

2	CHECK THROTTLE OPENER OPERATION
<p>1. Start engine and let it idle.</p> <p>2. Confirm that the throttle drum becomes free from the rod of the throttle opener.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Check throttle opener. Refer to "INSPECTION", EC-1406.

3	CHECK THROTTLE DRUM OPERATION
<p>Confirm that throttle drum moves to contact the stopper.</p>	
	
<small>LEC267</small>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 4.

Basic Inspection (Cont'd)

4	CHECK ACCELERATOR WIRE INSTALLATION	
1. Stop engine. 2. Check accelerator wire for slack.		
OK or NG		
OK	▶▶	GO TO 5.
NG	▶▶	Adjust accelerator wire. Refer to FE-3 , "Adjusting Accelerator Wire".

5	CHECK THROTTLE VALVE OPERATION	
1. Remove intake air ducts. 2. Check throttle valve operation when moving throttle drum by hand.		
OK or NG		
OK	▶▶	Retighten the throttle drum fixing nuts.
NG	▶▶	Clean the throttle body and throttle valve.

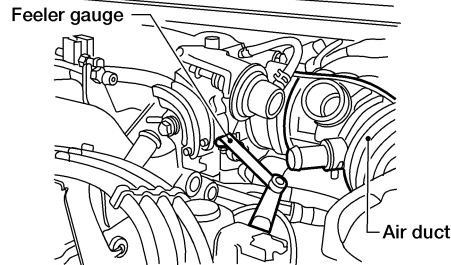
6	CHECK THROTTLE POSITION SWITCH CLOSED POSITION-I	
<p>NOTE: Always check ignition timing before performing the following.</p> 1. Warm up engine to normal operating temperature. 2. Stop engine. 3. Remove the vacuum hose connected to the throttle opener. 4. Connect suitable vacuum hose to vacuum pump as shown below.		
<p style="text-align: right; font-size: small;">SEF793WA</p>		
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum is free from the throttle opener rod.		
With CONSULT-II	▶▶	GO TO 7.
Without CONSULT-II	▶▶	GO TO 13.

7 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

Ⓜ With CONSULT-II

1. Turn ignition switch "ON".
2. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode with CONSULT-II.
3. Read "CLSD THL/P SW" signal under the following conditions.
 - Insert a 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between stopper and throttle drum as shown in the figure and check the signal.

View with resonator and blow-by tube removed



LEC270

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

"CLSD THL/P SW" signal should remain "ON" while inserting 0.05 mm (0.0020 in) feeler gauge.
 "CLSD THL/P SW" signal should remain "OFF" while inserting 0.15 mm (0.0059 in) feeler gauge.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

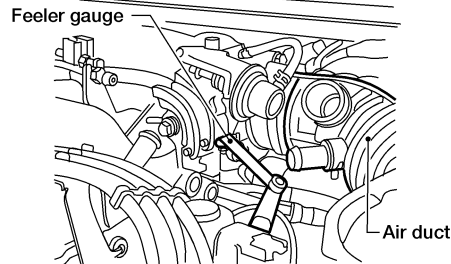
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8 | **ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I**

With CONSULT-II

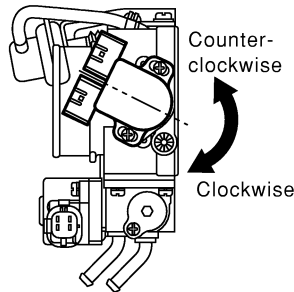
1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to test No. 6. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.

View with resonator and blow-by tube removed



LEC270

4. Turn throttle position sensor body counterclockwise until "CLSD THL/P SW" signal switches to "OFF".



SEF867X

TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	OFF

SEF716Y



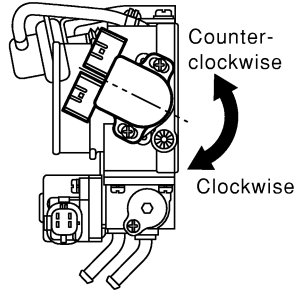
GO TO 9.

9 ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II

With CONSULT-II

1. Temporarily tighten sensor body fixing bolts as follows.

- Gradually move the sensor body clockwise and stop it when "CLSD THL/P SW" signal switches from "OFF" to "ON", then temporarily tighten sensor body fixing bolts.



SEF867X

2. Make sure two or three times that the signal is "ON" when the throttle valve is closed and "OFF" when it is opened.
3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.
4. Make sure two or three times that the signal remains "OFF" when the throttle valve is closed.
5. Tighten throttle position sensor.
6. Check the "CLSD THL/P SW" signal again.

The signal remains "OFF" while closing throttle valve.

OK or NG

OK	▶	GO TO 10.
NG	▶	GO TO 8.

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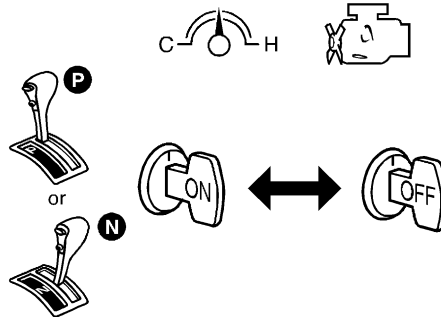
10 RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY

With CONSULT-II

NOTE:

Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.

1. Confirm that proper vacuum is applied. Refer to Test No. 6.
2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.
3. Start engine.
4. Warm up engine to normal operating temperature.
5. Select "TP SW/TP SEN IDLE POSI ADJ" in "WORK SUPPORT" mode.
6. Stop engine. (Turn ignition switch "OFF".)
7. Turn ignition switch "ON" and wait at least 10 seconds.



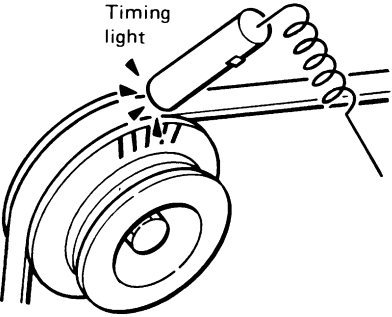
SEF864V

8. Turn ignition switch "OFF" and wait at least 10 seconds.
9. Repeat steps 7 and 8 until "CLSD THL POS" signal changes to "ON".

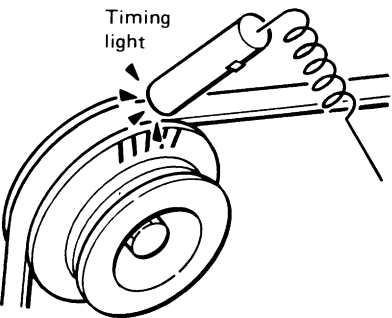
TP SW/TP SEN IDLE POSI ADJ	
MONITOR	
COOLAN TEMP/S	91 °C
CLSD THL POS	ON
CLSD THL/P SW	ON

SEF715Y

▶ GO TO 11.

11	CHECK IGNITION TIMING-I
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Release vacuum from throttle opener. 3. Remove vacuum pump and vacuum hose from throttle opener. 4. Reinstall original vacuum hose to throttle opener securely. 5. Start engine and warm it up to normal operating temperature. 6. Select "IGNITION TIMING ADJ" in "WORK SUPPORT" mode with CONSULT-II. 7. Touch "START". 8. Check ignition timing at idle using a timing light. 	
	
<p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p>	
SEF284G	
OK or NG	
OK	▶ GO TO 12.
NG	▶ 1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-1407. 2. GO TO 12.

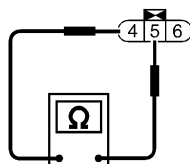
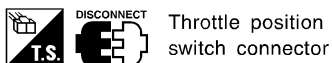
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12	CHECK IGNITION TIMING-II
<p>Ⓟ With CONSULT-II</p> <p>Touch "MODE" or "BACK". (Cancel "IGNITION TIMING ADJ" in "WORK SUPPORT" mode.)</p> <p>Check ignition timing at idle using a timing light.</p>	
	
<p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p>	
SEF284G	
OK or NG	
OK	▶ GO TO 26.
NG	▶ GO TO 19.

13 CHECK THROTTLE POSITION SWITCH CLOSED POSITION-II

⊗ Without CONSULT-II

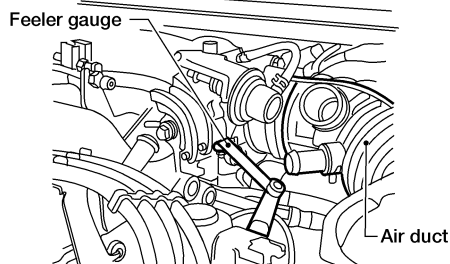
1. Disconnect closed throttle position switch harness connector.
2. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions.



SEF711X

- Insert the 0.05 mm (0.0020 in) and 0.15 mm (0.0059 in) feeler gauge alternately between the stopper and throttle drum as shown in the figure.

View with resonator and blow-by tube removed



LEC270

- “Continuity should exist” while inserting 0.05 mm (0.0020 in) feeler gauge.
- “Continuity should not exist” while inserting 0.15 mm (0.0059 in) feeler gauge.

OK or NG

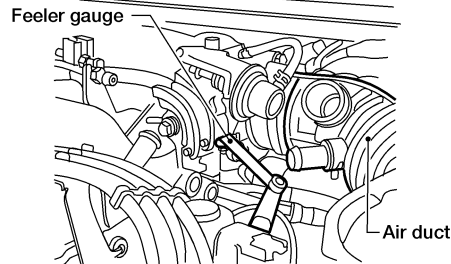
OK	▶	GO TO 16.
NG	▶	GO TO 14.

14 ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-I

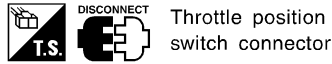
⊗ Without CONSULT-II

1. Loosen throttle position sensor fixing bolts.
2. Confirm that proper vacuum is applied. Refer to Test No. 6. During adjustment, vacuum should be applied.
3. Insert 0.05 mm (0.0020 in) feeler gauge between stopper and throttle drum as shown in the figure.

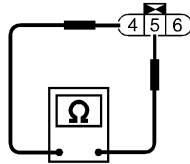
View with resonator and blow-by tube removed



LEC270

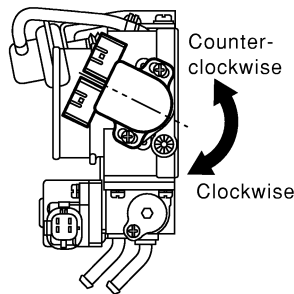


Throttle position switch connector



SEF711X

4. Turn throttle position sensor body counterclockwise until continuity does not exist.



SEF867X

▶ GO TO 15.

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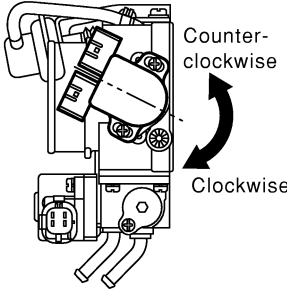
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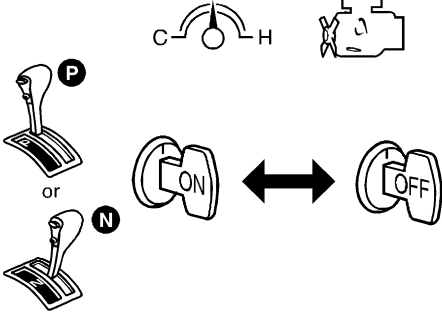
HA

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15	ADJUSTMENT THROTTLE POSITION SWITCH CLOSED POSITION-II
<p>⊗ Without CONSULT-II</p> <p>1. Temporarily tighten sensor body fixing bolts as follows.</p> <ul style="list-style-type: none"> ● Gradually move the sensor body clockwise and stop it when the continuity comes to exist, then temporarily tighten sensor body fixing bolts. 	
	
SEF867X	
<p>2. Make sure two or three times that the continuity exists when the throttle valve is closed and continuity does not exist when it is opened.</p> <p>3. Remove 0.05 mm (0.0020 in) feeler gauge then insert 0.15 mm (0.0059 in) feeler gauge.</p> <p>4. Make sure two or three times that the continuity does not exist when the throttle valve is closed.</p> <p>5. Tighten throttle position sensor.</p> <p>6. Check the continuity again.</p> <p style="color: blue;">Continuity does not exist while closing the throttle valve.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 16.
NG	▶ GO TO 14.

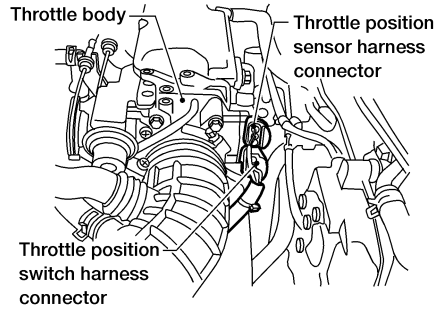
16	RESET THROTTLE POSITION SENSOR IDLE POSITION MEMORY
<p>⊗ Without CONSULT-II</p> <p>NOTE:</p> <p>Always warm up engine to normal operating temperature. If engine is cool, the throttle position sensor idle position memory will not be reset correctly.</p> <p>1. Confirm that proper vacuum is applied. Refer to Test No. 6.</p> <p>2. Attach blind cap to vacuum port from which vacuum hose to throttle opener was disconnected.</p> <p>3. Start engine.</p> <p>4. Warm up engine to normal operating temperature.</p> <p>5. Stop engine. (Turn ignition switch "OFF".)</p> <p>6. Turn ignition switch "ON" and wait at least 5 seconds.</p>	
	
SEF864V	
<p>7. Turn ignition switch "OFF" and wait at least 10 seconds.</p> <p>8. Repeat steps 6 and 7, 20 times.</p>	
▶	GO TO 17.

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17 CHECK IGNITION TIMING-I

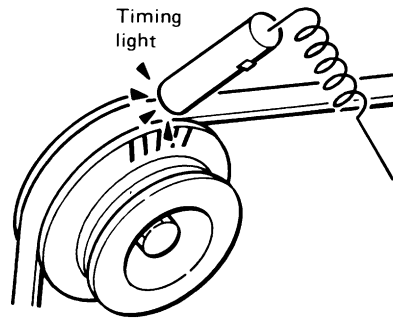
⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Release vacuum from throttle opener.
3. Remove vacuum pump and vacuum hose from throttle opener.
4. Reinstall original vacuum hose to throttle opener securely.
5. Start engine and warm it up to normal operating temperature.
6. Stop engine and disconnect throttle position sensor harness connector.



LEC279

7. Start engine.
8. Check ignition timing at idle using a timing light.

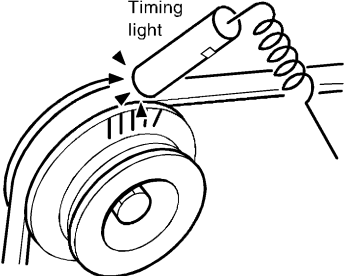


SEF284G

Ignition timing:
M/T 15°±2° BTDC
A/T 15°±2° BTDC (in "P" or "N" position)

OK or NG

OK	▶	GO TO 18.
NG	▶	1. Adjust ignition timing by turning distributor. Refer to "Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment", EC-1407. 2. GO TO 18.

18	CHECK IGNITION TIMING-II
<p>1. Stop engine. 2. Reconnect throttle position sensor harness connector. 3. Start engine and let it idle. 4. Check ignition timing at idle using a timing light.</p>	
	
<p>Ignition timing: M/T 15°±2° BTDC A/T 15°±2° BTDC (in "P" or "N" position)</p>	
OK or NG	
OK	▶ GO TO 29.
NG	▶ GO TO 19.

SEF984U

19	PERFORM IDLE AIR VOLUME LEARNING
<p>Refer to "Idle Air Volume Learning", EC-1419. Is the result CMPLT or INCMP?</p>	
CMPLT or INCMP	
CMPLT	▶ GO TO 20.
INCMP	▶ Follow the instruction of "Idle Air Volume Learning".

20	CHECK IGNITION TIMING AGAIN
<p>Check ignition timing again. Refer to Test No. 12 (With CONSULT-II) or 18 (Without CONSULT-II).</p>	
OK or NG	
OK (With CONSULT-II)	▶ GO TO 26.
OK (Without CONSULT-II)	▶ GO TO 29.
NG	▶ GO TO 21.

21	CHECK FOR INTAKE AIR LEAK
<p>1. Start engine and let it idle. 2. Listen for an air leak from PCV hose and after IACV-AAC valve.</p>	
OK or NG	
OK	▶ GO TO 23.
NG	▶ GO TO 22.

22	REPAIR MALFUNCTION
<p>1. Stop engine. 2. Repair or replace malfunctioning part.</p>	
	▶ GO TO 19.

23	DETECT MALFUNCTIONING PART	
Check the IACV-AAC valve circuit and function. Refer to EC-1764.		
OK or NG		
OK	▶	GO TO 25.
NG	▶	GO TO 24.

GI

MA

EM

24	REPAIR MALFUNCTION	
Repair or replace malfunction part following the "Diagnostic Procedure" corresponding the detected malfunction.		
	▶	GO TO 19.


LC

25	CHECK ECM FUNCTION	
1. Substitute another known good ECM to check ECM function. (ECM may be the cause of a problem, but this is rarely the case.)		
2. Perform initialization of NVIS (NATS) system and registration of NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN Vehicle Immobilizer System — NATS)", EC-1435.		
	▶	GO TO 19.

EC

FE

CL

26	CHECK TARGET IDLE SPEED	
 With CONSULT-II 1. Start engine and warm it up to normal operating temperature. 2. Select "ENG SPEED" in "DATA MONITOR" mode. 3. Check idle speed. M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)		
OK or NG		
OK	▶	GO TO 32.
NG	▶	GO TO 27.

MT

AT

AX

SU

BR

27	PERFORM IDLE AIR VOLUME LEARNING	
Refer to "Idle Air Volume Learning", EC-1419. Is the result CmplT or INcMp?		
CmplT or INcMp		
CmplT	▶	GO TO 28.
INcMp	▶	Follow the instruction of "Idle Air Volume Learning".

ST

RS

BT

28	CHECK TARGET IDLE SPEED AGAIN	
1. Start engine and warm it up to normal operating temperature. 2. Select "ENG SPEED" in "DATA MONITOR" mode with CONSULT-II. 3. Check idle speed. M/T: 800±50 rpm A/T: 800±50 rpm (in "P" or "N" position)		
OK or NG		
OK	▶	GO TO 32.
NG	▶	GO TO 21.

HA

SC

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IDX

Basic Inspection (Cont'd)

29	CHECK TARGET IDLE SPEED	
<p>⊗ Without CONSULT-II</p> <p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="padding-left: 20px;">M/T: 800±50 rpm</p> <p style="padding-left: 20px;">A/T: 800±50 rpm (in “P” or “N” position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 32.
NG	▶	GO TO 30.

30	PERFORM IDLE AIR VOLUME LEARNING	
<p>Refer to “Idle Air Volume Learning”, EC-1419.</p> <p>Is the result CMPLT or INCMP?</p> <p style="text-align: center;">CMPLT or INCMP</p>		
CMPLT	▶	GO TO 31.
INCMP	▶	Follow the instruction of “Idle Air Volume Learning”.

31	CHECK TARGET IDLE SPEED AGAIN	
<p>1. Start engine and warm it up to normal operating temperature.</p> <p>2. Check idle speed.</p> <p style="padding-left: 20px;">M/T: 800±50 rpm</p> <p style="padding-left: 20px;">A/T: 800±50 rpm (in “P” or “N” position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 32.
NG	▶	GO TO 21.

32	ERASE UNNECESSARY DTC	
<p>After this inspection, unnecessary DTC No. might be displayed.</p> <p>Erase the stored memory in ECM and TCM (Transmission control module).</p> <p>Refer to “HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION”, EC-1433 and “HOW TO ERASE DTC”, AT-37.</p>		
	▶	INSPECTION END

DTC Inspection Priority Chart

NIEC0763

If some DTCs are displayed at the same time, perform inspections one by one based on the following priority chart.

Priority	Detected items (DTC)	
1	<ul style="list-style-type: none"> ● P0100 Mass air flow sensor ● P0110 Intake air temperature sensor ● P0115, P0125 Engine coolant temperature sensor ● P0120 Throttle position sensor ● P0180 Fuel tank temperature sensor ● P0325 Knock sensor ● P0340 Camshaft position sensor ● P0403 EGR volume control valve ● P0460, P0461, P0464, P1464 Fuel level sensor ● P0500 Vehicle speed sensor ● P0605 ECM ● P1126 Thermostat function ● P1605 A/T diagnosis communication line ● P1706 Park/Neutral position (PNP) switch 	<div style="text-align: right; margin-bottom: 10px;">GI</div> <div style="text-align: right; margin-bottom: 10px;">MA</div> <div style="text-align: right; margin-bottom: 10px;">EM</div> <div style="text-align: right; margin-bottom: 10px;">LC</div> <div style="text-align: right; margin-bottom: 10px;">EC</div> <div style="text-align: right; margin-bottom: 10px;">FE</div>
2	<ul style="list-style-type: none"> ● P0105 Absolute pressure sensor ● P0130-P0134 Heated oxygen sensor 1 (front) ● P0135 Heated oxygen sensor 1 heater (front) ● P0137-P0140 Heated oxygen sensor 2 (rear) ● P0141 Heated oxygen sensor 2 heater (rear) ● P0217 Coolant overtemperature enrichment protection ● P0335, P1336 Crankshaft position sensor (OBD) ● P0443, P1444 EVAP canister purge volume control solenoid valve ● P0446, P1446, P1448 EVAP canister vent control valve ● P0450 EVAP control system pressure sensor ● P0510 Closed throttle position switch ● P0705-P0725, P0740-P1760 A/T related sensors, solenoid valves and switches ● P1401 EGR temperature sensor ● P1447 EVAP control system purge flow monitoring ● P1490, P1491 Vacuum cut valve bypass valve 	<div style="text-align: right; margin-bottom: 10px;">CL</div> <div style="text-align: right; margin-bottom: 10px;">MT</div> <div style="text-align: right; margin-bottom: 10px;">AT</div> <div style="text-align: right; margin-bottom: 10px;">AX</div> <div style="text-align: right; margin-bottom: 10px;">SU</div>
3	<ul style="list-style-type: none"> ● P0171, P0172 Fuel injection system function ● P0300-P0304 Misfire ● P0400, P1402 EGR function ● P0420 Three way catalyst function ● P0440, P1440 EVAP control system (SMALL LEAK) ● P0455 EVAP control system (GROSS LEAK) ● P0505 IACV-AAC valve ● P0600 A/T communication line ● P0731-P0734, P0744 A/T function ● P1148 Closed loop control 	<div style="text-align: right; margin-bottom: 10px;">BR</div> <div style="text-align: right; margin-bottom: 10px;">ST</div> <div style="text-align: right; margin-bottom: 10px;">RS</div>

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Fail-safe Chart

=NIEC0764

The ECM enters fail-safe mode if any of the following malfunctions is detected due to the open or short circuit. When the ECM enters the fail-safe mode, the MIL illuminates.

DTC No.	Detected items	Engine operating condition in fail-safe mode	
P0100	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.	
P0115	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
		Condition	Engine coolant temperature decided (CONSULT-II display)
		Just as ignition switch is turned ON or Start	40°C (104°F)
		More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)	
P0120	Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
		Condition	Driving condition
		When engine is idling	Normal
	When accelerating	Poor acceleration	
P0403	EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.	
Unable to access ECM	ECM	ECM fail-safe activating condition The computing function of the ECM was judged to be malfunctioning. When the fail-safe system activates (i.e., if the ECM detects a malfunction condition in the CPU of ECM), the MIL on the instrument panel lights to warn the driver. However it is not possible to access ECM and DTC cannot be confirmed.	
		Engine control with fail-safe When ECM fail-safe is operating, fuel injection, ignition timing, fuel pump operation and IACV-AAC valve operation are controlled under certain limitations.	
			ECM fail-safe operation
		Engine speed	Engine speed will not rise more than 3,000 rpm
		Fuel injection	Simultaneous multiport fuel injection system
		Ignition timing	Ignition timing is fixed at the preset valve
		Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls
		IACV-AAC valve	Full open
		Replace ECM, if ECM fail-safe condition is confirmed.	

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

Symptom Matrix Chart

Symptom Matrix Chart SYSTEM — ENGINE CONTROL SYSTEM

NIEC0765

NIEC0765S01

		SYMPTOM											Reference page		
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEAT/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION		EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	1	1	2	3	2		2	2			3		2	EC-1914
	Fuel pressure regulator system	3	3	4	4	4	4	4	4	4		4			EC-1404
	Injector circuit	1	1	2	3	2		2	2			2			EC-1905
	Evaporative emission system	3	3	4	4	4	4	4	4	4		4			EC-1385
Air	Positive crankcase ventilation system	3	3	4	4	4	4	4	4	4		4	1		EC-1401
	Incorrect idle speed adjustment	3	3				1	1	1	1		1			EC-1461
	IACV-AAC valve circuit	1	1	2	3	3	2	2	2	2		2		2	EC-1764
Ignition	Incorrect ignition timing adjustment	3	3	1	1	1		1	1			1			EC-1461
	Ignition circuit	1	1	2	2	2		2	2			2			EC-1899
EGR	EGR volume control valve circuit		2	2	3	3						3			EC-1688
	EGR system	2	1	2	3	3	3	2	2	3		3			EC-1679, EC-1820
Main power supply and ground circuit		2	2	3	3	3		3	3		2	3		2	EC-1500
Air conditioner circuit		2	2	3	3	3	3	3	3	3		3		2	HA section

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

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TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

Symptom Matrix Chart (Cont'd)

	SYMPTOM													Reference page
	HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Camshaft position sensor circuit	2	2	3	3	3		3	3			3			EC-1672
Mass air flow sensor circuit	1	1	2	2	2		2	2			2			EC-1507
Heated oxygen sensor 1 (front) circuit		1	2	3	2		2	2			2			EC-1545
Engine coolant temperature sensor circuit	1	1	2	3	2	3	2	2	3		2			EC-1524, 1540
Throttle position sensor circuit		1	2		2	2	2	2	2		2			EC-1529
Incorrect throttle position sensor adjustment		3	1		1	1	1	1	1		1			EC-1461
Vehicle speed sensor circuit		2	3		3						3			EC-1760
Knock sensor circuit			2								3			EC-1663
ECM	2	2	3	3	3	3	3	3	3	3	3			EC-1784, 1476
Start signal circuit	2													EC-1910
PNP switch circuit			3		3		3	3			3			EC-1894
Power steering oil pressure switch circuit		2					3	3						EC-1920
Electrical load signal circuit							3	3						EC-1930

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

Symptom Matrix Chart (Cont'd)

SYSTEM — ENGINE MECHANICAL & OTHER

NIEC0765S02

		SYMPTOM											Reference page			
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION		EXCESSIVE OIL CONSUMPTION	BATTERY DEAD (UNDER CHARGE)	
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	5	5												FE section	
	Fuel piping			5	5	5		5	5			5				
	Vapor lock															
	Valve deposit															
	Poor fuel (Heavy weight gasoline, Low octane)	5			5	5	5		5	5			5			—
Air	Air duct															
	Air cleaner															
	Air leakage from air duct (Mass air flow sensor — throttle body)		5	5		5		5	5			5				
	Throttle body, Throttle wire	5			5		5			5					FE section	
	Air leakage from intake manifold/Collector/Gasket														—	
Cranking	Battery	1	1	1		1		1	1					1	EL section	
	Alternator circuit															
	Starter circuit	3										1				
	Flywheel/Drive plate	6													EM section	
	PNP switch	4													AT section	

1 - 6: The numbers refer to the order of inspection.
(continued on next page)

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

Symptom Matrix Chart (Cont'd)

		SYMPTOM												Reference page	
		HARD/NO START/RESTART (EXCP. HA)	ENGINE STALL	HESITATION/SURGING/FLAT SPOT	SPARK KNOCK/DETONATION	LACK OF POWER/POOR ACCELERATION	HIGH IDLE/LOW IDLE	ROUGH IDLE/HUNTING	IDLING VIBRATION	SLOW/NO RETURN TO IDLE	OVERHEATS/WATER TEMPERATURE HIGH	EXCESSIVE FUEL CONSUMPTION	EXCESSIVE OIL CONSUMPTION		BATTERY DEAD (UNDER CHARGE)
Warranty symptom code		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Engine	Cylinder head														EM section
	Cylinder head gasket	5	5	5	5	5		5	5		4	5	3		
	Cylinder block												4		
	Piston														
	Piston ring														
	Connecting rod	6	6	6	6	6		6	6			6			
	Bearing														
	Crankshaft														
Valve mechanism	Timing chain														EM section
	Camshaft														
	Intake valve	5	5	5	5	5		5	5			5			
	Exhaust valve												3		
Exhaust	Exhaust manifold/Tube/Muffler/Gasket	5	5	5	5	5		5	5			5			FE section
	Three way catalyst														
Lubrication	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	5	5	5	5	5		5	5			5			MA, EM and LC sections
	Oil level (Low)/Filthy oil														
Cooling	Radiator/Hose/Radiator filler cap														LC section
	Thermostat														
	Water pump														
	Water gallery	5	5	5	5	5		5	5		4	5			
	Cooling fan													5	
	Coolant level (low)/Contaminated coolant														

1 - 6: The numbers refer to the order of inspection.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0766

Remarks:

- Specification data are reference values.
- Specification data are output/input values which are detected or supplied by the ECM at the connector.

* Specification data may not be directly related to their components signals/values/operations.

(i.e., Adjust ignition timing with a timing light before monitoring IGN TIMING. Specification data might be displayed even when ignition timing is not adjusted to specification. This IGN TIMING monitors the data calculated by the ECM according to the input signals from the camshaft position sensor and other ignition timing related sensors.)

- If the real-time diagnosis results are NG, and the on board diagnostic system results are OK, when diagnosing the mass air flow sensor, first check to see if the fuel pump control circuit is normal.

MONITOR ITEM	CONDITION	SPECIFICATION
ENG SPEED	<ul style="list-style-type: none"> ● Tachometer: Connect ● Run engine and compare tachometer indication with the CONSULT-II value. 	Almost the same speed as the CONSULT-II value.
MAS A/F SE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.3 - 1.7V
		2,500 rpm 1.8 - 2.4V
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle 1.0 - 1.6 msec
		2,000 rpm 0.7 - 1.3 msec
A/F ALPHA-B1	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm 53 - 155%
COOLAN TEMP/S	<ul style="list-style-type: none"> ● Engine: After warming up 	More than 70°C (158°F)
HO2S1 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Maintaining engine speed at 2,000 rpm 0 - 0.3V ↔ 0.6 - 1.0V
HO2S1 MNTR (B1)		LEAN ↔ RICH Changes more than 5 times during 10 seconds.
HO2S2 (B1)	<ul style="list-style-type: none"> ● Engine: After warming up 	Revving engine from idle to 3,000 rpm quickly 0 - 0.3V ↔ 0.6 - 1.0V
HO2S2 MNTR (B1)		LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> ● Turn drive wheels and compare speedometer indication with the CONSULT-II value 	Almost the same speed as the CONSULT-II value
BATTERY VOLT	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) 	11 - 14V
THRTL POS SEN	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed 0.15 - 0.85V
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) ● Vacuum is applied using a vacuum pump 	Throttle valve: fully opened 3.5 - 4.7V
EGR TEMP SEN	<ul style="list-style-type: none"> ● Engine: After warming up 	Less than 4.5V
EVAP SYS PRES	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 3.4V
ABSOL PRES/SE	<ul style="list-style-type: none"> ● Ignition switch: ON 	Approx. 4.4V
START SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON → START → ON 	OFF → ON → OFF
CLSD THL POS CLSD THL/P SW	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: Idle position ON
	<ul style="list-style-type: none"> ● Vacuum is applied using a vacuum pump 	Throttle valve: Slightly open OFF

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION	
AIR COND SIG	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	A/C switch "OFF"	OFF
		A/C switch "ON" (Compressor operates)	ON
P/N POSI SW	<ul style="list-style-type: none"> ● Ignition switch: ON 	Shift lever "P" or "N"	ON
		Except above	OFF
PW/ST SIGNAL	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is turned	ON
LOAD SIGNAL	<ul style="list-style-type: none"> ● Ignition switch: ON 	Rear window defogger switch and/or lighting switch "2ND"	ON
		Rear window defogger switch and lighting switch "OFF"	OFF
IGNITION SW	<ul style="list-style-type: none"> ● Ignition switch: ON → OFF 		ON → OFF
HEATER FAN SW	<ul style="list-style-type: none"> ● Ignition switch: ON 	Fan control switch: ON	ON
		Fan control switch: OFF	OF
INJ PULSE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 2.8 msec
IGN TIMING	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	15°±2° BTDC
		2,000 rpm	More than 25° BTDC
CAL/LD VALUE	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	20.0 - 35.5%
		2,500 rpm	17.0 - 30.0%
ABSOL TH-P/S	<ul style="list-style-type: none"> ● Engine: After warming up, idle the engine 	Throttle valve: fully closed	0.0%
	<ul style="list-style-type: none"> ● Engine: After warming up ● Ignition switch: ON (Engine stopped) 	Throttle valve: fully opened	Approx. 88.0%
MASS AIRFLOW	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: N ● No-load 	Idle	2.5 - 5.0 g·m/s
		2,500 rpm	7.1 - 12.5 g·m/s
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	5 - 20 steps
		2,000 rpm	—
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0%
		2,000 rpm	—
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0 step
		Engine speed: Revving from idle up to 3,000 rpm quickly	10 - 55 step
AIR COND RLY	<ul style="list-style-type: none"> ● Air conditioner switch: OFF → ON 		OFF → ON

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION	
FUEL PUMP RLY	<ul style="list-style-type: none"> ● Ignition switch is turned to ON (Operates for 5 seconds) ● Engine running and cranking ● When engine is stopped (stops in 1.0 seconds) 		ON	GI
	<ul style="list-style-type: none"> ● Except as shown above 		OFF	MA
VC/V BYPASS/V	<ul style="list-style-type: none"> ● Ignition switch: ON 		OFF	EM
VENT CONT/V	<ul style="list-style-type: none"> ● Ignition switch: ON 		OFF	EM
COOLING FAN	<ul style="list-style-type: none"> ● After warming up engine, idle the engine. ● Air conditioner switch: OFF 	Engine coolant temperature is below 95°C (203°F)	OFF	LC
		Engine coolant temperature is between 95°C (203°F) and 105°C (221°F)	LOW	EC
		Engine coolant temperature is above 105°C (221°F)	HIGH	FE
HO2S1 HTR (B1)	<ul style="list-style-type: none"> ● Engine speed: Below 3,200 rpm 		ON	
	<ul style="list-style-type: none"> ● Engine speed: Above 3,200 rpm 		OFF	CL
HO2S2 HTR (B1)	<ul style="list-style-type: none"> ● Ignition switch: ON (Engine stopped) ● Engine speed: Above 3,600 rpm 		OFF	MT
	<ul style="list-style-type: none"> ● Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more] 		ON	AT

GI

MA

EM

LC

EC

FE

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SU

BR

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IDX

Major Sensor Reference Graph in Data Monitor Mode

=NIEC0767

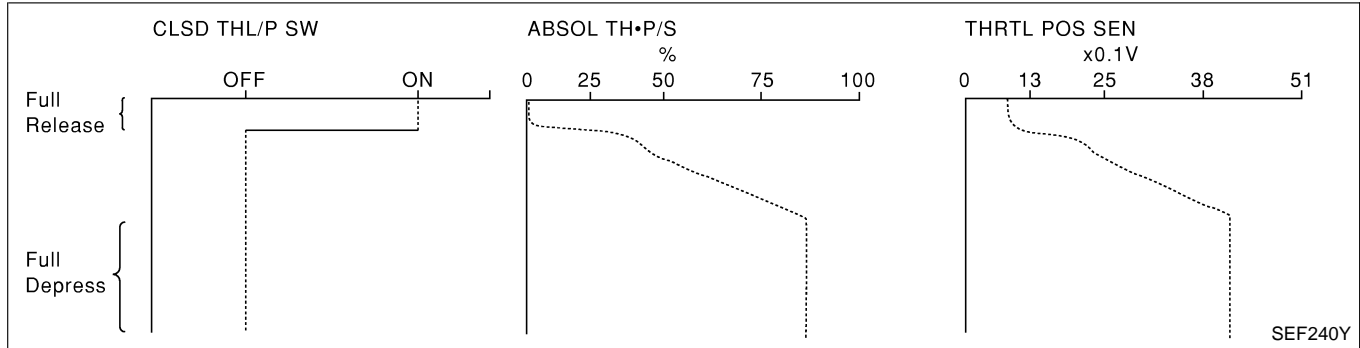
The following are the major sensor reference graphs in "DATA MONITOR" mode.

THRTL POS SEN, ABSOL TH·P/S, CLSD THL/P SW

NIEC0767S01

Below is the data for "THRTL POS SEN", "ABSOL TH·P/S" and "CLSD THL/P SW" when depressing the accelerator pedal with the ignition switch "ON".

The signal of "THRTL POS SEN" and "ABSOL TH·P/S" should rise gradually without any intermittent drop or rise after "CLSD THL/P SW" is changed from "ON" to "OFF".

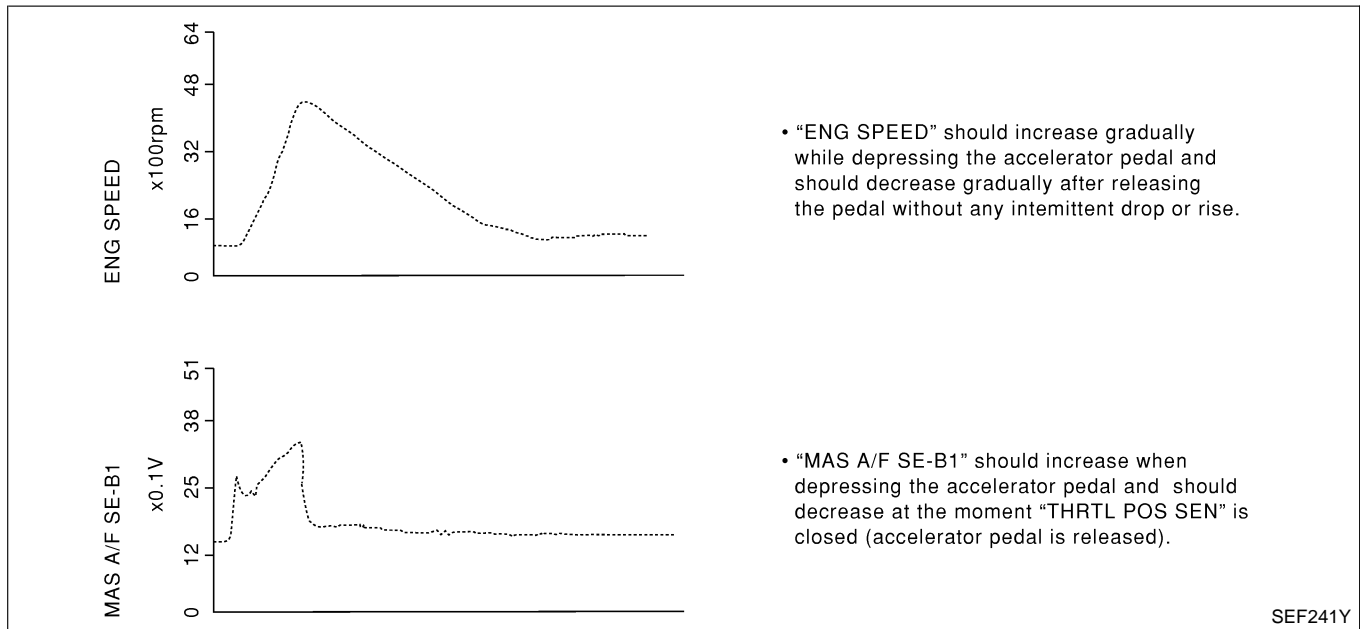


ENG SPEED, MAS A/F SE-B1, THRTL POS SEN, HO2S2 (B1), HO2S1 (B1), INJ PULSE-B1

NIEC0767S02

Below is the data for "ENG SPEED", "MAS A/F SE-B1", "THRTL POS SEN", "HO2S2 (B1)", "HO2S1 (B1)" and "INJ PULSE-B1" when revving engine quickly up to 4,800 rpm under no load after warming up engine to normal operating temperature.

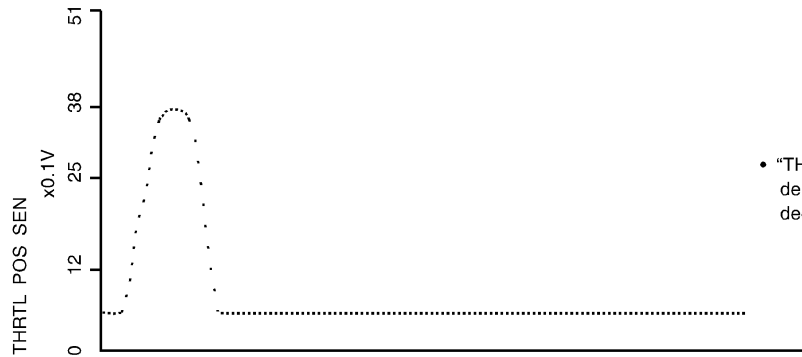
Each value is for reference, the exact value may vary.



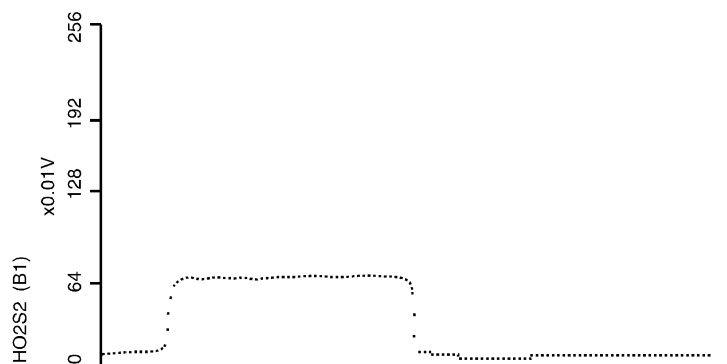
TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



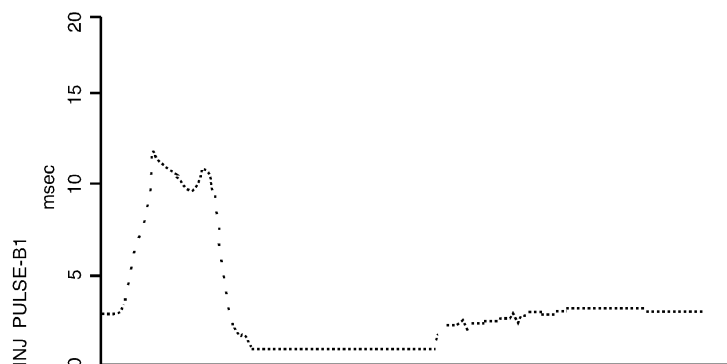
- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "HO2S2 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "HO2S1 (B1)" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "INJ PULSE-B1" should increase when depressing the accelerator pedal and should decrease when the pedal is released.

GI

MA

EM

LC

EC

FE

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AT

AX

SU

BR

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RS

BT

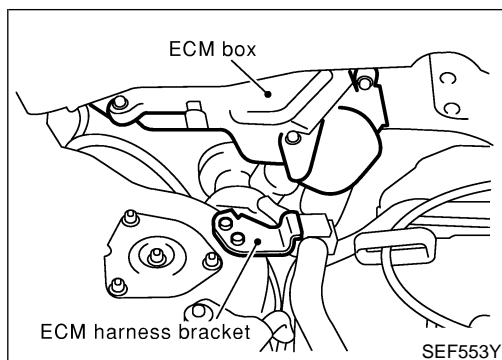
HA

SC

EL

IDX

SEF242YA



ECM Terminals and Reference Value

NIEC0768

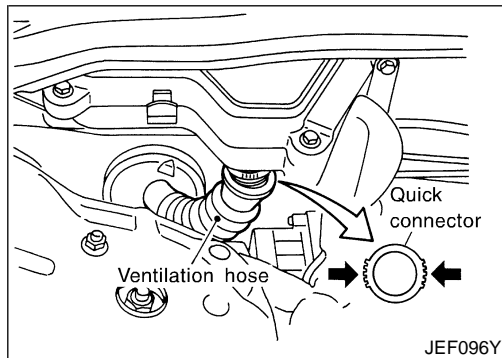
PREPARATION

NIEC0768S01

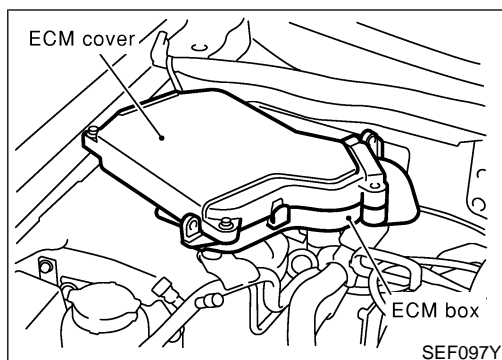
1. ECM is located in the right side of the cowl top (behind the strut tower).

For this inspection:

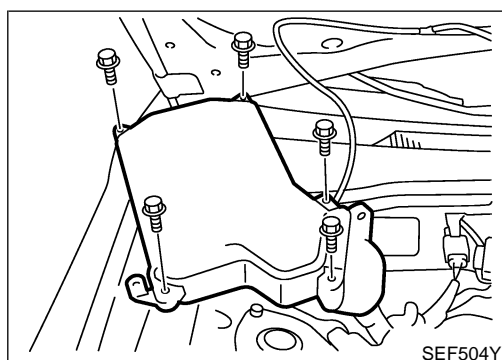
- Remove front strut tower bar. Refer to **SU-6**, "FRONT SUSPENSION PARTS".
- Remove engine control harness bracket on the strut tower.



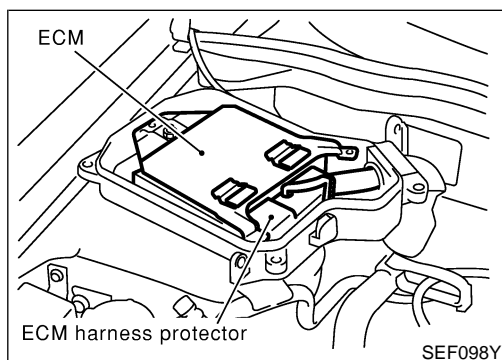
- Remove quick connector on the ventilation hose.



- Remove ECM fixing bolts and pull it out all the way.



- Remove ECM cover fixing bolts.

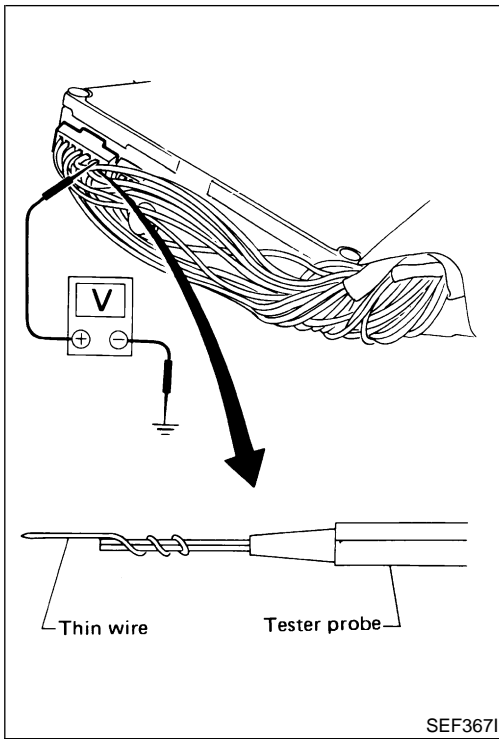


- Remove ECM fixing bolts.
 - Remove ECM with its harness from the cover.
2. Remove ECM harness protector.

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

ECM Terminals and Reference Value (Cont'd)



3. Perform all voltage measurements with the connector connected. Extend tester probe as shown to perform tests easily.
 - Open harness securing clip to make testing easier.
 - Use extreme care not to touch 2 pins at one time.
 - Data is for comparison and may not be exact.

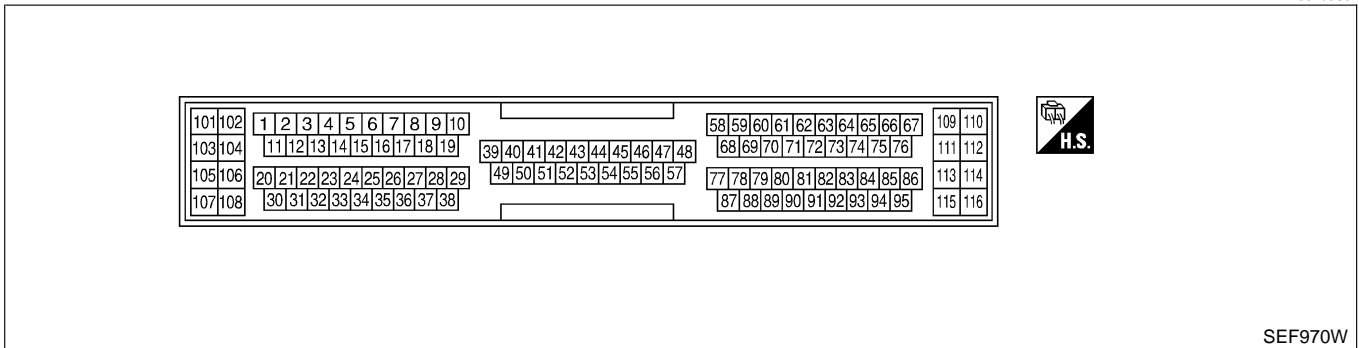
CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

GI
MA
EM
LC
EC

ECM HARNESS CONNECTOR TERMINAL LAYOUT

NIEC0768S02



FE
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ST

ECM INSPECTION TABLE

NIEC0768S03

Specification data are reference values and are measured between each terminal and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

RS
BT
HA

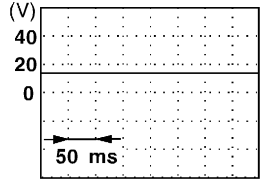
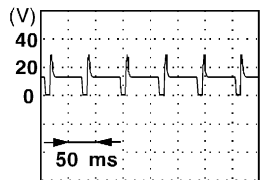
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
2	L/B	Vacuum cut valve bypass valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)

SC
EL
IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

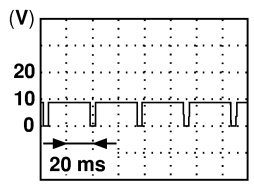
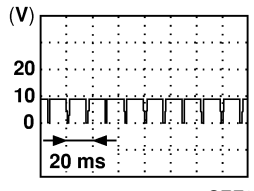
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
3	W/R	Heated oxygen sensor 2 heater (rear)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,600 rpm. ● After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more. 	0 - 1.0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Engine stopped [Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,600 rpm. 	BATTERY VOLTAGE (11 - 14V)
4	R/B	Heated oxygen sensor 1 heater (front)	[Engine is running] <ul style="list-style-type: none"> ● Engine speed is below 3,200 rpm. 	0 - 1.0V
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is above 3,200 rpm. 	BATTERY VOLTAGE (11 - 14V)
6 7 15 16	BR LG P OR	IACV-AAC valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
8 9 17 18	SB W/B R/Y Y	EGR volume control valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0.1 - 14V
10	Y/B	A/T signal No. 3	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	0 - 1.0V
12	LG/B	Cooling fan relay (High)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan (High) is operating 	0 - 0.6V
13	LG/R	Cooling fan relay (Low)	[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is not operating 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Cooling fan is operating 	0 - 0.6V
14	GY/L	EVAP canister purge volume control solenoid valve	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	BATTERY VOLTAGE (11 - 14V) <div style="text-align: right;">  <p style="text-align: right; margin-top: 5px;">SEF994U</p> </div>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is about 2,000 rpm (More than 100 seconds after starting engine). 	BATTERY VOLTAGE (11 - 14V) <div style="text-align: right;">  <p style="text-align: right; margin-top: 5px;">SEF995U</p> </div>
19	BR/W	A/T signal No. 5	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 8V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

ECM Terminals and Reference Value (Cont'd)

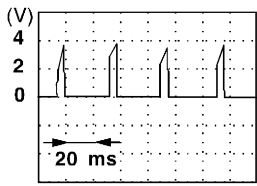
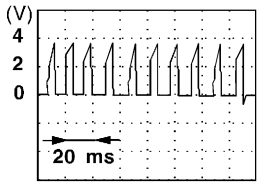
TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
20 (With-out NVIS model)	B/P	Fuel pump relay	[Ignition switch "ON"] ● For 5 seconds after turning ignition switch "ON" [Engine is running]	0 - 1V
			[Ignition switch "ON"] ● More than 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
21 (With NVIS model)	B/P		[Ignition switch "ON"] ● More than 5 seconds after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
22	OR/L	Malfunction indicator lamp	[Ignition switch "ON"]	0 - 1.0V
			[Engine is running] ● Idle speed	BATTERY VOLTAGE (11 - 14V)
23	L	Air conditioner relay	[Engine is running] ● Both A/C switch and blower switch are "ON" (Compressor operates)	0 - 0.6V
			[Engine is running] ● A/C switch is "OFF"	BATTERY VOLTAGE (11 - 14V)
31	W/G	ECM relay (Self shut-off)	[Engine is running] [Ignition switch "OFF"] ● For a few seconds after turning ignition switch "OFF"	0 - 1.0V
			[Ignition switch "OFF"] ● A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
32	L/OR	Tachometer	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 8.2V 
			[Engine is running] ● Engine speed is 2,000 rpm	Approximately 8.2V 

GI
 MA
 EM
 LC
EC
 FE
 CL
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 AT
 AX
 SU
 BR
 ST
 RS
 BT
 HA
 SC
 EL
 IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

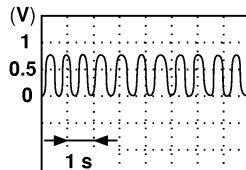
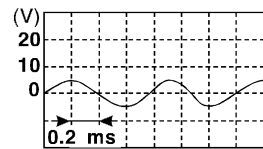
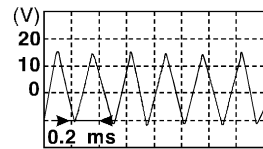
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
35	R/G	Ignition signal	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0.3V  <p style="text-align: right; margin-top: 5px;">SEF996V</p>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 0.5V  <p style="text-align: right; margin-top: 5px;">SEF997V</p>
40	Y/PU	Throttle position switch (Closed position)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	BATTERY VOLTAGE (11 - 14V)
			[Engine is running] <ul style="list-style-type: none"> ● Accelerator pedal depressed 	Approximately 0V
41	B/Y	Start signal	[Ignition switch "ON"]	Approximately 0V
			[Ignition switch "START"]	9 - 14V
42	G/OR	PNP switch	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Gear position is "Neutral position" (M/T models) ● Gear position is "P" or "N" (A/T models) 	Approximately 0V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Except the above gear position 	BATTERY VOLTAGE (11 - 14V)
43	B/R	Ignition switch	[Ignition switch "OFF"]	0V
			[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
44	L/R	Air conditioner switch	[Engine is running] <ul style="list-style-type: none"> ● Both A/C switch and blower switch are "ON" 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> ● A/C switch is "OFF" 	BATTERY VOLTAGE (11 - 14V)
46	PU/W	Power steering oil pressure switch	[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is being turned. 	Approximately 0V
			[Engine is running] <ul style="list-style-type: none"> ● Steering wheel is not being turned. 	Approximately 5V
48	B	ECM ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Engine ground
50	R/W	Electrical load signal	[Ignition switch "ON"] <ul style="list-style-type: none"> ● Lighting switch "2ND" and/or rear window defogger switch "ON" 	BATTERY VOLTAGE (11 - 14V)
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Lighting switch and rear window defogger switch "OFF" 	0V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

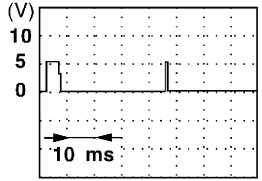
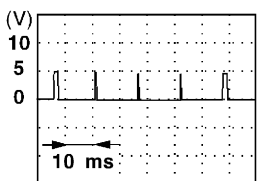
ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
51	LG/B	Heater fan switch	[Ignition switch "ON"] ● Heater fan switch is "ON"	Approximately 0V	GI
			[Ignition switch "ON"] ● Heater fan switch is "OFF"	Approximately 5V	MA
54	Y/R	A/T signal No. 1	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	EM
55	Y/G	A/T signal No. 2	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	LC
56	G/Y	A/T signal No. 4	[Engine is running] ● Idle speed	Approximately 0 - 1.0V	EC
57	B	ECM ground	[Engine is running] ● Idle speed	Engine ground	FE
58	B	Sensor's ground	[Engine is running] ● Warm-up condition ● Idle speed	Approximately 0V	CL
61	G	Mass air flow sensor	[Engine is running] ● Warm-up condition ● Idle speed	1.3 - 1.7V	MT
			[Engine is running] ● Warm-up condition ● Engine speed is 2,500 rpm	1.8 - 2.4V	AT
62	W	Heated oxygen sensor 1 (front)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V (Periodically change)	AX
				 <p style="text-align: right; margin-right: 50px;">SEF059V</p>	SU
63	L	Heated oxygen sensor 2 (rear)	[Engine is running] ● Warm-up condition ● Engine speed is 2,000 rpm	0 - Approximately 1.0V	BR
64	Y/B	Intake air temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with intake air temperature.	ST
65	B/R	Crankshaft position sensor (OBD)	[Engine is running] ● Warm-up condition ● Idle speed	3 - 5V (AC range)	HA
			[Engine is running] ● Engine speed is 2,000 rpm	 <p style="text-align: right; margin-right: 50px;">SEF721W</p>	SC
				6 - 9V (AC range)	EL
				 <p style="text-align: right; margin-right: 50px;">SEF722W</p>	IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
66 75 (With NVIS model) 76 85 (Without NVIS model)	OR/L	Camshaft position sensor (Reference signal)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	0.1 - 0.4V  <p style="text-align: right; font-size: small;">SEF006W</p>
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	0.1 - 0.4V  <p style="text-align: right; font-size: small;">SEF007W</p>
67	W/L	Power supply for ECM (Back-up)	[Ignition switch "OFF"]	BATTERY VOLTAGE (11 - 14V)
70	BR/W	Engine coolant temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with engine coolant temperature.
71	GY	Throttle position sensor signal output	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	Approximately 0.4V
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	Approximately 4V
72	PU	EGR temperature sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Less than 4.5V
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● EGR system is operating 	0 - 1.5V
73	B	Mass air flow sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 0V
74	R/L	Refrigerant pressure sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Both A/C switch and blower switch are "ON" (Compressor operates) 	0.36 - 3.88V
81	W	Knock sensor	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 2.5V
82	G/OR	Fuel tank temperature sensor	[Engine is running]	Approximately 0 - 4.8V Output voltage varies with fuel tank temperature.
83	G	Fuel level sensor	[Ignition switch "ON"]	Approximately 0 - 4.8V Output voltage varies with fuel level.
84	P	EVAP control system pressure sensor	[Ignition switch "ON"]	Approximately 3.4V

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)	
75 (With-out NVIS model)	W/L	Camshaft position sensor (Position signal)	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	Approximately 2.6V 	GI MA EM LC
			[Engine is running] <ul style="list-style-type: none"> ● Engine speed is 2,000 rpm 	Approximately 2.5V 	EC FE CL
86	PU/R	Vehicle speed sensor	[Engine is running] <ul style="list-style-type: none"> ● Lift up the vehicle ● In 2nd gear position ● Vehicle speed is 40 km/h (25 MPH) 	0 - Approximately 4.2V 	MT AT AX
90	B/W	Fuel level sensor ground	[Engine is running] <ul style="list-style-type: none"> ● Idle speed 	Approximately 0V	SU
91	PU	A/T check signal	[Ignition switch "ON"]	0 - Approximately 5V	BR
92	Y	Throttle position sensor	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Accelerator pedal fully released 	0.15 - 0.85V	ST
			[Ignition switch "ON"] <ul style="list-style-type: none"> ● Accelerator pedal fully depressed 	3.5 - 4.7V	RS
101 103 105 107	R/B Y/B G/B L/B	Injector No. 1 Injector No. 2 Injector No. 3 Injector No. 4	[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Idle speed 	BATTERY VOLTAGE (11 - 14V) 	BT HA
			[Engine is running] <ul style="list-style-type: none"> ● Warm-up condition ● Engine speed is 2,000 rpm 	BATTERY VOLTAGE (11 - 14V) 	SC EL IDX

TROUBLE DIAGNOSIS — GENERAL DESCRIPTION

SR20DE

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC Voltage)
102	L/Y	EVAP canister vent control valve	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
106 108	B/Y B/Y	ECM ground	[Engine is running] ● Idle speed	Engine ground
110 112	W W	Power supply for ECM	[Ignition switch "ON"]	BATTERY VOLTAGE (11 - 14V)
111	R	Sensor's power supply	[Ignition switch "ON"]	Approximately 5V
115	LG	DATA link connector	[Ignition switch "ON"] ● CONSULT-II or GST is disconnected.	Approximately 8V

Description

The specification (SP) value indicates the tolerance of the value that is displayed in “DATA MONITOR (SPEC)” mode of CONSULT-II during normal operation of engine control system. When the value in “DATA MONITOR (SPEC)” mode is within the SP value, the engine control system is confirmed OK. When the value in “DATA MONITOR (SPEC)” mode is NOT within the SP value, the engine control system may have one or more malfunctions.

The SP value is used to detect malfunctions that may affect the engine control system, but will not light the MIL.

The SP value will be displayed for the following three items:

- B/FUEL SCHDL (The fuel injection pulse width programmed into ECM prior to any learned on board correction.)
- A/F ALPHA-B1/B2 (The mean value of air/fuel ratio feedback correction factor per cycle.)
- MAS A/F SE-B1 (The signal voltage of the mass air flow sensor.)

TESTING CONDITION

- Vehicle driven distance: More than 5,000 km (3,107 miles)
- Barometric pressure: 98.3 - 104.3 kPa (1.003 - 1.064 kg/cm², 14.25 - 15.12 psi)
- Atmosphere temperature: 20 - 30°C (68 - 86°F)
- Engine coolant temperature: 75 - 95°C (167 - 203°F)
- Transmission: Warmed-up *1
- Electrical load: Not applied *2
- Engine speed: Idle

*1: For A/T models, after the engine is warmed-up to normal operating temperature, drive vehicle until “FLUID TEMP SE” (A/T fluid temperature sensor signal) indicates less than 0.9V. For M/T models, drive vehicle for 5 minutes after the engine is warmed-up to normal operating temperature.

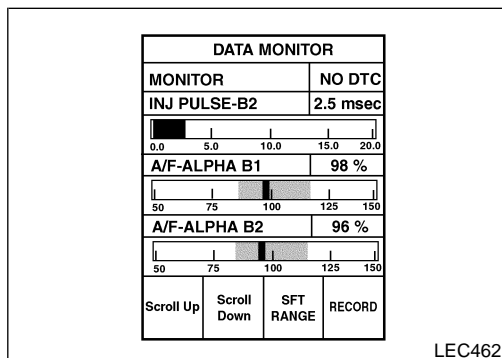
*2: Rear window defogger switch, air conditioner switch, and lighting switch are “OFF”. Cooling fans are not operating. Steering wheel straight ahead.

INSPECTION PROCEDURE

NOTE:

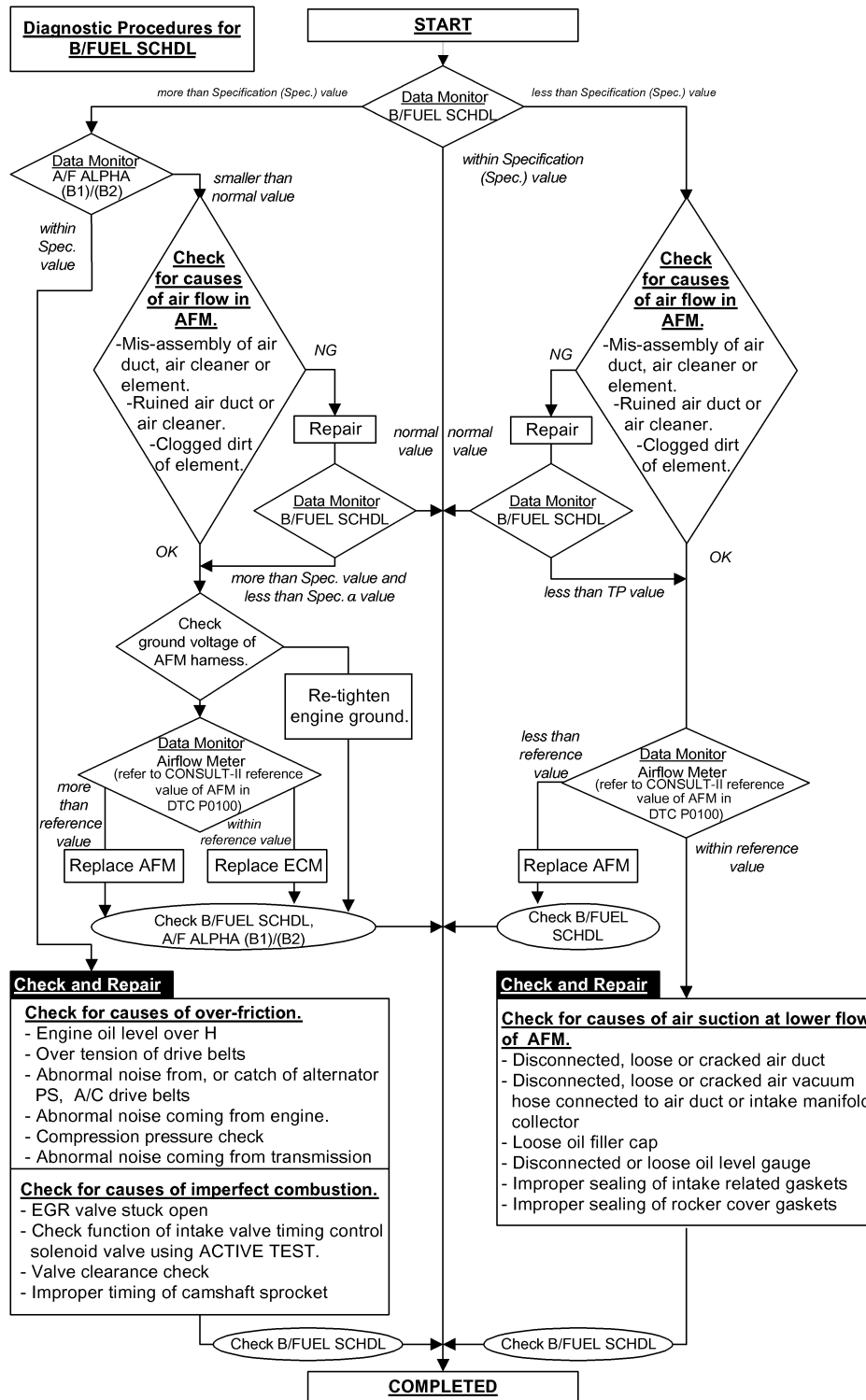
Perform “DATA MONITOR (SPEC)” mode in maximum scale display.

1. Perform “Basic Inspection”. Refer to “Basic Inspection”, EC-1461.
2. Confirm that the testing conditions indicated above are met.
3. Select “B/FUEL SCHDL”, “A/F ALPHA-B1”, “A/F ALPHA-B2”, and “MAS A/F SE-B1” in “DATA MONITOR (SPEC)” mode with CONSULT-II.
4. Make sure that monitor items are within the SP value.
5. If NG, go to “Diagnostic Procedure”. Refer to “Diagnostic Procedure”, EC-1496.



LEC462

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Description

NIEC0769

Intermittent incidents (I/I) may occur. In many cases, the problem resolves itself (the part or circuit function returns to normal without intervention). It is important to realize that the symptoms described in the customer's complaint often do not recur on DTC (1st trip) visits. Realize also that the most frequent cause of I/I occurrences is poor electrical connections. Because of this, the conditions under which the incident occurred may not be clear. Therefore, circuit checks made as part of the standard diagnostic procedure may not indicate the specific problem area.

COMMON I/I REPORT SITUATIONS

NIEC0769S01

STEP in Work Flow	Situation
II	The CONSULT-II is used. The SELF-DIAG RESULTS screen shows time data other than "0" or "1t".
III	The symptom described by the customer does not recur.
IV	(1st trip) DTC data does not appear during the DTC CONFIRMATION PROCEDURE.
VI	The TROUBLE DIAGNOSIS for PXXXX does not indicate the problem area.

Diagnostic Procedure

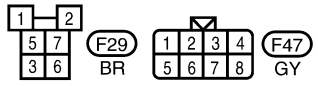
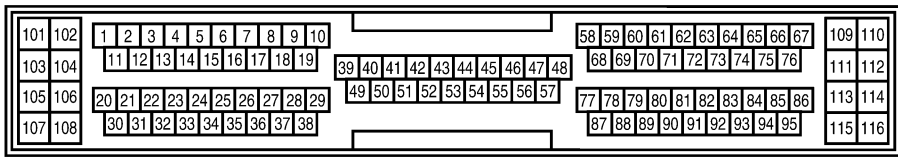
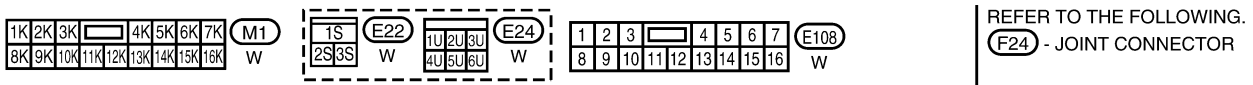
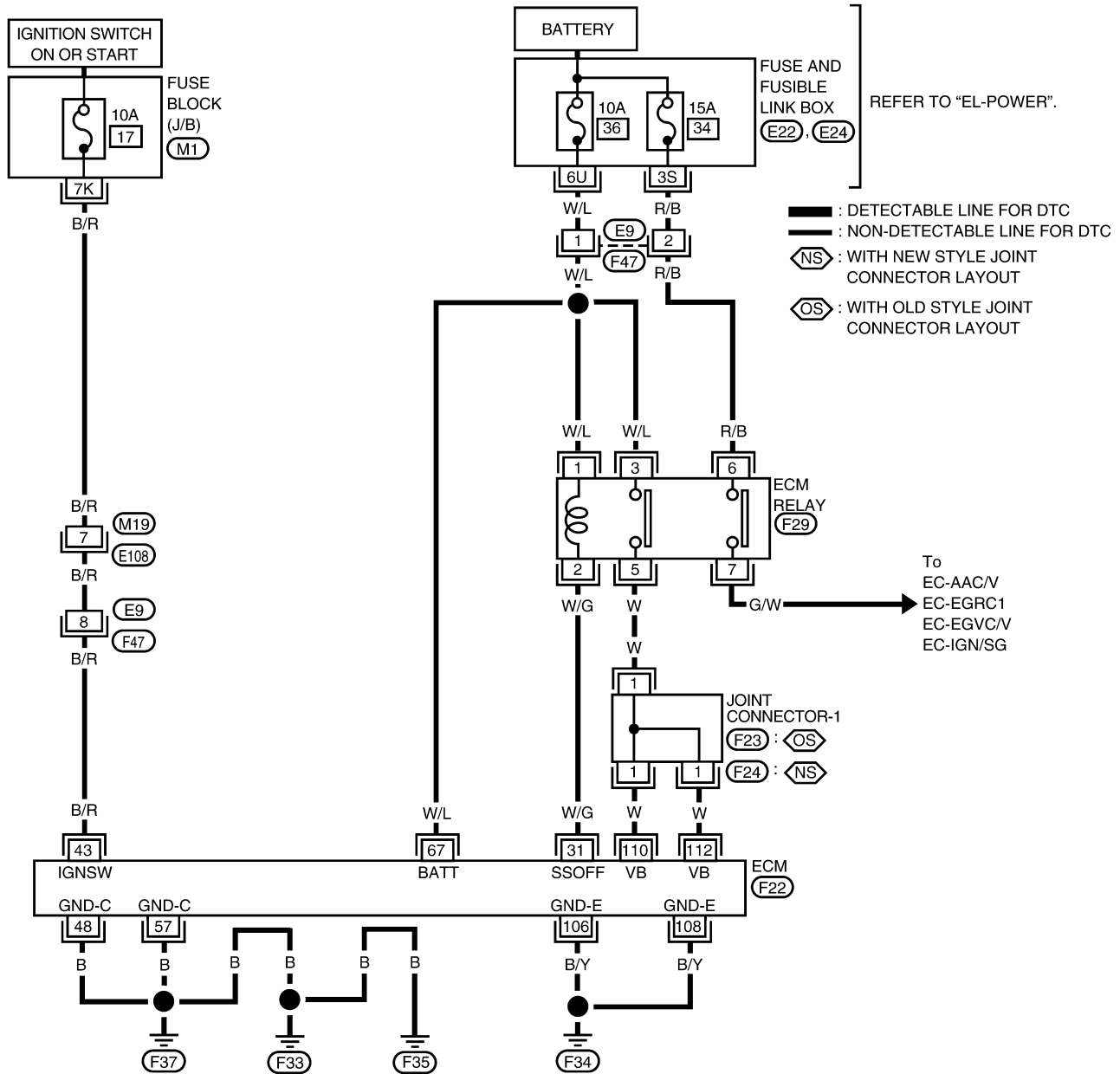
NIEC0770

1	INSPECTION START	
Erase (1st trip) DTCs. Refer to "HOW TO ERASE EMISSION-RELATED INFORMATION", EC-1433.		
▶		GO TO 2.
2	CHECK GROUND TERMINALS	
Check ground terminals for corroding or loose connection. Refer to GI-30 , "GROUND INSPECTION".		
OK or NG		
OK ▶		GO TO 3.
NG ▶		Repair or replace.
3	SEARCH FOR ELECTRICAL INCIDENT	
Refer to GI-25 , "Incident Simulation Tests".		
OK or NG		
OK ▶		GO TO 4.
NG ▶		Repair or replace.
4	CHECK CONNECTOR TERMINALS	
Refer to GI-22 , "How to Check Enlarged Contact Spring of Terminal".		
OK or NG		
OK ▶		INSPECTION END
NG ▶		Repair or replace connector.

Main Power Supply and Ground Circuit WIRING DIAGRAM

NIEC0771

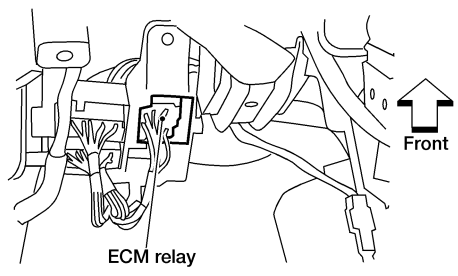
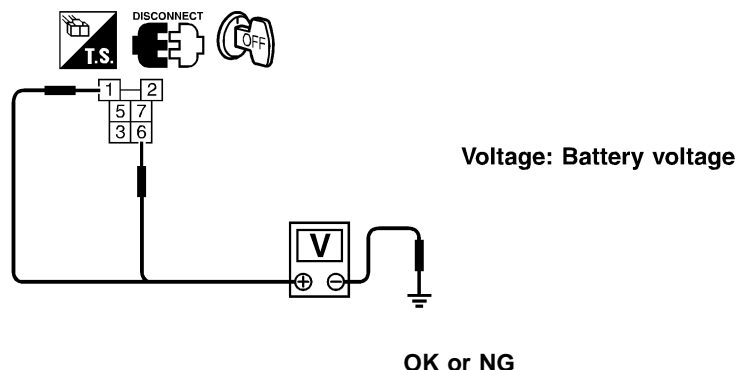
EC-MAIN-01



2	CHECK ECM POWER SUPPLY CIRCUIT-I
<p>1. Turn ignition switch "OFF" and then "ON". 2. Check voltage between ECM terminal 43 and ground with CONSULT-II or tester.</p>	
SEF291X	
OK	▶ GO TO 4.
NG	▶ GO TO 3.

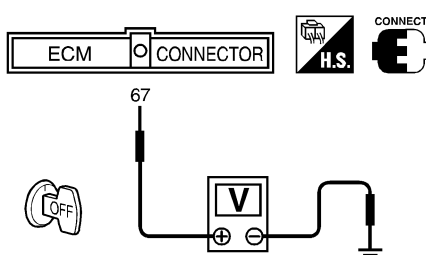
3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M19, E108 ● Harness connectors E9, F47 ● Harness for open or short between ECM and 10A fuse 	
▶	Repair harness or connectors.

4	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-I
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to WIRING DIAGRAM. Continuity should exist. 4. Also check harness for short to power.</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Repair open circuit or short to power in harness or connectors.

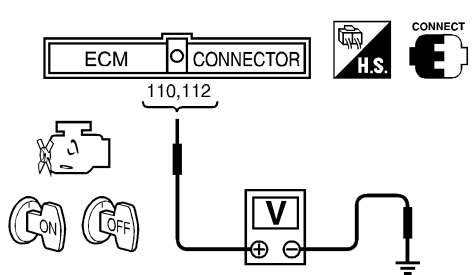
5	CHECK ECM POWER SUPPLY CIRCUIT-II	<p>1. Disconnect ECM relay.</p> <p style="text-align: center;">View with glove box removed</p> <div style="text-align: center;">  <p>ECM relay</p> </div> <p style="text-align: right;">LEC444</p> <p>2. Check voltage between ECM relay terminals 1, 6 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF101Y</p> </div>	GI MA EM LC EC FE CL MT AT AX SU						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black; padding: 2px;">OK</td> <td style="width: 5%; text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 2px;">GO TO 7.</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">NG</td> <td style="text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 2px;">GO TO 6.</td> </tr> </table>	OK	▶	GO TO 7.	NG	▶	GO TO 6.	
OK	▶	GO TO 7.							
NG	▶	GO TO 6.							

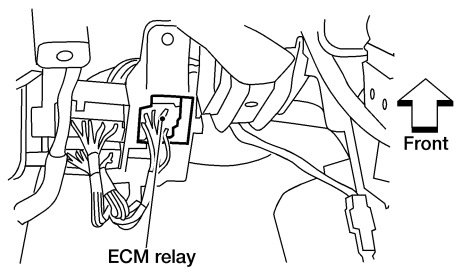
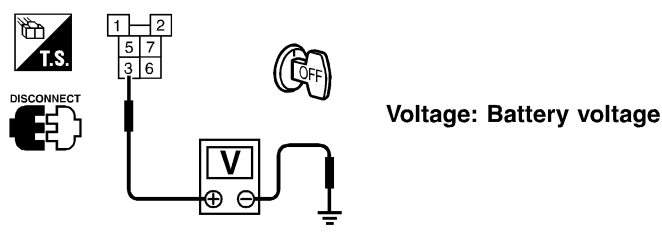
6	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● 15A fuse and 10A fuse ● Harness connectors E9, F47 ● Harness for open or short between ECM relay and battery <p style="text-align: right;">▶ Repair open circuit or short to ground or short to power in harness or connectors.</p>	BR ST RS
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7	CHECK OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Check harness continuity between ECM terminal 31 and ECM relay terminal 2. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; border-right: 1px solid black; padding: 2px;">OK</td> <td style="width: 5%; text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 2px;">Go to "IGNITION SIGNAL", EC-1899.</td> </tr> <tr> <td style="border-right: 1px solid black; padding: 2px;">NG</td> <td style="text-align: center; border-right: 1px solid black;">▶</td> <td style="padding: 2px;">Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	Go to "IGNITION SIGNAL", EC-1899.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	BT HA SC EL IDX
OK	▶	Go to "IGNITION SIGNAL", EC-1899.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

8	CHECK ECM POWER SUPPLY CIRCUIT-III	
<p>1. Stop engine. 2. Check voltage between ECM terminal 67 and ground with CONSULT-II or tester.</p>		
 <p style="margin-left: 400px;">Voltage: Battery voltage</p>		
SEF293X		
OK or NG		
OK	▶	GO TO 10.
NG	▶	GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Fuse and fusible link box E24 ● 10A fuse ● Harness for open or short between ECM and 10A fuse 		
▶ Repair harness or connectors.		

10	CHECK ECM POWER SUPPLY CIRCUIT-IV	
<p>1. Turn ignition switch "ON" and then "OFF". 2. Check voltage between ECM terminals 110, 112 and ground with CONSULT-II or tester.</p>		
 <p style="margin-left: 400px;">Voltage: After turning ignition switch "OFF", battery voltage will exist for a few seconds, then drop approximately 0V.</p>		
SEF294X		
OK or NG		
OK	▶	GO TO 16.
NG (Battery voltage does not exist.)	▶	GO TO 11.
NG (Battery voltage exists for more than a few seconds.)	▶	GO TO 13.

11	CHECK ECM POWER SUPPLY CIRCUIT-V	
<p>1. Disconnect ECM relay.</p> <p style="text-align: center;">View with glove box removed</p> <div style="text-align: center;">  <p>ECM relay</p> </div> <p style="text-align: right;">LEC444</p> <p>2. Check voltage between ECM relay terminal 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p style="text-align: right;">SEF295X</p> </div> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 15.
NG	▶	GO TO 12.

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12	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness for open or short between ECM relay and 10A fuse 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

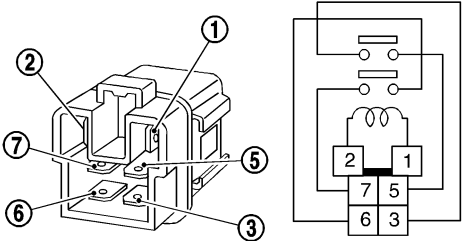
13	CHECK HARNESS CONTINUITY BETWEEN ECM RELAY AND ECM FOR OPEN AND SHORT	
<p>1. Check harness continuity between ECM terminals 110, 112 and ECM relay terminal 5. Refer to WIRING DIAGRAM. Continuity should exist.</p> <p>2. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 16.
NG	▶	GO TO 14.

14	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between ECM and ECM relay 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

TROUBLE DIAGNOSIS FOR POWER SUPPLY

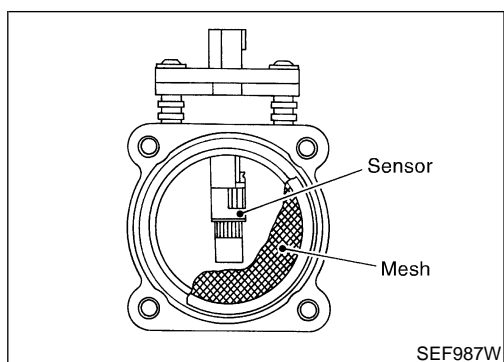
SR20DE

Main Power Supply and Ground Circuit (Cont'd)

15	CHECK ECM RELAY	
<p>1. Apply 12V direct current between ECM relay terminals 1 and 2. 2. Check continuity between ECM relay terminals 3 and 5, 6 and 7.</p>		
		
SEF296X		
OK or NG		
OK	▶	GO TO 16.
NG	▶	Replace ECM relay.

16	CHECK ECM GROUND CIRCUIT FOR OPEN AND SHORT-II	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals 48, 57, 106, 108 and engine ground. Refer to "Wiring Diagram", EC-1500. Continuity should exist. 4. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	Repair open circuit or short to power in harness or connectors.

17	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END



Component Description

The mass air flow sensor is placed in the stream of intake air. It measures the intake flow rate by measuring a part of the entire intake flow. It consists of a hot wire that is supplied with electric current from the ECM. The temperature of the hot wire is controlled by the ECM a certain amount. The heat generated by the hot wire is reduced as the intake air flows around it. The more air, the greater the heat loss.

Therefore, the ECM must supply more electric current to maintain the temperature of the hot wire as air flow increases. The ECM detects the air flow by means of this current change.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
MAS A/F SE-B1	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	1.3 - 1.7V
	2,500 rpm	1.8 - 2.4V
CAL/LD VALUE	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	20.0 - 35.5%
	2,500 rpm	17.0 - 30.0%
MASS AIRFLOW	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load Idle	2.5 - 5.0 g-m/s
	2,500 rpm	7.1 - 12.5 g-m/s

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0100	A) An excessively high voltage from the sensor is sent to ECM when engine is not running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Mass air flow sensor
	C) A high voltage from the sensor is sent to ECM under light load driving condition.	
	B) An excessively low voltage from the sensor is sent to ECM* when engine is running.	● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air leaks ● Mass air flow sensor
	D) A low voltage from the sensor is sent to ECM under heavy load driving condition.	
	E) A voltage from the sensor exists constantly approx. 1.0V when engine is running.	

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode
Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.

DTC Confirmation Procedure

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B and E". If there is no problem on "PROCEDURE FOR MALFUNCTION B and E", perform "PROCEDURE FOR MALFUNCTION C". If there is no problem on "PROCEDURE FOR MALFUNCTION C", perform "PROCEDURE FOR MALFUNCTION D".

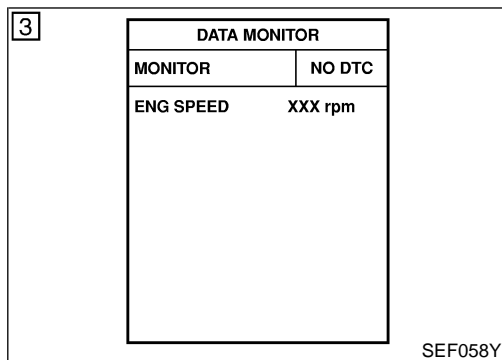
NIEC0776

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.



PROCEDURE FOR MALFUNCTION A

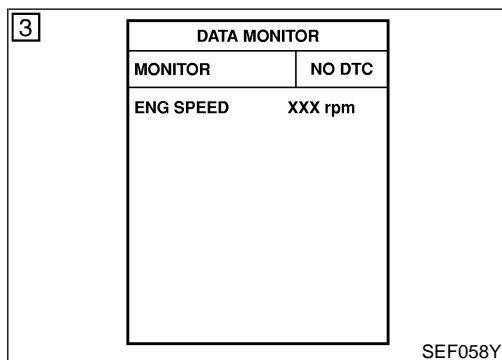
NIEC0776S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1512.

With GST

Follow the procedure "With CONSULT-II" above.



PROCEDURE FOR MALFUNCTION B AND E

NIEC0776S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait 5 seconds at most.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1512.

With GST

Follow the procedure "With CONSULT-II" above.

NOTE:

If 1st trip DTC is confirmed after more than 5 seconds, there may be malfunction C.

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION C

NIEC0776S03

NOTE:

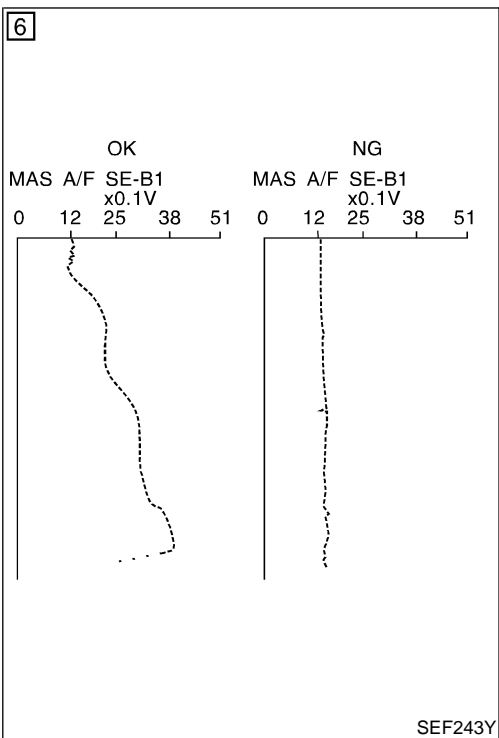
If engine will not start or stops soon wait at least 10 seconds with engine stopped (Ignition switch "ON") instead of running engine at idle speed.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and warm it up to normal operating temperature.
- 4) Run engine for at least 10 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1512.

With GST

Follow the procedure "With CONSULT-II" above.



PROCEDURE FOR MALFUNCTION D

NIEC0776S04

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature. If engine cannot be started, go to "Diagnostic Procedure", EC-1512.
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Check the voltage of "MAS A/F SE-B1" with "DATA MONITOR".
- 5) Increases engine speed to about 4,000 rpm.
- 6) Monitor the linear voltage rise in response to engine speed increases.
If NG, go to "Diagnostic Procedure", EC-1512.
If OK, go to following step.
- 7) Maintain the following conditions for at least 10 consecutive seconds.

ENG SPEED	More than 2,000 rpm
THRTL POS SEN	More than 3V
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

7

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V

SEF175Y

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1512.

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Overall Function Check

CALC LOAD	20%
COOLANT TEMP	95°C
SHORT FT #1	2%
LONG FT #1	0%
SHORT FT #2	4%
LONG FT #2	0%
ENGINE SPD	2637RPM
VEHICLE SPD	0MPH
IGN ADVANCE	41.0°
INTAKE AIR	41°C
MAF	14.1gm/sec
THROTTLE POS	3%

SEF534P

Overall Function Check

Use this procedure to check the overall function of the mass air flow sensor circuit. During this check, a 1st trip DTC might not be confirmed. NIEC0777

PROCEDURE FOR MALFUNCTION D

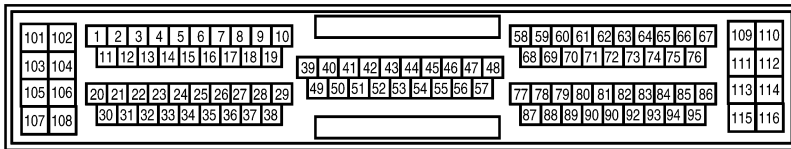
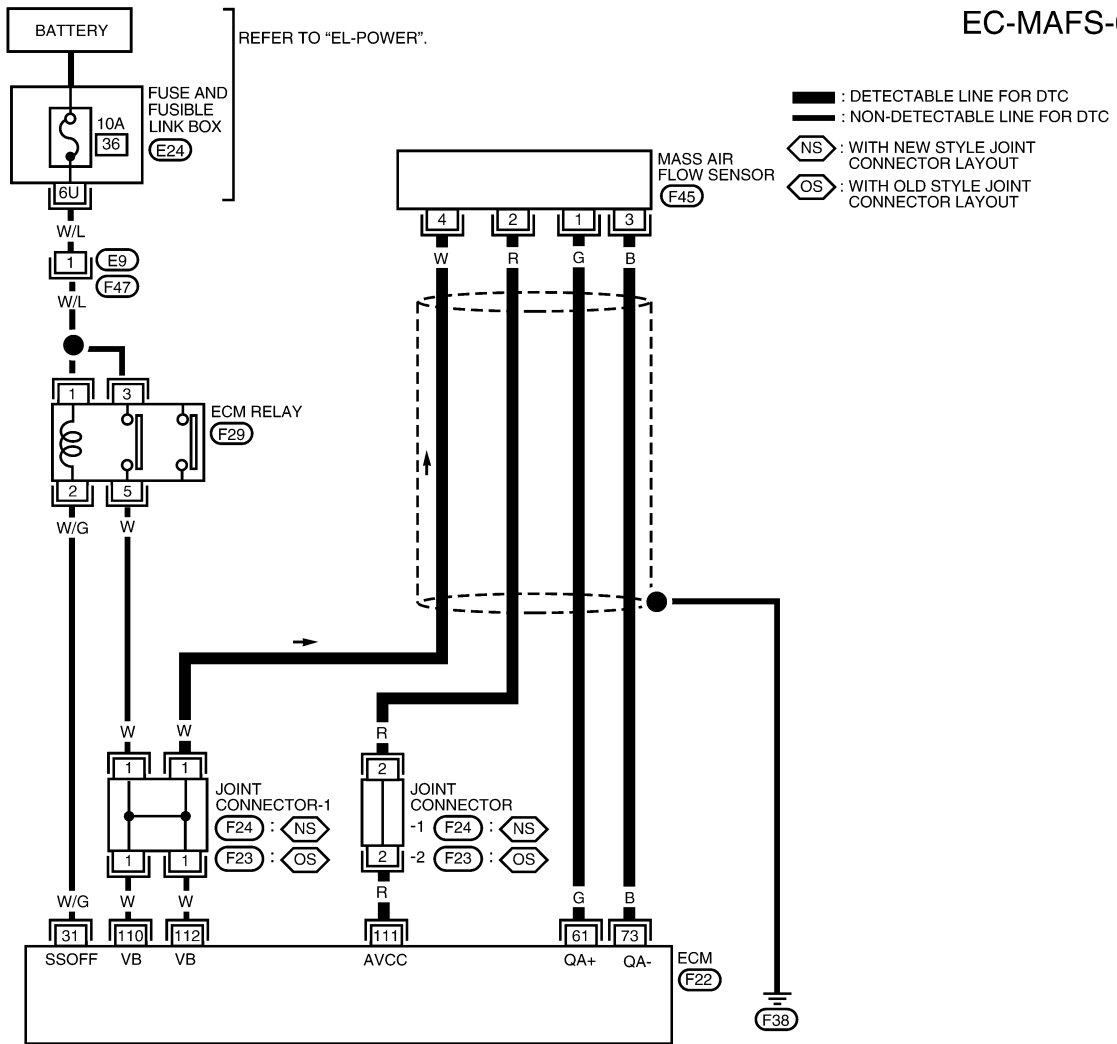
NIEC0777S01
 With GST

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Select "MODE 1" with GST.
- 4) Check the mass air flow sensor signal with "MODE 1".
- 5) Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.
- 6) If NG, go to "Diagnostic Procedure", EC-1512.

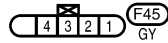
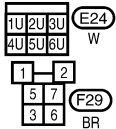
Wiring Diagram

NIEC0778

EC-MAFS-01



REFER TO THE FOLLOWING.
(F23), (F24) JOINT CONNECTOR



WEC947

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
61	G	MASS AIR FLOW SENSOR	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	1.3 - 1.7V
			ENGINE RUNNING AT 2,500 RPM UNDER WARM-UP CONDITION	1.8 - 2.4V
73	B	MASS AIR FLOW SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 0V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

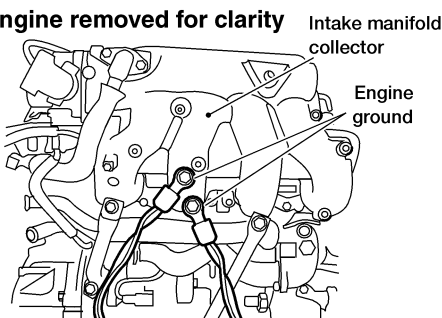
SEF564Y

Diagnostic Procedure

NIEC0779

1	INSPECTION START							
Which malfunction (A, B, C, D or E) is duplicated?								
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A and/or C</td> <td style="text-align: center;">I</td> </tr> <tr> <td style="text-align: center;">B, D and/or E</td> <td style="text-align: center;">II</td> </tr> </tbody> </table>			MALFUNCTION	Type	A and/or C	I	B, D and/or E	II
MALFUNCTION	Type							
A and/or C	I							
B, D and/or E	II							
MTBL0373								
Type I or Type II								
Type I	▶	GO TO 3.						
Type II	▶	GO TO 2.						

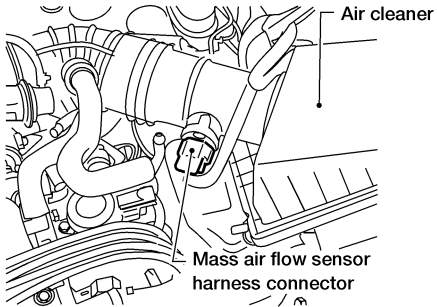
2	CHECK INTAKE SYSTEM	
Check the following connections.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to collector 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Reconnect the parts.

3	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine removed for clarity</p> 		
LEC302		
▶		GO TO 4.

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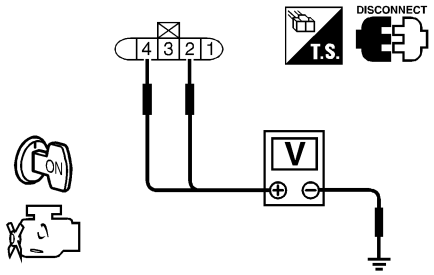
4 CHECK POWER SUPPLY

1. Disconnect mass air flow sensor harness connector.



2. Turn ignition switch "ON".

3. Check voltage between MAFS terminals 2, 4 and ground with CONSULT-II or tester.



Terminal	Voltage
2	Approximately 5
4	Battery voltage

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

LEC286

SEF297X

5 DETECT MALFUNCTIONING PART

Check the following.

- Joint connector-1
- Joint connector-2
- Harness for open or short between ECM relay and mass air flow sensor
- Harness for open or short between mass air flow sensor and ECM

▶ Repair harness or connectors.

6 CHECK GROUND CIRCUIT

1. Turn ignition switch "OFF".

2. Disconnect ECM harness connector.

3. Check harness continuity between MAFS terminal 3 and ECM terminal 73. Refer to "Wiring Diagram", EC-1511.
Continuity should exist.

4. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 7.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0100 MASS AIR FLOW SENSOR (MAFS)

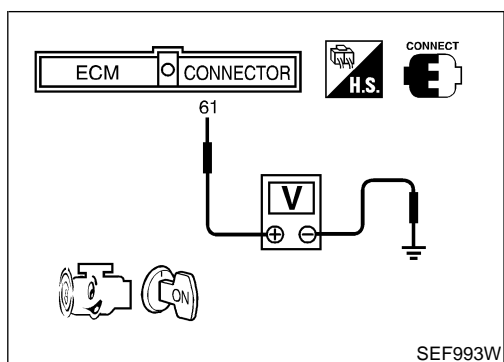
SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK INPUT SIGNAL CIRCUIT
1. Check harness continuity between MAFS terminal 1 and ECM terminal 61. Refer to "Wiring Diagram", EC-1511. Continuity should exist.	
2. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK MASS AIR FLOW SENSOR
Refer to "Component Inspection", EC-1515.	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace mass air flow sensor.

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END



Component Inspection MASS AIR FLOW SENSOR

~NIEC0780

NIEC0780S01

1. Turn ignition switch "ON".
2. Start engine and warm it up to normal operating temperature.
3. Check voltage between ECM terminal 61 (Mass air flow sensor signal) and ground.

Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up to normal operating temperature.)	1.3 - 1.7
2,500 rpm (Engine is warmed-up to normal operating temperature.)	1.8 - 2.4
Idle to about 4,000 rpm*	1.3 - 1.7 to Approx. 4.0

*: Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

4. If the voltage is out of specification, disconnect mass air flow sensor harness connector and connect it again. Repeat above check.
5. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.

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Component Description

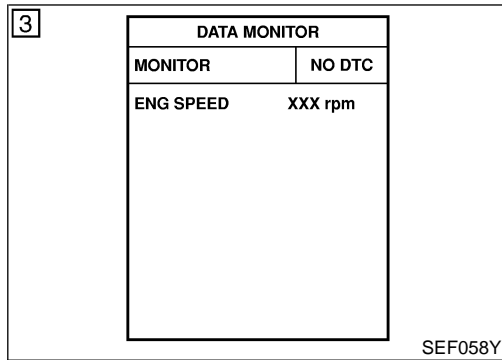
The absolute pressure sensor is built into ECM. The sensor detects ambient barometric pressure and sends the voltage signal to the micro computer. As the pressure increases, the voltage rises.

NIEC0781

On Board Diagnosis Logic

NIEC0782

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0105	An excessively low or high voltage from the sensor is sent to the micro computer.	<ul style="list-style-type: none"> ECM



DTC Confirmation Procedure

NIEC0783

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1517.

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

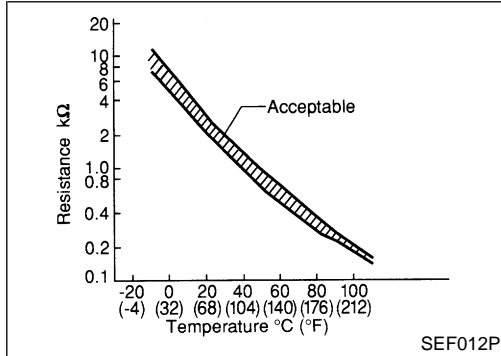
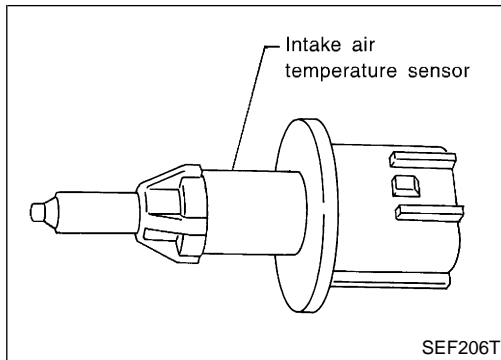
NIEC1193

1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-1516. 5. Is the 1st trip DTC P0105 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-1516. 5. Is the 1st trip DTC P0105 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-1435. 3. Perform "Idle Air Volume Learning", EC-1419, Is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the instruction of "Idle Air Volume Learning".

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Component Description



Component Description

NIEC0786

The intake air temperature sensor is mounted to the air duct housing. The sensor detects intake air temperature and transmits a signal to the ECM.

The temperature sensing unit uses a thermistor which is sensitive to the change in temperature. Electrical resistance of the thermistor decreases in response to the temperature rise.

<Reference data>

Intake air temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.1 - 2.9
80 (176)	1.23	0.27 - 0.38

*: These data are reference values and are measured between ECM terminal 64 (Intake air temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

NIEC0787

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0110	A)	An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Intake air temperature sensor
	B)	Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.	

DTC Confirmation Procedure

NIEC0788

Perform "PROCEDURE FOR MALFUNCTION A" first. If the 1st trip DTC cannot be confirmed, perform "PROCEDURE FOR MALFUNCTION B".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC0788S01

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1521.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

5	DATA MONITOR	
	MONITOR	NO DTC
	COOLAN TEMP/S VHCL SPEED SE	XXX °C XXX km/h

SEF176Y

PROCEDURE FOR MALFUNCTION B

NIEC0788S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

This test may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

Ⓜ With CONSULT-II

- 1) Wait until engine coolant temperature is less than 90°C (194°F).
- a) Turn ignition switch "ON".
- b) Select "DATA MONITOR" mode with CONSULT-II.
- c) Check the engine coolant temperature.
- d) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - Perform the following steps before engine coolant temperature is above 90°C (194°F).
- 2) Turn ignition switch "ON".
- 3) Select "DATA MONITOR" mode with CONSULT-II.
- 4) Start engine.
- 5) Hold vehicle speed more than 70 km/h (43 MPH) for 105 consecutive seconds.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1521.

Ⓜ With GST

Follow the procedure "With CONSULT-II" above.

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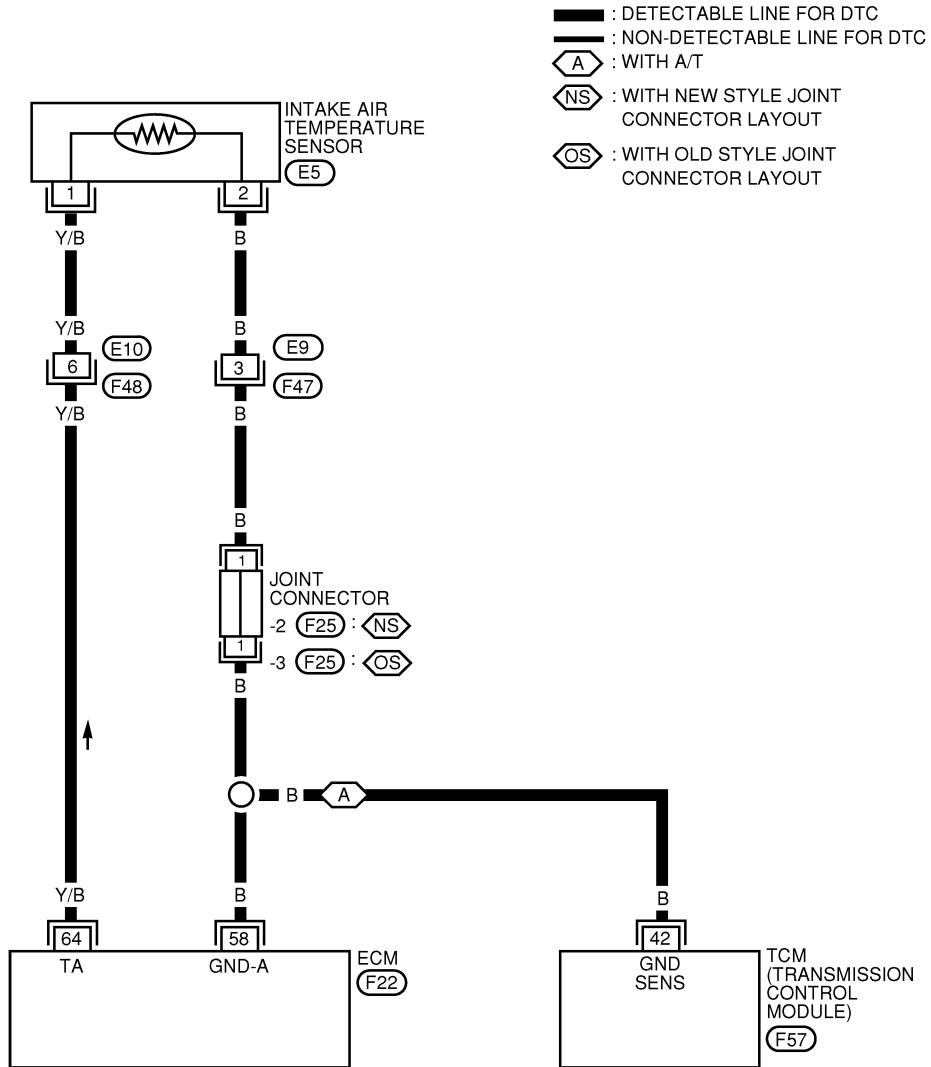
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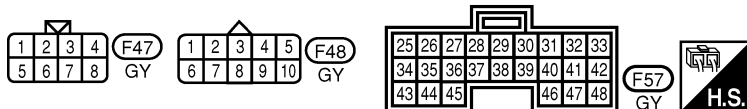
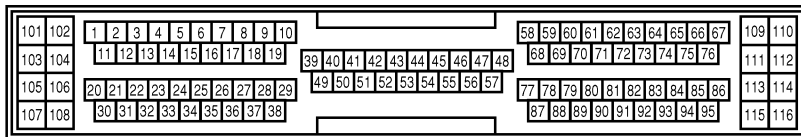
Wiring Diagram

NIEC0789

EC-IATS-01



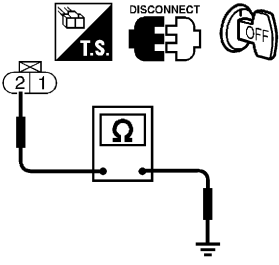
REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR



DTC P0110 INTAKE AIR TEMPERATURE SENSOR

SR20DE

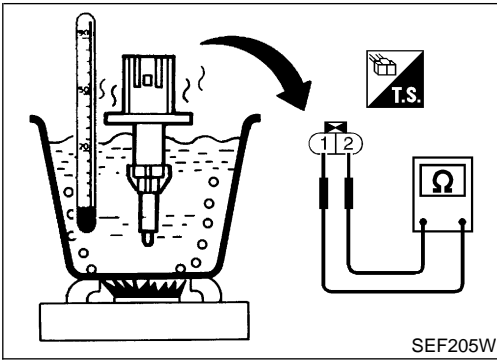
Diagnostic Procedure (Cont'd)

3	CHECK GROUND CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between terminal 2 and engine ground.</p> <div style="text-align: center;"></div>	
<p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: right;">SEF204W</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ GO TO 4.

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● Harness connectors E9, F47● Joint connector-3● Harness for open or short between ECM and intake air temperature sensor● Harness for open or short between intake air temperature sensor and TCM (Transmission control module)	
▶	Repair open circuit or short to power in harness or connectors.

5	CHECK INTAKE AIR TEMPERATURE SENSOR
<p>Refer to "Component Inspection", EC-1523.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ Replace intake air temperature sensor.

6	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>	
▶	INSPECTION END



Component Inspection INTAKE AIR TEMPERATURE SENSOR

Check resistance as shown in the figure.

-NIEC0791

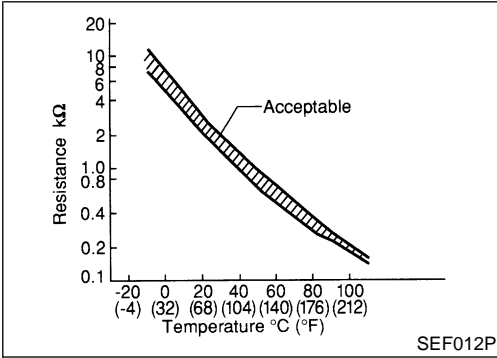
NIEC0791S01

GI

MA

EM

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<Reference data>

Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

EC

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If NG, replace intake air temperature sensor.

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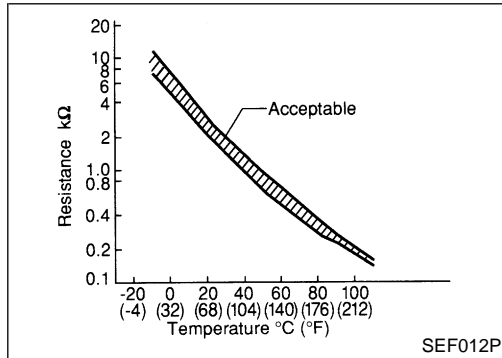
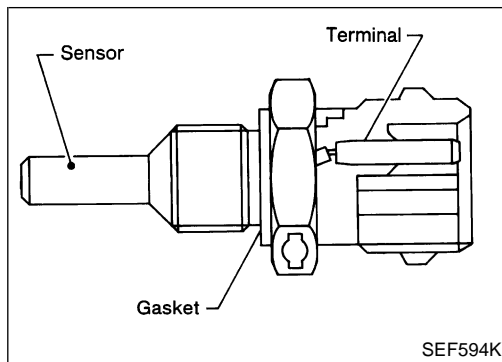
EL

IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

SR20DE

Component Description



Component Description

NIEC0792

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0793

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC0794

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0115	● An excessively high or low voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Engine coolant temperature sensor

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

SR20DE

On Board Diagnosis Logic (Cont'd)

Detected items	Engine operating condition in fail-safe mode	
Engine coolant temperature sensor circuit	Engine coolant temperature will be determined by ECM based on the time after turning ignition switch "ON" or "START". CONSULT-II displays the engine coolant temperature decided by ECM.	
	Condition	Engine coolant temperature decided (CONSULT-II display)
	Just as ignition switch is turned ON or Start	40°C (104°F)
	More than approx. 4 minutes after ignition ON or Start	80°C (176°F)
	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)
	When the fail-safe system for engine coolant temperature sensor is activated, the cooling fan operates while the engine is running.	

GI

MA

EM

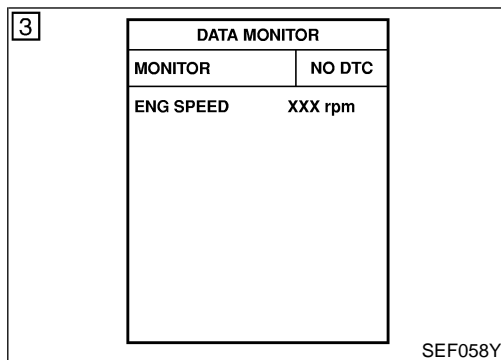
LC

EC

FE

CL

MT



DTC Confirmation Procedure

NIEC0795

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1527.

With GST

Follow the procedure "With CONSULT-II" above.

AT

AX

SU

BR

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RS

BT

HA

SC

EL

IDX

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)






SR20DE

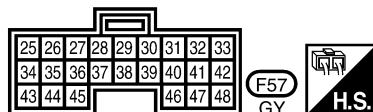
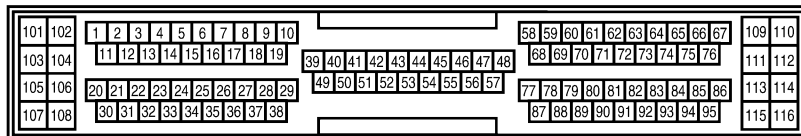
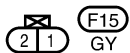
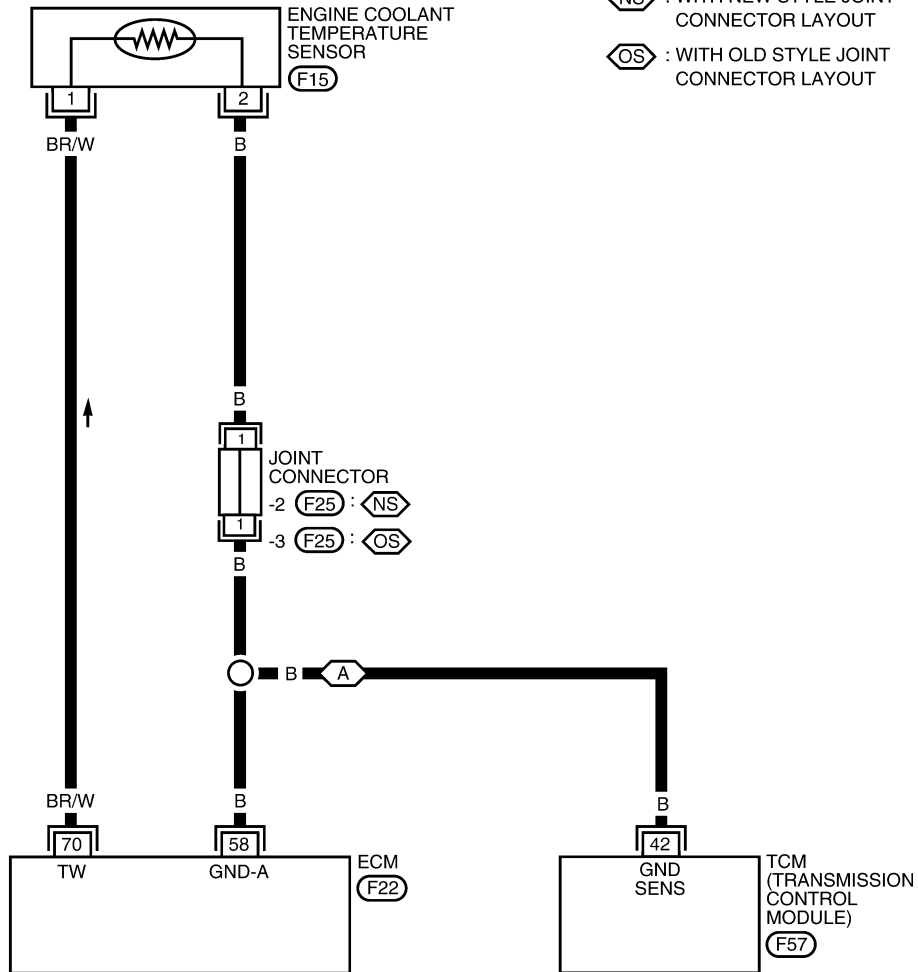
Wiring Diagram


Wiring Diagram

NIEC0796

EC-ECTS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T
-  : WITH NEW STYLE JOINT CONNECTOR LAYOUT
-  : WITH OLD STYLE JOINT CONNECTOR LAYOUT



REFER TO THE FOLLOWING.
 - JOINT CONNECTOR



WEC949

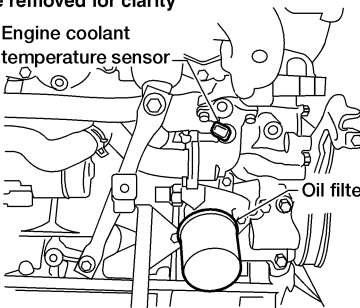
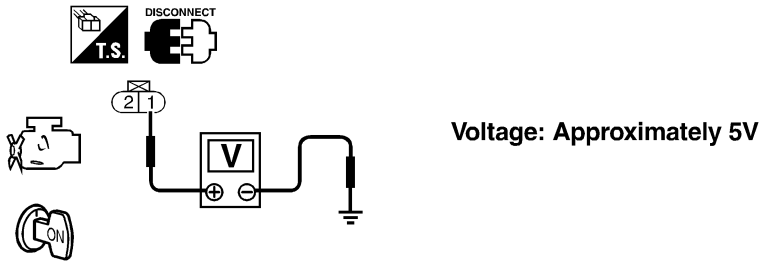
DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

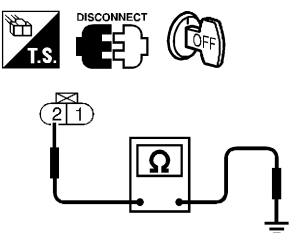
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0797

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect engine coolant temperature sensor (ECTS) harness connector.</p> <div style="text-align: center;"> <p>Engine removed for clarity</p>  </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: right;">LEC301</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SU</p>
		OK or NG	<p>SEF585X</p>
OK	▶	GO TO 2.	
NG	▶	Repair harness or connectors.	

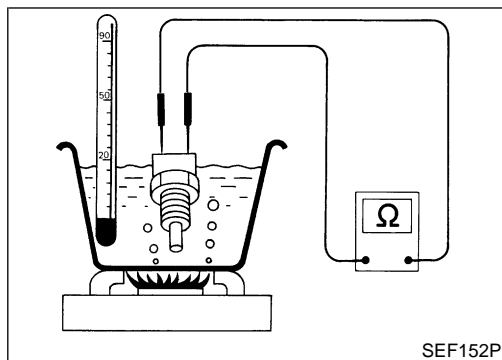
2	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between ECTS terminal 2 and engine ground.</p> <div style="text-align: center;">  </div> <p style="text-align: center; color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: right;">SEF207W</p>	<p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
		OK or NG	
OK	▶	GO TO 4.	
NG	▶	GO TO 3.	

DTC P0115 ENGINE COOLANT TEMPERATURE SENSOR (ECTS) (CIRCUIT)

SR20DE

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module) 	
▶	Repair open circuit or short to power in harness or connectors.
4	CHECK ENGINE COOLANT TEMPERATURE SENSOR
Refer to "Component Inspection", EC-1528.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace engine coolant temperature sensor.
5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END



Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

NIEC0798

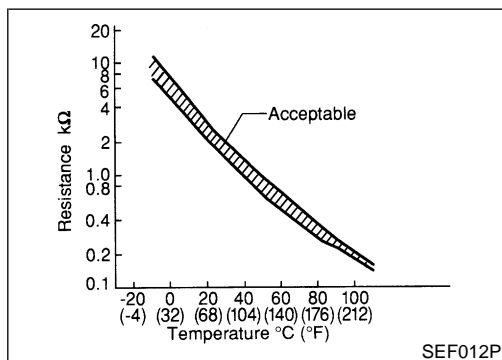
NIEC0798S01

Check resistance as shown in the figure.

<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.



Component Description

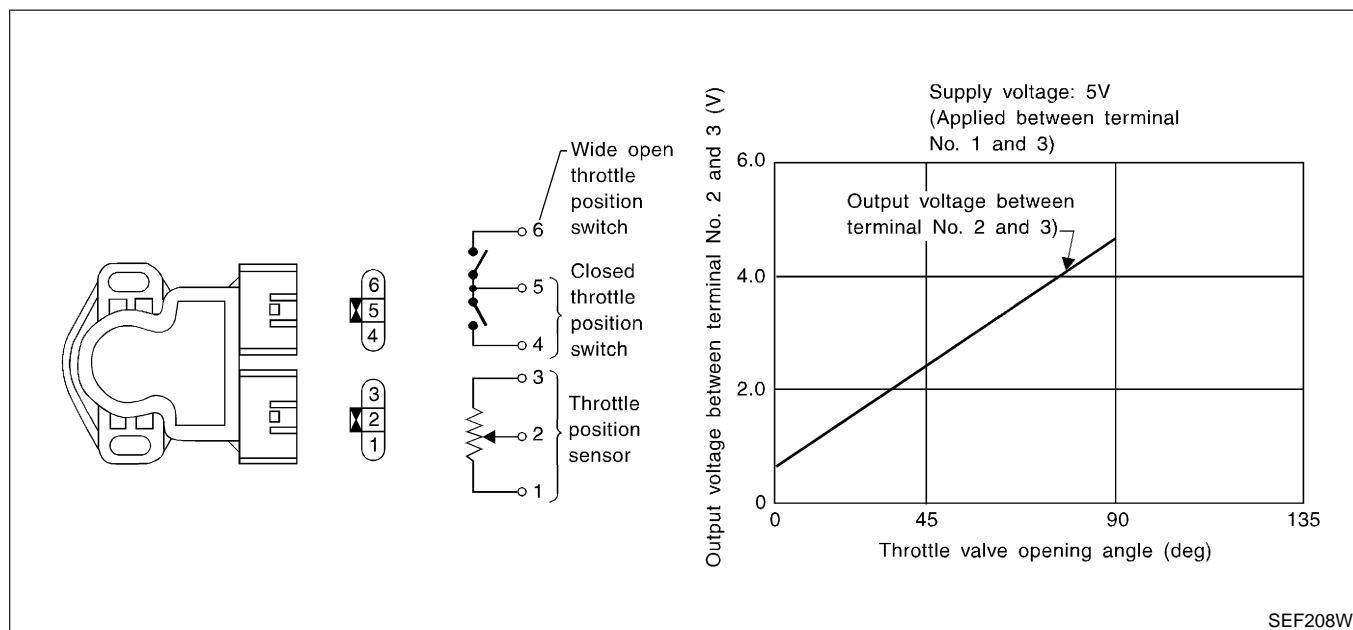
NIEC0799

NOTE:

If DTC P0120 is displayed with DTC P0510, first perform trouble diagnosis for DTC P0510, EC-1773.

The throttle position sensor responds to the accelerator pedal movement. This sensor is a kind of potentiometer which transforms the throttle position into output voltage, and emits the voltage signal to the ECM. In addition, the sensor detects the opening and closing speed of the throttle valve and feeds the voltage signal to the ECM.

Idle position of the throttle valve is determined by the ECM receiving the signal from the throttle position sensor. This sensor controls engine operation such as fuel cut. The "Wide open and closed throttle position switch", which is built into the throttle position sensor unit, is not used for engine control.



SEF208W

CONSULT-II Reference Value in Data Monitor Mode

NIEC0800

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
THRTL POS SEN	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.15 - 0.85V
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Vacuum is applied using a vacuum pump Throttle valve: fully opened	3.5 - 4.7V
ABSOL TH-P/S	<ul style="list-style-type: none"> Engine: After warming up, idle the engine Throttle valve: fully closed	0.0%
	<ul style="list-style-type: none"> Engine: After warming up Ignition switch: ON (Engine stopped) Throttle valve: fully opened	Approx. 88.0%

On Board Diagnosis Logic

NIEC0801

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0120	A) An excessively low or high voltage from the sensor is sent to ECM.*	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor
	B) A high voltage from the sensor is sent to ECM under light load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Throttle position sensor ● Fuel injector ● Camshaft position sensor ● Mass air flow sensor
	C) A low voltage from the sensor is sent to ECM under heavy load driving condition.	<ul style="list-style-type: none"> ● Harness or connectors (The throttle position sensor circuit is open or shorted.) ● Intake air leaks ● Throttle position sensor

*: When this malfunction is detected, the ECM enters fail-safe mode and the MIL lights up.

Detected items	Engine operating condition in fail-safe mode	
Throttle position sensor circuit	Throttle position will be determined based on the injected fuel amount and the engine speed. Therefore, acceleration will be poor.	
	Condition	Driving condition
	When engine is idling	Normal
	When accelerating	Poor acceleration

DTC Confirmation Procedure

NIEC0802

Perform “PROCEDURE FOR MALFUNCTION A” first. If the 1st trip DTC cannot be confirmed, perform “PROCEDURE FOR MALFUNCTION B”. If there is no problem on “PROCEDURE FOR MALFUNCTION B”, perform “PROCEDURE FOR MALFUNCTION C”.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

PROCEDURE FOR MALFUNCTION A

NIEC0802S01

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 10V at idle.
- This test may be conducted in the shop with the drive wheels lifted or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

DTC P0120 THROTTLE POSITION SENSOR

SR20DE

DTC Confirmation Procedure (Cont'd)

2	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	P/N POSI SW	OFF

SEF065Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and maintain the following conditions for at least 5 consecutive seconds.

VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position except "P" or "N" position

- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1535.

With GST

Follow the procedure "With CONSULT-II" above.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B

NIEC0802S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 10 seconds.
If idle speed is over 1,000 rpm, maintain the following conditions for at least 10 seconds to keep engine speed below 1,000 rpm.

A/T model	Selector lever	Suitable position except "P" or "N" position
	Brake pedal	Depressed
	Vehicle speed	0 km/h (0 MPH)
M/T model	Selector lever	Suitable position except "N" (Higher gear position such as 3rd or 4th is better to keep low engine rpm.)
	Accelerator pedal	Released
	Vehicle speed	As slow as possible

- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1535.

With GST

Follow the procedure "With CONSULT-II" above.

GI
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DATA MONITOR	
MONITOR	NO DTC
THRTL POS SEN	XXX V
ABSOL TH•P/S	XXX %

SEF177Y

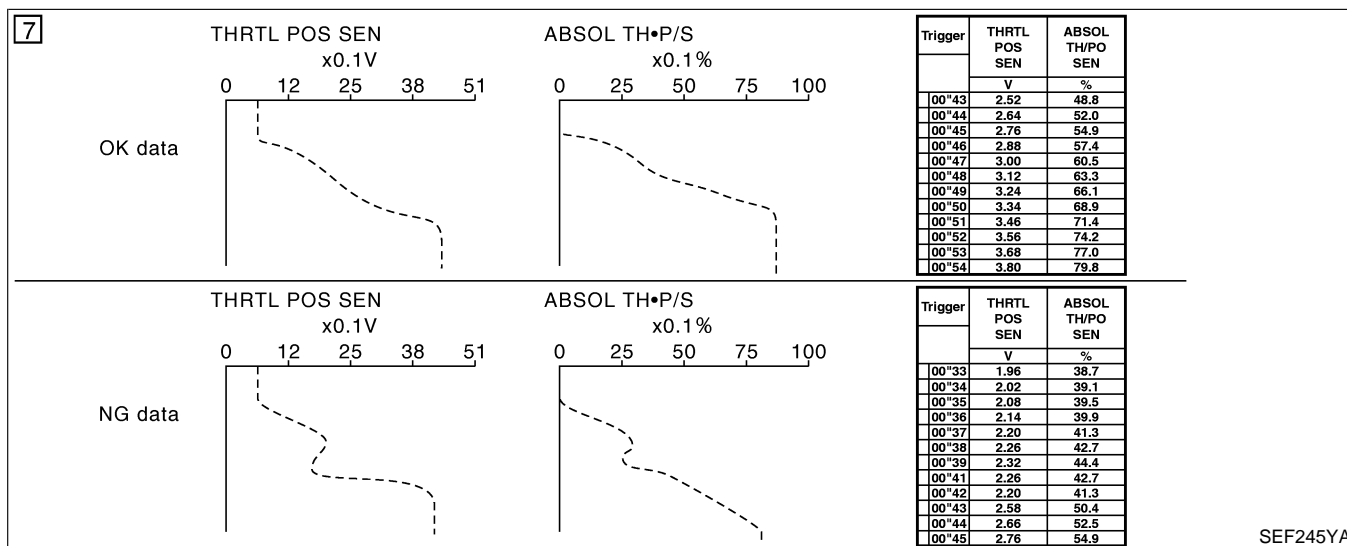
PROCEDURE FOR MALFUNCTION C

CAUTION:

Always drive vehicle at a safe speed.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 3) Turn ignition switch "ON".
 - 4) Select "MANU TRIG" in "DATA MONITOR" mode with CONSULT-II.
 - 5) Select "THRTL POS SEN" and "ABSOL TH•P/S" in "DATA MONITOR" mode with CONSULT-II.
 - 6) Press RECORD on CONSULT-II SCREEN at the same time accelerator pedal is depressed.
 - 7) Print out the recorded graph and check the following:
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal is fully depressed is approximately 4V.
- If NG, go to "Diagnostic Procedure", EC-1535.
If OK, go to following step.



- 8) Select "AUTO TRIG" in "DATA MONITOR" mode with CONSULT-II.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C

SEF178Y

- 9) Maintain the following conditions for at least 10 consecutive seconds.

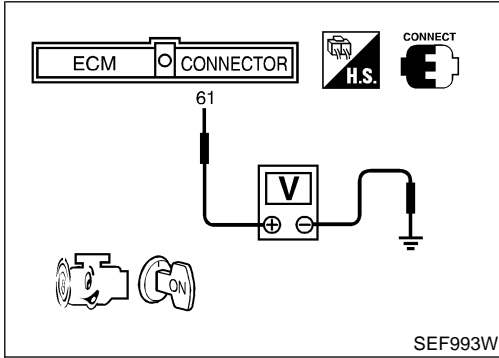
ENG SPEED	More than 2,000 rpm
MAS A/F SE-B1	More than 3V
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

DTC P0120 THROTTLE POSITION SENSOR

SR20DE

DTC Confirmation Procedure (Cont'd)

- 10) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1535.



With GST

- 1) Maintain the following conditions for at least 10 consecutive seconds.

Gear position	Suitable position
Engine speed	More than 2,000 rpm
Engine coolant temperature	More than 70°C (158°F)
Voltage between ECM terminal 61 (Mass air flow sensor signal) and ground	More than 3V

- 2) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1535.

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SC

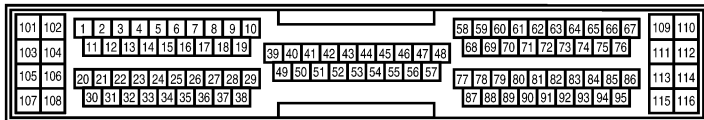
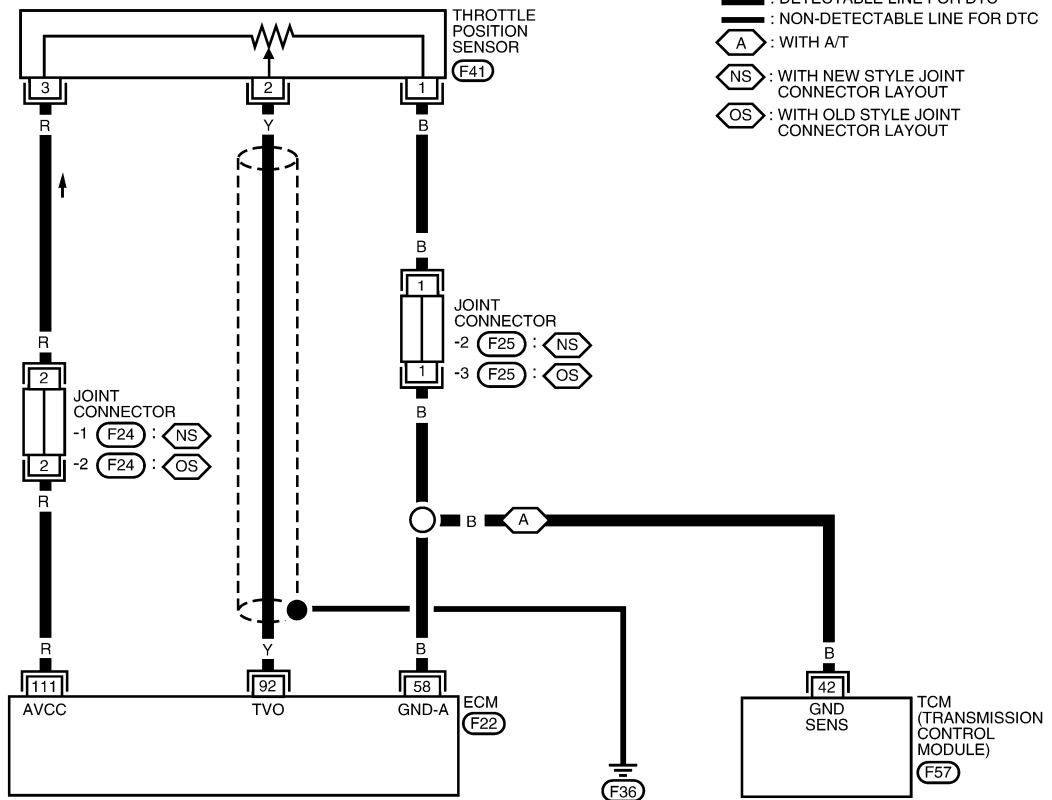
EL

IDX

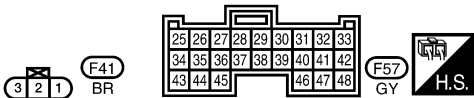
Wiring Diagram

NIEC0803

EC-TPS-01



REFER TO THE FOLLOWING.
 (F24) (F25) - JOINT CONNECTOR



WEC950

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
92	Y	THROTTLE POSITION SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH ACCELERATOR PEDAL FULLY RELEASED	0.15 - 0.85V
			IGN ON WITH ACCELERATOR PEDAL FULLY DEPRESSED	3.5 - 4.7V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF566YB

Diagnostic Procedure

NIEC0804

1	INSPECTION START									
Which malfunction (A, B or C) is duplicated?										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">MALFUNCTION</th> <th style="width: 50%;">Type</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">A</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">B</td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">C</td> </tr> </tbody> </table>			MALFUNCTION	Type	A	A	B	B	C	C
MALFUNCTION	Type									
A	A									
B	B									
C	C									
<small>MTBL0066</small>										
Type A, B or C										
Type A or B	▶	GO TO 4.								
Type C	▶	GO TO 2.								

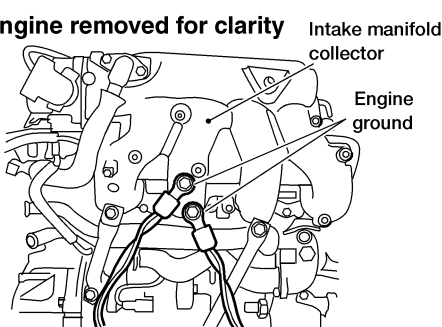
GI
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EC

2	ADJUST THROTTLE POSITION SENSOR	
Perform "Basic Inspection", EC-1461.		
OK or NG		
OK	▶	GO TO 3.

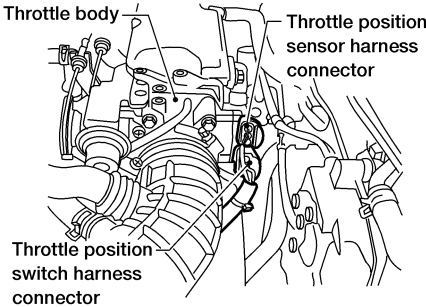
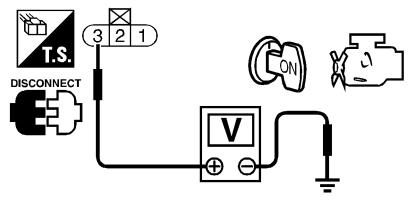
FE
CL

3	CHECK INTAKE SYSTEM	
Check the following connections.		
<ul style="list-style-type: none"> ● Air duct ● Vacuum hoses ● Intake air passage between air duct to intake manifold collector 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Reconnect the parts.

MT
AT
AX
SU

4	RETIGHTEN GROUND SCREWS	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws. 		
<p>Engine removed for clarity</p>  <p style="text-align: right; margin-right: 50px;">Intake manifold collector Engine ground</p>		
<small>LEC302</small>		
		▶ GO TO 5.

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5	CHECK POWER SUPPLY		
<p>1. Disconnect throttle position sensor harness connector.</p> <div style="text-align: center;">  </div>			
LEC279			
<p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between throttle position sensor terminal 3 and ground with CONSULT-II or tester.</p>			
		<p>Voltage: Approximately 5V</p>	
OK or NG			
OK	▶	GO TO 7.	
NG	▶	GO TO 6.	

6	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-2 ● Harness for open or short between throttle position sensor and ECM 			
▶		Repair open circuit or short to ground or short to power in harness or connectors.	

7	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between throttle position sensor terminal 1 and engine ground. Refer to "Wiring Diagram". Continuity should exist.</p> <p>3. Also check harness for short to power.</p>			
OK or NG			
OK	▶	GO TO 9.	
NG	▶	GO TO 8.	

8	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and throttle position sensor ● Harness for open or short between throttle position sensor and TCM (Transmission control module) 			
▶		Repair open circuit or short to power in harness or connectors.	

DTC P0120 THROTTLE POSITION SENSOR

SR20DE

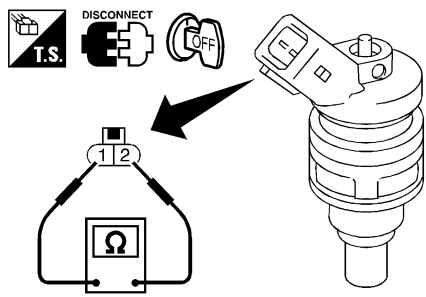
Diagnostic Procedure (Cont'd)

9	CHECK INPUT SIGNAL CIRCUIT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 92 and throttle position sensor terminal 2. Refer to "Wiring Diagram", EC-1534. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 10.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK THROTTLE POSITION SENSOR
<p>Refer to "Component Inspection", EC-1538.</p> <p style="text-align: center;">OK or NG</p>	
OK (Type B in step1)	▶ GO TO 11.
OK (Type A or C in step1)	▶ GO TO 14.
NG	▶ Replace throttle position sensor. To adjust it, perform "Basic Inspection", EC-1461.

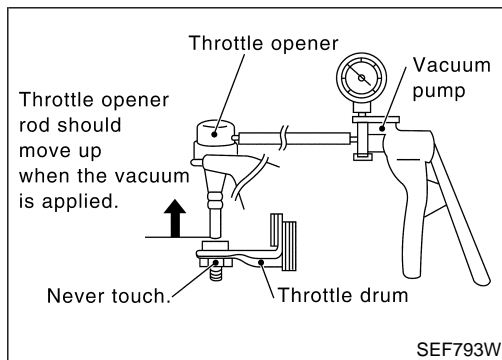
11	CHECK MASS AIR FLOW SENSOR
<p>Refer to "Component Inspection", EC-1515.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 12.
NG	▶ Replace mass air flow sensor.

12	CHECK CAMSHAFT POSITION SENSOR
<p>Refer to "Component Inspection", EC-1678.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 13.
NG	▶ Replace camshaft position sensor.

13	CHECK FUEL INJECTOR
<p>1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.</p> <div style="text-align: center;">  <p style="text-align: right;">Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> </div> <p style="text-align: right;">SEF964XA</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 14.
NG	▶ Replace fuel injector.

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14	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	INSPECTION END



DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
THRTL POS SEN	XXX V

SEF179Y

Component Inspection THROTTLE POSITION SENSOR

NIEC0805

NIEC0805S01

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, 11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Select "DATA MONITOR" mode with CONSULT-II.
- 8) Check voltage of "THRTL POS SEN" under the following conditions.

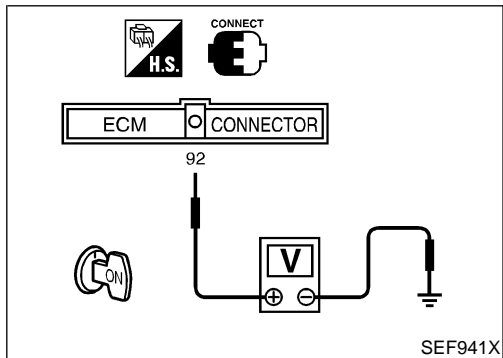
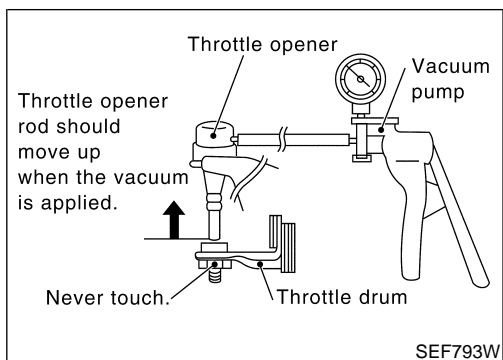
NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-1530.

- 9) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.



⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine (ignition switch OFF).
- 3) Remove the vacuum hose connected to the throttle opener.
- 4) Connect suitable vacuum hose to the vacuum pump and the opener.
- 5) Apply vacuum [more than -40.0 kPa (-300 mmHg, 11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.
- 6) Turn ignition switch ON.
- 7) Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground under the following conditions.

NOTE:

Voltage measurement must be made with throttle position sensor installed in vehicle.

Throttle valve conditions	Voltage V
Completely closed	0.15 - 0.85 (a)
Partially open	Between (a) and (b)
Completely open	3.5 - 4.7 (b)

If NG, adjust closed throttle position switch. Refer to "Basic Inspection", EC-1461.

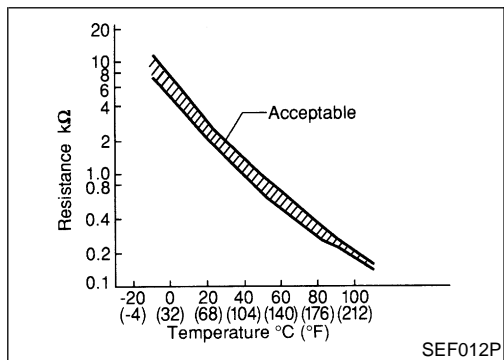
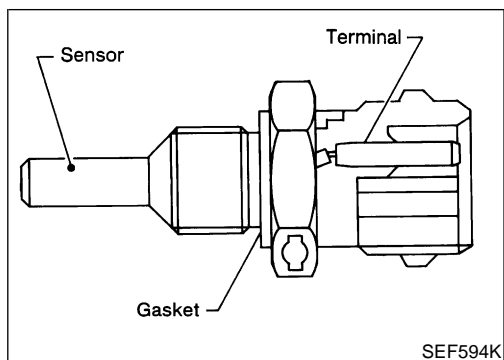
- 8) If it is impossible to adjust closed throttle position switch in "Basic Inspection", replace throttle position sensor.

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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

SR20DE

Component Description



Component Description

NIEC0806

NOTE:

If DTC P0125 is displayed with P0115, first perform trouble diagnosis for DTC P0115, EC-1524.

The engine coolant temperature sensor is used to detect the engine coolant temperature. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the engine coolant temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

<Reference data>

Engine coolant temperature °C (°F)	Voltage* V	Resistance kΩ
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.1 - 2.9
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260

*: These data are reference values and are measured between ECM terminal 70 (Engine coolant temperature sensor) and ground.

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0807

MONITOR ITEM	CONDITION	SPECIFICATION
COOLAN TEMP/S	● Engine: After warming up	More than 70°C (158°F)

On Board Diagnosis Logic

NIEC0808

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0125	<ul style="list-style-type: none"> ● Voltage sent to ECM from the sensor is not practical, even when some time has passed after starting the engine. ● Engine coolant temperature is insufficient for closed loop fuel control. 	<ul style="list-style-type: none"> ● Harness or connectors (High resistance in the circuit) ● Engine coolant temperature sensor ● Thermostat

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

SR20DE

DTC Confirmation Procedure

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

-NIEC0809

CAUTION:

Be careful not to overheat engine.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Check that "COOLAN TEMP/S" is above 10°C (50°F).
If it is above 10°C (50°F), the test result will be OK. If it is below 10°C (50°F), go to following step.
- 4) Start engine and run it for 65 minutes at idle speed.
If "COOLAN TEMP/S" increases to more than 10°C (50°F) within 65 minutes, stop engine because the test result will be OK.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1543.

④ With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR






SR20DE

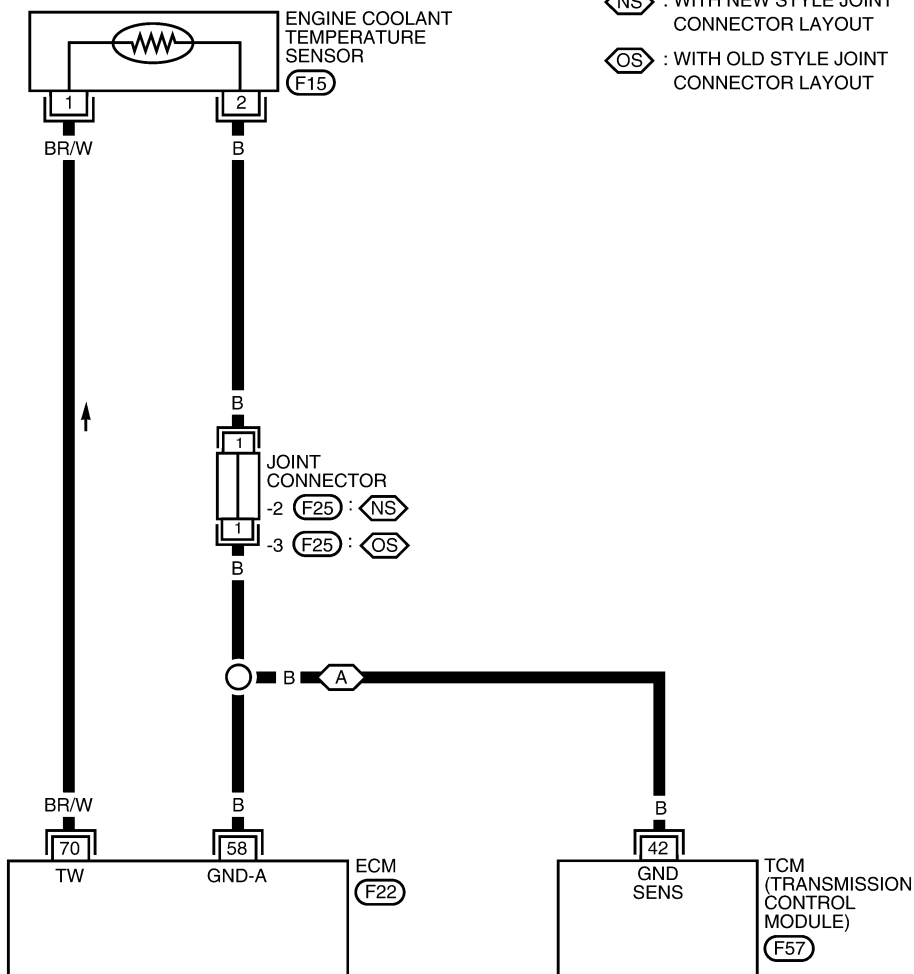
Wiring Diagram


Wiring Diagram

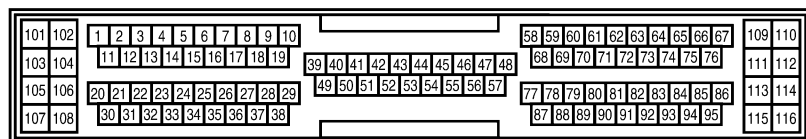
NIEC0810

EC-ECTS-01

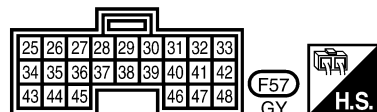
-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T
-  : WITH NEW STYLE JOINT CONNECTOR LAYOUT
-  : WITH OLD STYLE JOINT CONNECTOR LAYOUT



 F15
GY



F22
GY



F57
GY



REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR

WEC949

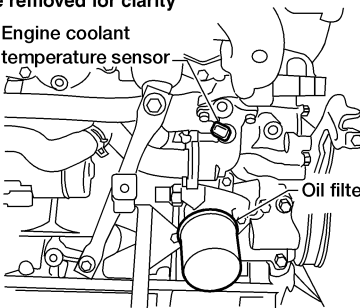
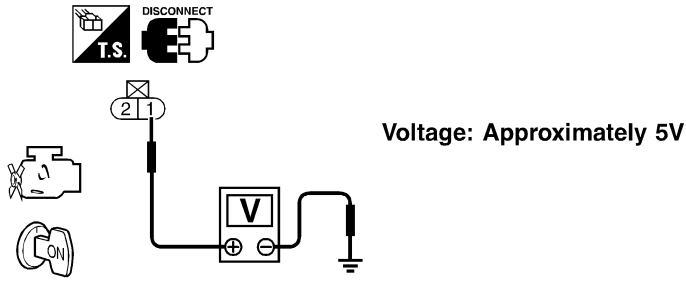
DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

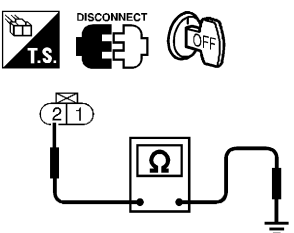
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0811

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect engine coolant temperature sensor harness connector.</p> <div style="text-align: center;"> <p>Engine removed for clarity</p>  </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between ECTS terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Approximately 5V</p> </div> <p style="text-align: right;">LEC301</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SEF303X</p>
		OK or NG	
	OK	▶ GO TO 2.	
	NG	▶ Repair harness or connectors.	

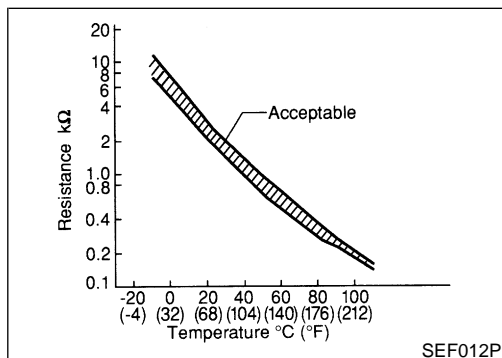
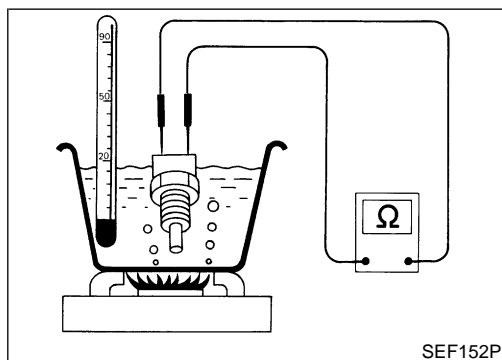
2	CHECK GROUND CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Check harness continuity between ECTS terminal 2 and engine ground.</p> <div style="text-align: center;">  </div> <p style="text-align: center; color: blue;">Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: right;">SEF207W</p>	<p>ST</p> <p>RS</p> <p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
		OK or NG	
	OK	▶ GO TO 4.	
	NG	▶ GO TO 3.	

DTC P0125 ENGINE COOLANT TEMPERATURE (ECT) SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and engine coolant temperature sensor ● Harness for open or short between engine coolant temperature sensor and TCM (Transmission control module) 		
▶	Repair open circuit or short to power in harness or connectors.	
4	CHECK ENGINE COOLANT TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-1544.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace engine coolant temperature sensor.
5	CHECK THERMOSTAT OPERATION	
When the engine is cooled [lower than 76.5°C (170°F)], grasp lower radiator hose and confirm the engine coolant does not flow.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or replace thermostat. Refer to LC-31 , "Thermostat".
6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶	INSPECTION END	



Component Inspection ENGINE COOLANT TEMPERATURE SENSOR

NIEC0812

NIEC0812S01

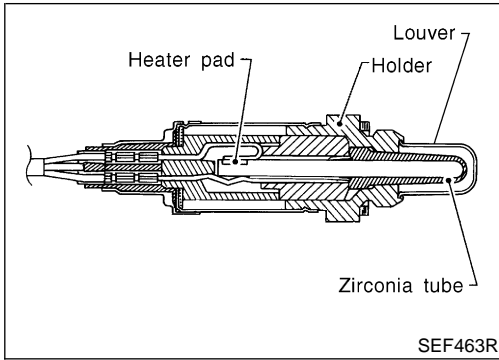
Check resistance as shown in the figure.
<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.0
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT) SR20DE

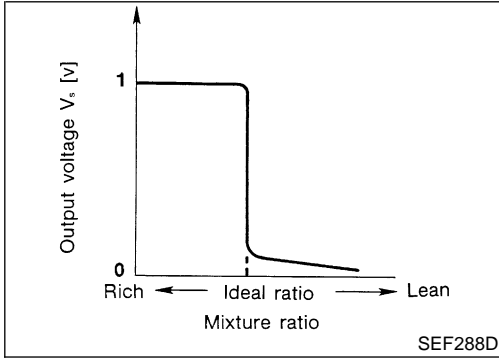
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0813

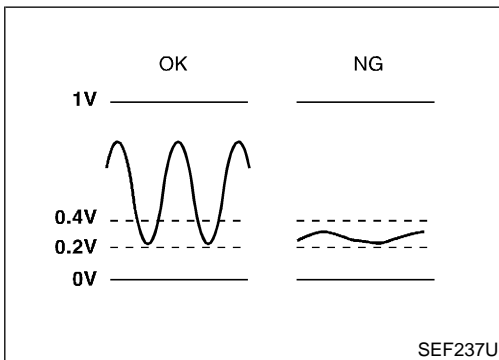


CONSULT-II Reference Value in Data Monitor Mode

NIEC0814

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

Under the condition in which the heated oxygen sensor 1 (front) signal is not input, the ECM circuits will read a continuous approximately 0.3V. Therefore, for this diagnosis, the time that output voltage is within 200 to 400 mV range is monitored, and the diagnosis checks that this time is not inordinately long.

NIEC0815

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0130	<ul style="list-style-type: none"> The voltage from the sensor is constantly approx. 0.3V. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT) SR20DE

DTC Confirmation Procedure

NIEC0816

5

HO2S1 (B1) P0130	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF643Y

DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

④ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "HO2S1 (B1) P0130" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 3) Touch "START".
- 4) Let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 4.

- 5) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 10 to 60 seconds.)

ENG SPEED	1,500 - 3,200 rpm
Vehicle speed	More than 64 km/h (40 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 6) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1549.

During this test, P1148 may be displayed on CONSULT-II screen.

5

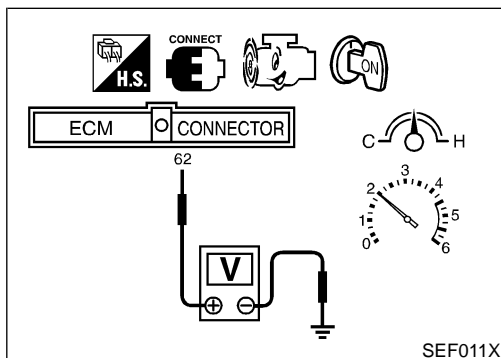
HO2S1 (B1) P0130	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
THRTL POS SEN	XXX V

SEF644Y

5

HO2S1 (B1) P0130	
COMPLETED	

SEF645Y



Overall Function Check

NIEC0817

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

④ With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.

- The voltage does not remain in the range of 0.2 - 0.4V.

EC-1546

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT) **SR20DE**

Overall Function Check (Cont'd)

4) If NG, go to "Diagnostic Procedure", EC-1549.

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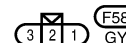
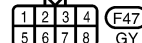
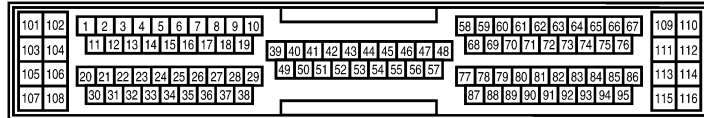
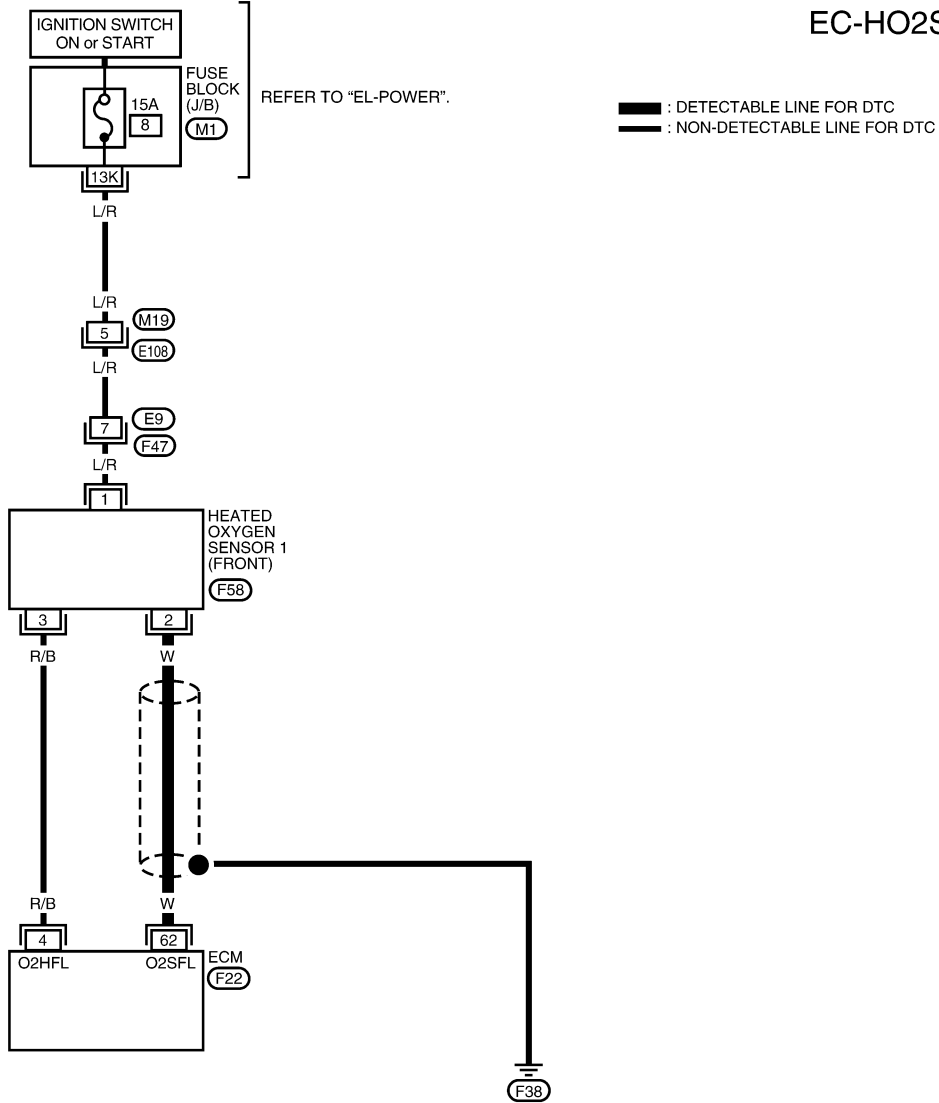
DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT) SR20DE

Wiring Diagram

Wiring Diagram

=NIEC0818

EC-HO2S1-01



WEC580

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

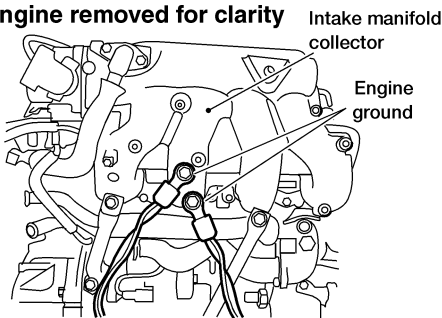
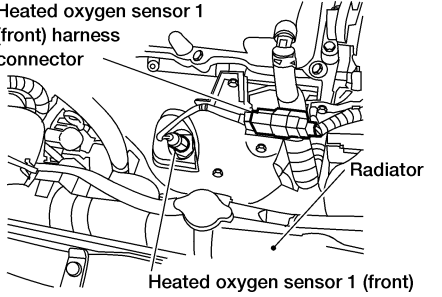
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V (V)

SEF567Y

Diagnostic Procedure

NIEC0819

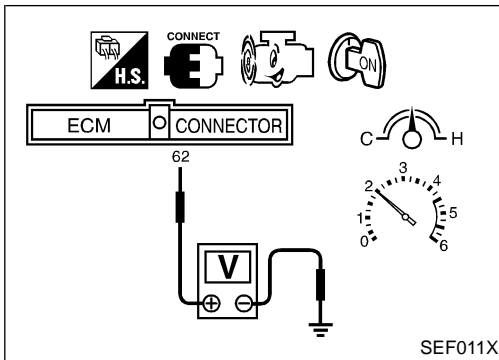
1	INSPECTION START	<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;"> <p>Engine removed for clarity</p>  </div> <p>3. Disconnect heated oxygen sensor 1 (front) harness connector.</p> <div style="text-align: center;">  </div>	<p>GI MA EM LC EC FE CL MT AT AX SU</p>
▶		GO TO 2.	<p>LEC302 LEC274</p>

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to "Wiring Diagram", EC-1548. Continuity should exist. 3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to "Wiring Diagram", EC-1548. Continuity should not exist. 4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>BR ST RS BT HA</p>
OK ▶		GO TO 3.	
NG ▶		Repair open circuit or short to ground or short to power in harness or connectors.	

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	<p>Refer to "Component Inspection", EC-1550.</p> <p style="text-align: center;">OK or NG</p>	<p>SC EL IDX</p>
OK ▶		GO TO 4.	
NG ▶		Replace heated oxygen sensor 1 (front).	

DTC P0130 HEATED OXYGEN SENSOR 1 (FRONT) (CIRCUIT) **SR20DE**

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.
1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.3V at least one time.
 - The voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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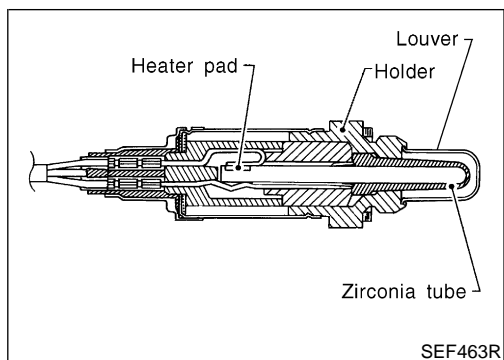
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DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

SR20DE

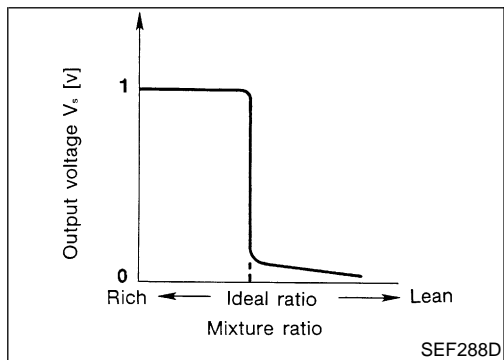
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0821

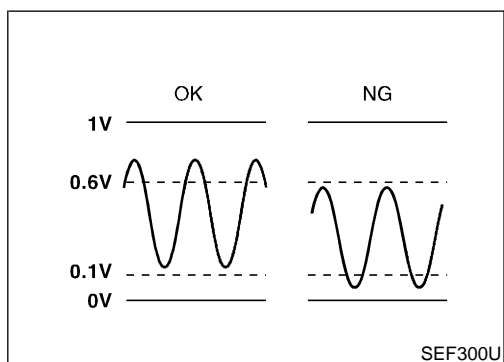


CONSULT-II Reference Value in Data Monitor Mode

NIEC0822

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the "rich" output is sufficiently high and whether the "lean" output is sufficiently low. When both the outputs are shifting to the lean side, the malfunction will be detected.

NIEC0823

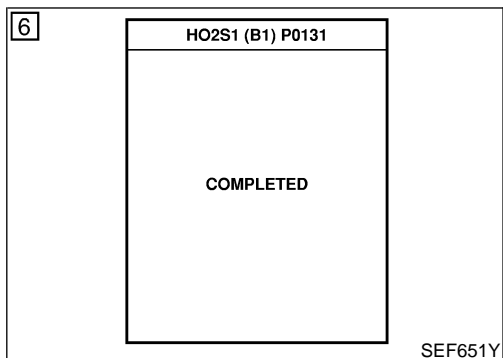
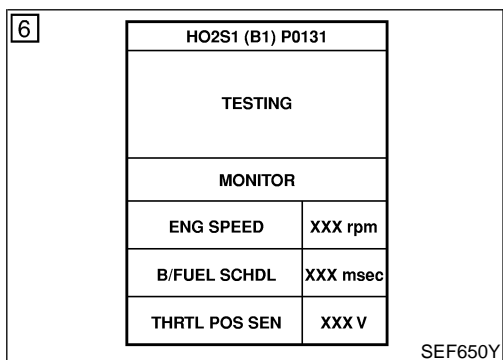
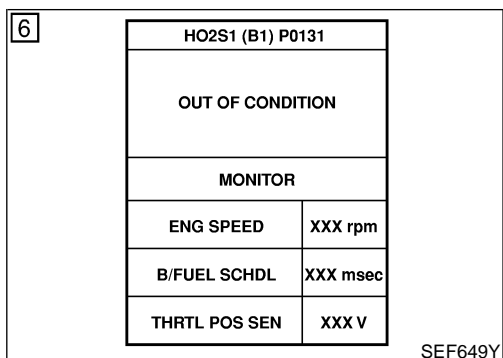
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0131	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are not reached to the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors Intake air leaks

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

SR20DE

DTC Confirmation Procedure

NIEC0824



DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Stop engine and wait at least 10 seconds.
- Turn ignition switch "ON" and select "HO2S1 (B1) P0131" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 50 seconds or more.)

ENG SPEED	1,900 - 3,200 rpm
Vehicle speed	Less than 120 km/h (75 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1554.

Overall Function Check

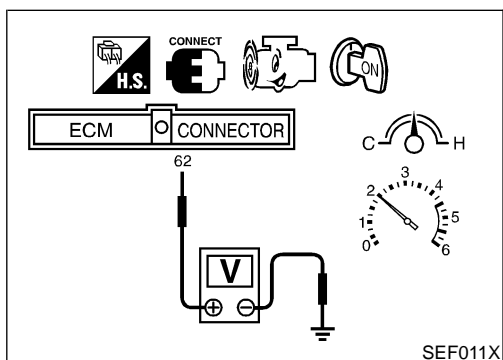
NIEC0825

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- Start engine and warm it up to normal operating temperature.
 - Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
 - Check the following with engine speed held at 2,000 rpm constant under no load.
- The maximum voltage is over 0.6V at least one time.

EC-1553



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DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

SR20DE

Overall Function Check (Cont'd)

- The minimum voltage is over 0.1V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-1554.

Diagnostic Procedure

NIEC0826

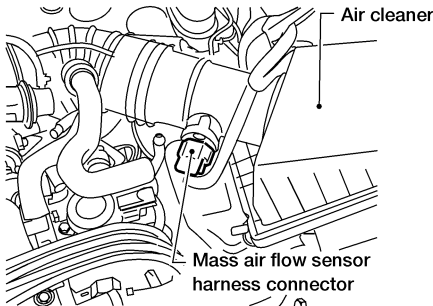
1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
1. Turn ignition switch "OFF". 2. Loosen and retighten heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N·m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)	
▶	GO TO 2.

DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA.								
<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: auto;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF215Z</p> <ol style="list-style-type: none"> 4. Run engine for at least 10 minutes at idle speed. <p style="text-align: center;">Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
CLEAR									

<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0;">Air cleaner</p> <p style="margin: 0;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right; margin-right: 20px;">LEC286</p> <ol style="list-style-type: none"> 4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. <p style="text-align: center;">Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%; padding: 2px;">Yes</td> <td style="width: 5%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0171. Refer to EC-1619.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 3.</td> </tr> </table>		Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-1619.	No	▶	GO TO 3.
Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-1619.					
No	▶	GO TO 3.					

3	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
Refer to "Component Inspection", EC-1583.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Replace heated oxygen sensor 1 (front).

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DTC P0131 HEATED OXYGEN SENSOR 1 (FRONT) (LEAN SHIFT MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-1556.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499. Refer to "Wiring Diagram", EC-1548, for circuit.		
▶		INSPECTION END

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

cycle 1 2 3 4 5 HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0827

NIEC0827S01

④ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

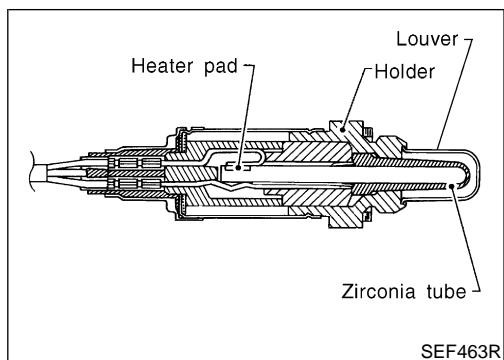
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

SR20DE

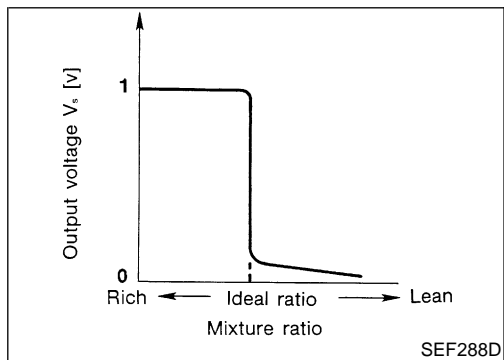
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0828

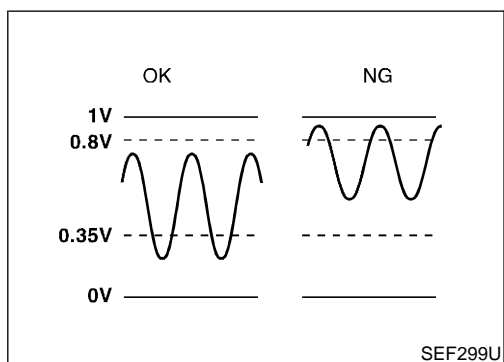


CONSULT-II Reference Value in Data Monitor Mode

NIEC0829

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction, the output from the heated oxygen sensor 1 (front) is monitored to determine whether the "rich" output is sufficiently high. The "lean" output is sufficiently low. When both the outputs are shifting to the rich side, the malfunction will be detected.

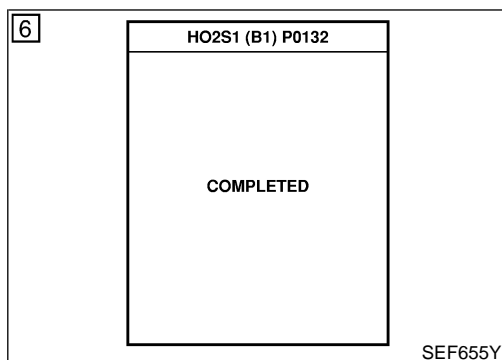
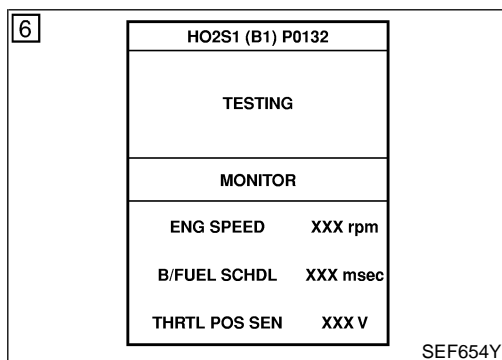
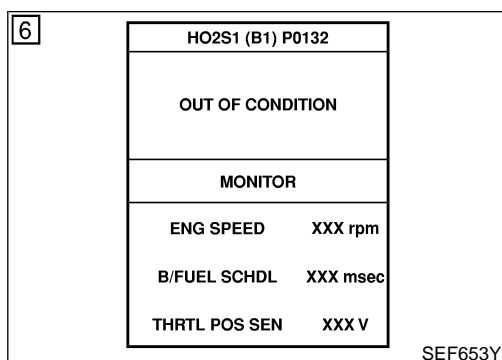
NIEC0830

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0132	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are beyond the specified voltages. 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

SR20DE

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC0831

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 10 seconds.
- 3) Turn ignition switch "ON" and select "HO2S1 (B1) P0132" of "HO2S1" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 4) Touch "START".
- 5) Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take approximately 50 seconds or more.)

ENG SPEED	1,900 - 3,200 rpm
Vehicle speed	Less than 120 km/h (75 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1561.

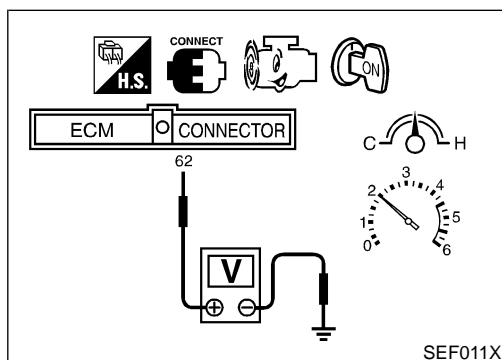
Overall Function Check

NIEC0832

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
- The maximum voltage is below 0.8V at least one time.



EC-1559

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**DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT)
(RICH SHIFT MONITORING)**

SR20DE

Overall Function Check (Cont'd)

- The minimum voltage is below 0.35V at least one time.
- 4) If NG, go to "Diagnostic Procedure", EC-1561.

DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

=NIEC0833

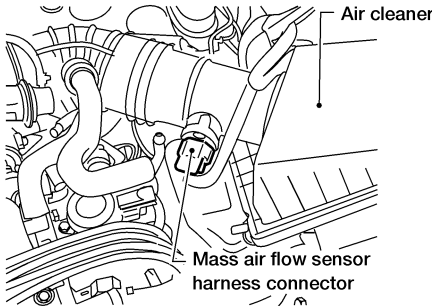
1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Loosen and retighten heated oxygen sensor 1 (front). <div style="margin-left: 20px; color: blue;"> Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb) </div> 	
▶	GO TO 2.

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2	CLEAR THE SELF-LEARNING DATA								
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". 									
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
CLEAR									
<p>4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p>									

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<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. 	
	
<p>4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine?</p>	
Yes or No	
Yes	▶ Perform trouble diagnosis for DTC P0172. Refer to EC-1626.
No	▶ GO TO 3.

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DTC P0132 HEATED OXYGEN SENSOR 1 (FRONT) (RICH SHIFT MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK HARNESS CONNECTOR	
1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector. 3. Check harness connector for water. Water should not exit.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace harness connector.

4	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
Refer to "Component Inspection", EC-1583.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).

5	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-1562.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 1 (front).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499. Refer to "Wiring Diagram", EC-1548, for circuit.		
▶		INSPECTION END

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

cycle 1 2 3 4 5
HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R
R means HO2S1 MNTR (B1) indicates RICH L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Component Inspection HEATED OXYGEN SENSOR 1 (FRONT)

NIEC0834

NIEC0834S01

④ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" 5 times in 10 seconds.
5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

CAUTION:

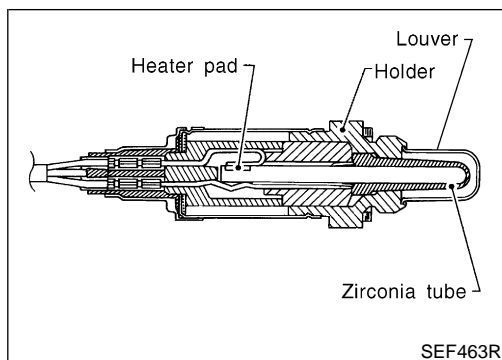
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

EC-1562

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

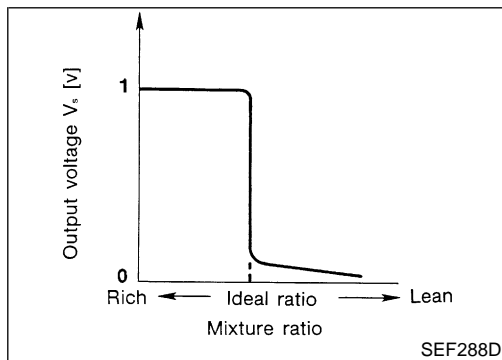
Component Description



Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0835

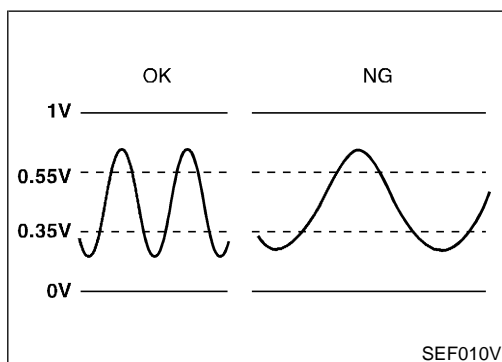


CONSULT-II Reference Value in Data Monitor Mode

NIEC0836

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)			0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	LEAN ↔ RICH Changes more than 5 times during 10 seconds.



On Board Diagnosis Logic

To judge the malfunction of heated oxygen sensor 1 (front), this diagnosis measures response time of heated oxygen sensor 1 (front) signal. The time is compensated by engine operating (speed and load), fuel feedback control constant, and heated oxygen sensor 1 (front) temperature index. Judgment is based on whether the compensated time [heated oxygen sensor 1 (front) cycling time index] is inordinately long or not.

NIEC0837

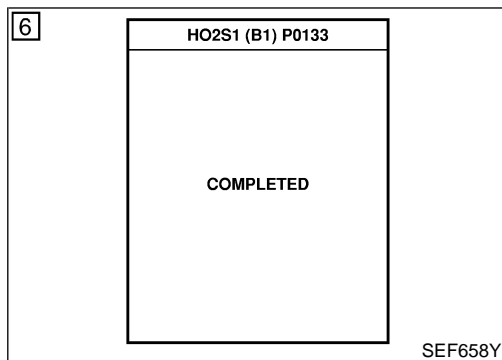
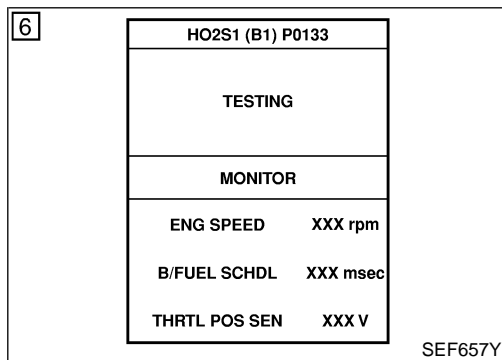
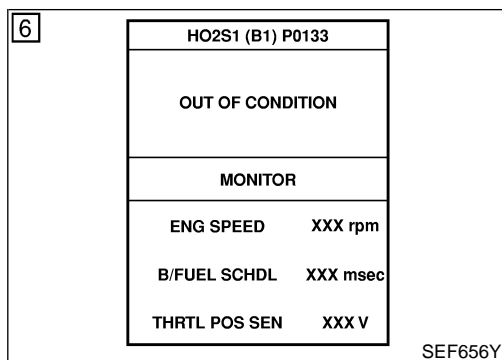
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0133	<ul style="list-style-type: none"> The response of the voltage signal from the sensor takes more than the specified time. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front) Fuel pressure Injectors Intake air leaks Exhaust gas leaks PCV Mass air flow sensor

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

DTC Confirmation Procedure

NIEC0838



DTC Confirmation Procedure

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform at a temperature above -10°C (14°F).
- Before performing the following procedure, confirm that battery voltage is more than 11V at idle.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Stop engine and wait at least 10 seconds.
- 3) Turn ignition switch “ON” and select “HO2S1 (B1) P0133” of “HO2S1” in “DTC WORK SUPPORT” mode with CONSULT-II.
- 4) Touch “START”.
- 5) Start engine and let it idle for at least 3.5 minutes.

NOTE:

Never raise engine speed above 3,200 rpm after this step. If the engine speed limit is exceeded, return to step 5.

- 6) When the following conditions are met, “TESTING” will be displayed on the CONSULT-II screen. Maintain the conditions continuously until “TESTING” changes to “COMPLETED”. (It will take approximately 20 seconds.)

ENG SPEED	1,900 - 3,200 rpm
Vehicle speed	More than 80 km/h (50 MPH)
B/FUEL SCHDL	2.0 - 12.5 msec
Selector lever	Suitable position

If “TESTING” is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that “OK” is displayed after touching “SELF-DIAG RESULTS”. If “NG” is displayed, refer to “Diagnostic Procedure”, EC-1568.

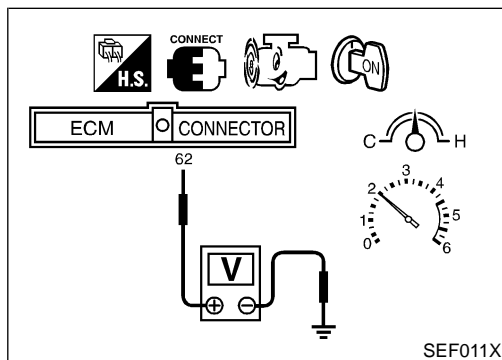
Overall Function Check

NIEC0839

Use this procedure to check the overall function of the heated oxygen sensor 1 (front) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
- The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more



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DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

Overall Function Check (Cont'd)

than five times within 10 seconds.

1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

- 4) If NG, go to "Diagnostic Procedure", EC-1568.

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

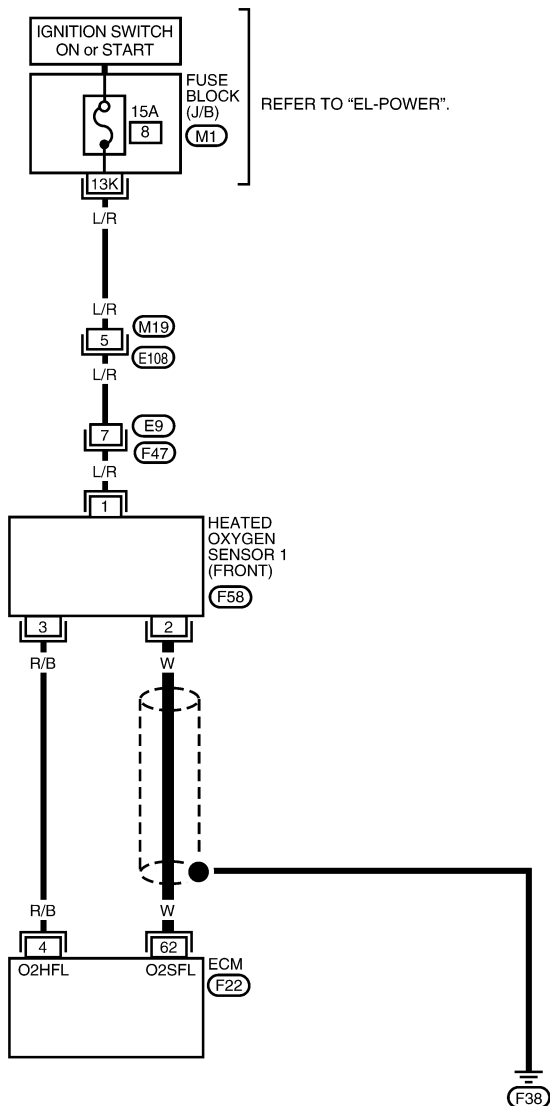
SR20DE

Wiring Diagram

Wiring Diagram

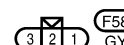
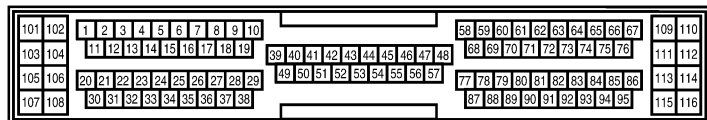
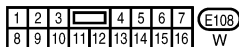
=NIEC0840

EC-HO2S1-01



— : DETECTABLE LINE FOR DTC
 - - - : NON-DETECTABLE LINE FOR DTC

GI
 MA
 EM
 LC
EC
 FE
 CL
 MT
 AT
 AX
 SU
 BR
 ST



WEC580

RS
 BT
 HA

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V

SC
 EL
 IDX

SEF567Y

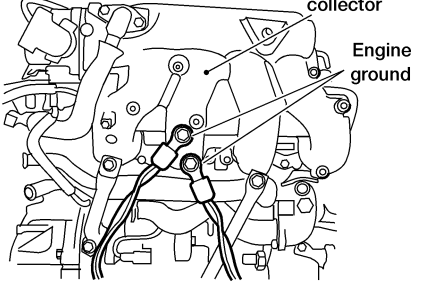
DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

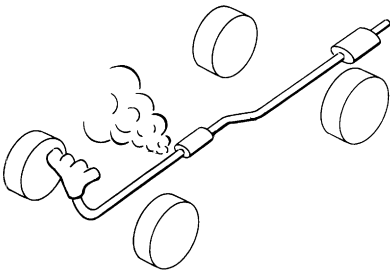
Diagnostic Procedure

Diagnostic Procedure

NIEC0841

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p>	
<p>Engine removed for clarity</p>  <p>The diagram shows a top-down view of an engine with several ground screws. Labels include 'Intake manifold collector' pointing to a component on the right and 'Engine ground' pointing to a screw on the left. The engine is shown without the cylinder head for clarity.</p>	
LEC302	
▶ GO TO 2.	

2	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
<p>Loosen and retighten heated oxygen sensor 1 (front).</p> <p>Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)</p>	
▶ GO TO 3.	

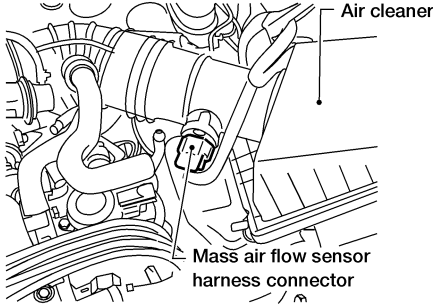
3	CHECK EXHAUST AIR LEAK
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before three way catalyst.</p>	
 <p>The diagram shows a hand holding a hose to the exhaust manifold. Air is shown escaping from the joint, indicating a leak. The hose is connected to a sensor or listening device.</p>	
SEF099P	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace.

4	CHECK FOR INTAKE AIR LEAK
<p>Listen for an intake air leak after the mass air flow sensor.</p>	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Repair or replace.

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

5	CLEAR THE SELF-LEARNING DATA	<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: auto;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF215Z</p> <ol style="list-style-type: none"> 4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine? 	WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR		GI MA EM LC EC FE
WORK SUPPORT											
SELF-LEARNING CONT	B1 100%										
CLEAR											
		<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0;">Air cleaner</p> <p style="margin: 0;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right; margin-right: 20px;">LEC286</p> <ol style="list-style-type: none"> 4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0171 or P0172 detected? Is it difficult to start engine? <p style="text-align: center; margin: 5px 0;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%; padding: 2px;">Yes</td> <td style="width: 5%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-1619, 1626.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 6.</td> </tr> </table>	Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-1619, 1626.	No	▶	GO TO 6.	CL MT AT AX SU BR ST RS BT HA SC EL IDX		
Yes	▶	Perform trouble diagnosis for DTC P0171, P0172. Refer to EC-1619, 1626.									
No	▶	GO TO 6.									

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK INPUT SIGNAL CIRCUIT
1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector. 2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to "Wiring Diagram", EC-1567. Continuity should exist. 3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to "Wiring Diagram", EC-1567. Continuity should not exist. 4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)
Refer to "Component Inspection", EC-1583.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Replace heated oxygen sensor 1 (front).

8	CHECK HEATED OXYGEN SENSOR 1 (FRONT)
Refer to "Component Inspection", EC-1571.	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace heated oxygen sensor 1 (front).

9	CHECK MASS AIR FLOW SENSOR
Refer to "Component Inspection", EC-1515.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace mass air flow sensor.

10	CHECK PCV VALVE
Refer to "Positive Crankcase Ventilation", EC-1402.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Repair or replace PCV valve.

11	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

Component Inspection

NIEC0842

NIEC0842S01

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

cycle | 1 | 2 | 3 | 4 | 5 |
HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Component Inspection

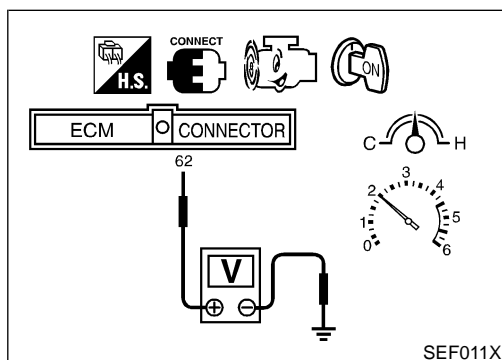
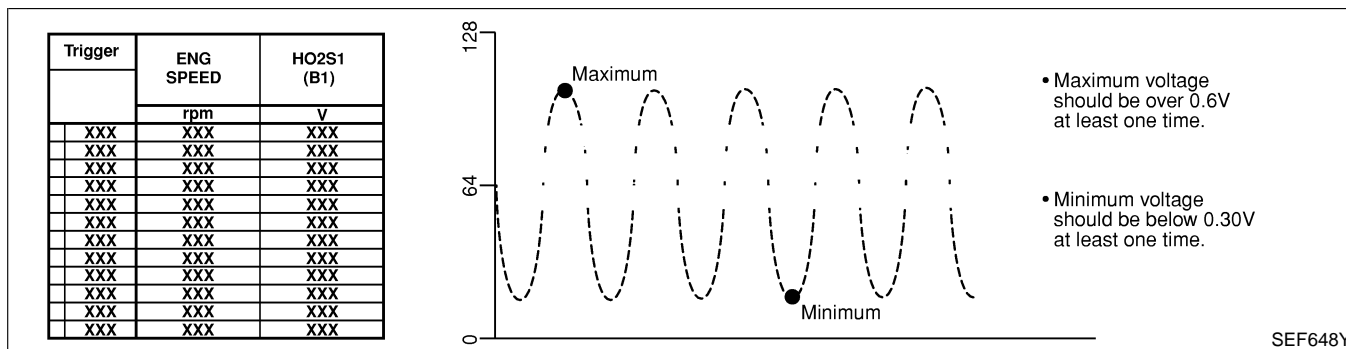
HEATED OXYGEN SENSOR 1 (FRONT)

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.
 - 1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
 - 2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

DTC P0133 HEATED OXYGEN SENSOR 1 (FRONT) (RESPONSE MONITORING)

SR20DE

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

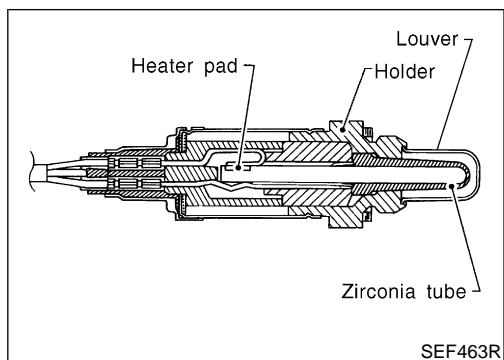
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

SR20DE

Component Description

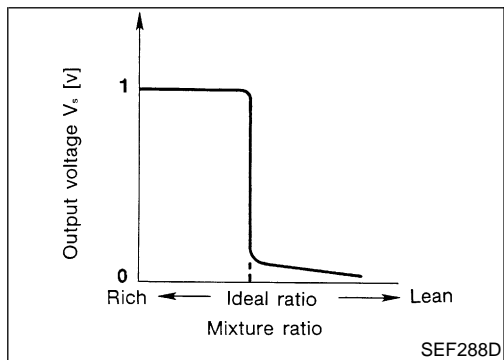


Component Description

The heated oxygen sensor 1 (front) is placed into the exhaust manifold. It detects the amount of oxygen in the exhaust gas compared to the outside air. The heated oxygen sensor 1 (front) has a closed-end tube made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions. The heated oxygen sensor 1 (front) signal is sent to the ECM. The ECM adjusts the injection pulse duration to achieve the ideal air-fuel ratio. The ideal air-fuel ratio occurs near the radical change from 1V to 0V.

NIEC0843

GI
MA
EM
LC



SEF288D

EC
FE
CL
MT

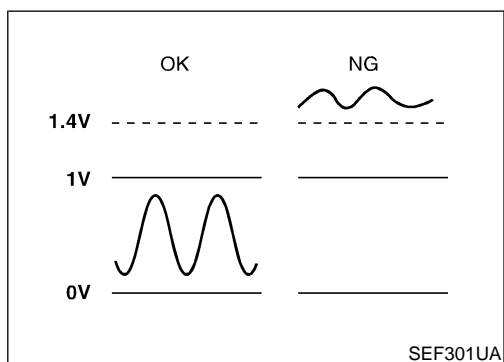
CONSULT-II Reference Value in Data Monitor Mode

NIEC0844

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S1 (B1)	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S1 MNTR (B1)			LEAN ↔ RICH Changes more than 5 times during 10 seconds.

AX
SU
BR



SEF301UA

On Board Diagnosis Logic

To judge the malfunction, the diagnosis checks that the heated oxygen sensor 1 (front) output is not inordinately high.

NIEC0845

ST
RS
BT
HA

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0134	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 1 (front)

SC
EL
IDX

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

SR20DE

DTC Confirmation Procedure

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

NIEC0846

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Restart engine and let it idle for 2 minutes.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1576.

Ⓜ With GST

- 1) Start engine and warm it up to normal operating temperature.
 - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 3) Restart engine and let it idle for 2 minutes.
 - 4) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 5) Restart engine and let it idle for 2 minutes.
 - 6) Select "MODE 3" with GST.
 - 7) If DTC is detected, go to "Diagnostic Procedure", EC-1576.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

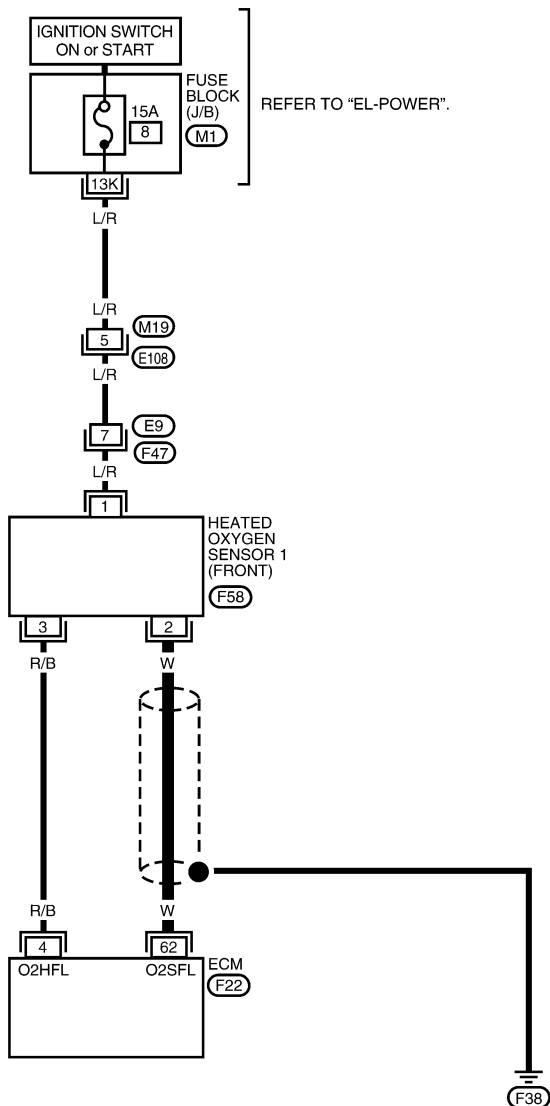
DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

SR20DE
Wiring Diagram

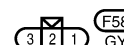
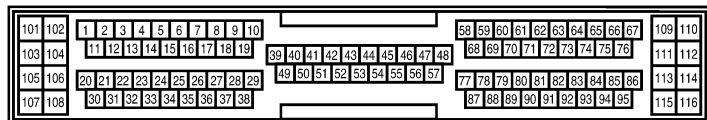
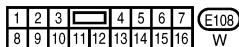
Wiring Diagram

NIEC0847

EC-HO2S1-01



— : DETECTABLE LINE FOR DTC
- - - : NON-DETECTABLE LINE FOR DTC



WEC580

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
62	W	HEATED OXYGEN SENSOR 1 (FRONT)	ENGINE RUNNING AT 2,000 RPM AFTER WARMING UP TO NORMAL OPERATING TEMPERATURE	0 - APPROX. 1.0V (V) 0.5 0 1 s

SEF567Y

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

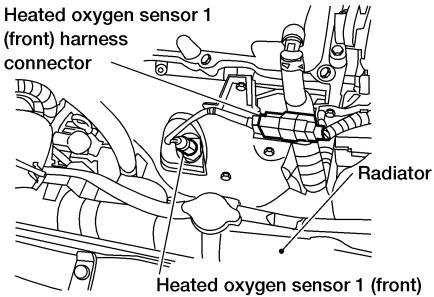
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0848

1	RETIGHTEN HEATED OXYGEN SENSOR 1 (FRONT)
Loosen and retighten heated oxygen sensor 1 (front). Tightening torque: 40 - 60 N-m (4.1 - 6.1 kg-m, 30 - 44 ft-lb)	
▶	GO TO 2.

2	CHECK INPUT SIGNAL CIRCUIT
1. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.	
	
LEC274	
2. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to "Wiring Diagram", EC-1575. Continuity should exist.	
3. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to "Wiring Diagram", EC-1575. Continuity should not exist.	
4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK HARNESS CONNECTOR
Check heated oxygen sensor 1 (front) harness connector for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair or replace harness connector.

4	CHECK HEATED OXYGEN SENSOR 1 (FRONT)
Refer to "Component Inspection", EC-1577.	
OK or NG	
OK	▶ GO TO 5.
NG	▶ Replace heated oxygen sensor 1 (front).

5	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

SR20DE

Component Inspection

NIEC0849

NIEC0849S01

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
COOLANT TEMP/S	XXX °C
HO2S1 (B1)	XXX V
HO2S1 MNTR (B1)	LEAN

SEF646Y

cycle | 1 | 2 | 3 | 4 | 5 |
HO2S1 MNTR (B1) R-L-R-L-R-L-R-L-R-L-R

R means HO2S1 MNTR (B1) indicates RICH
L means HO2S1 MNTR (B1) indicates LEAN

SEF217YA

Component Inspection

HEATED OXYGEN SENSOR 1 (FRONT)

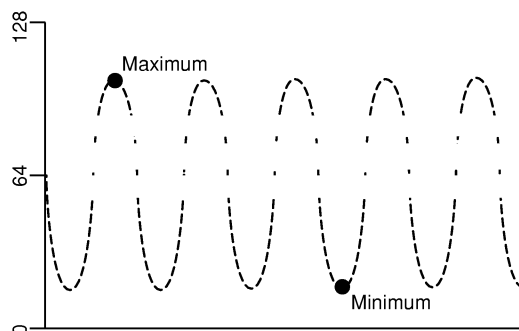
Ⓜ With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "MANU TRIG" in "DATA MONITOR" mode, and select "HO2S1 (B1)" and "HO2S1 MNTR (B1)".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT-II screen.
- 5) Check the following.
 - "HO2S1 MNTR (B1)" in "DATA MONITOR" mode changes from "RICH" to "LEAN" to "RICH" five times in 10 seconds. 5 times (cycles) are counted as shown below:
R = "HO2S1 MNTR (B1)", "RICH"
L = "HO2S1 MNTR (B1)", "LEAN"
 - "HO2S1 (B1)" voltage goes above 0.6V at least once.
 - "HO2S1 (B1)" voltage goes below 0.3V at least once.
 - "HO2S1 (B1)" voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

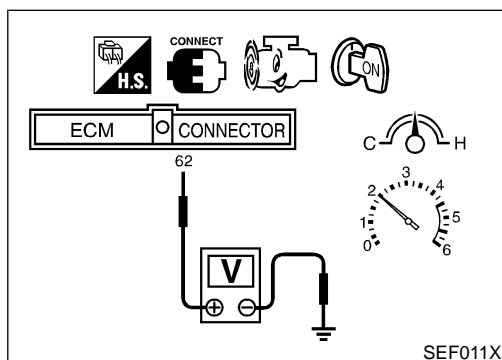
Trigger	ENG SPEED	HO2S1 (B1)
	rpm	V
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX
XXX	XXX	XXX



• Maximum voltage should be over 0.6V at least one time.

• Minimum voltage should be below 0.30V at least one time.

SEF648Y



ⓧ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage fluctuates between 0 to 0.3V and 0.6 to 1.0V more than five times within 10 seconds.
1 time: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V
2 times: 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V → 0.6 - 1.0V → 0 - 0.3V

EC-1577

DTC P0134 HEATED OXYGEN SENSOR 1 (FRONT) (HIGH VOLTAGE)

SR20DE

Component Inspection (Cont'd)

- The maximum voltage is over 0.6V at least one time.
- The minimum voltage is below 0.3V at least one time.
- The voltage never exceeds 1.0V.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT)

SR20DE
Description

Description

NIEC0850

SYSTEM DESCRIPTION

NIEC0850S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Heated oxygen sensor 1 heater (front) control	Heated oxygen sensor 1 heater (front)

The ECM performs ON/OFF control of the heated oxygen sensor 1 heater (front) corresponding to the engine operating condition.

OPERATION

NIEC0850S02

Engine speed	Heated oxygen sensor 1 heater (front)
Above 3,200 rpm	OFF
Below 3,200 rpm	ON

CONSULT-II Reference Value in Data Monitor Mode

NIEC0851

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S1 HTR (B1)	● Engine speed: Below 3,200 rpm	ON
	● Engine speed: Above 3,200 rpm	OFF

On Board Diagnosis Logic

NIEC0852

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0135	<ul style="list-style-type: none"> The current amperage in the heated oxygen sensor 1 heater (front) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 1 heater (front).] 	<ul style="list-style-type: none"> Harness or connectors [The heated oxygen sensor 1 heater (front) circuit is open or shorted.] Heated oxygen sensor 1 heater (front)

DTC Confirmation Procedure

NIEC0853

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is between 10.5V and 16V at idle.

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT) SR20DE

DTC Confirmation Procedure (Cont'd)

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 6 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1582.

With GST

- 1) Start engine and run it for at least 6 seconds at idle speed.
 - 2) Turn ignition switch "OFF" and wait at least 10 seconds.
 - 3) Start engine and run it for at least 6 seconds at idle speed.
 - 4) Select "MODE 3" with GST.
 - 5) If DTC is detected, go to "Diagnostic Procedure", EC-1582.
- **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

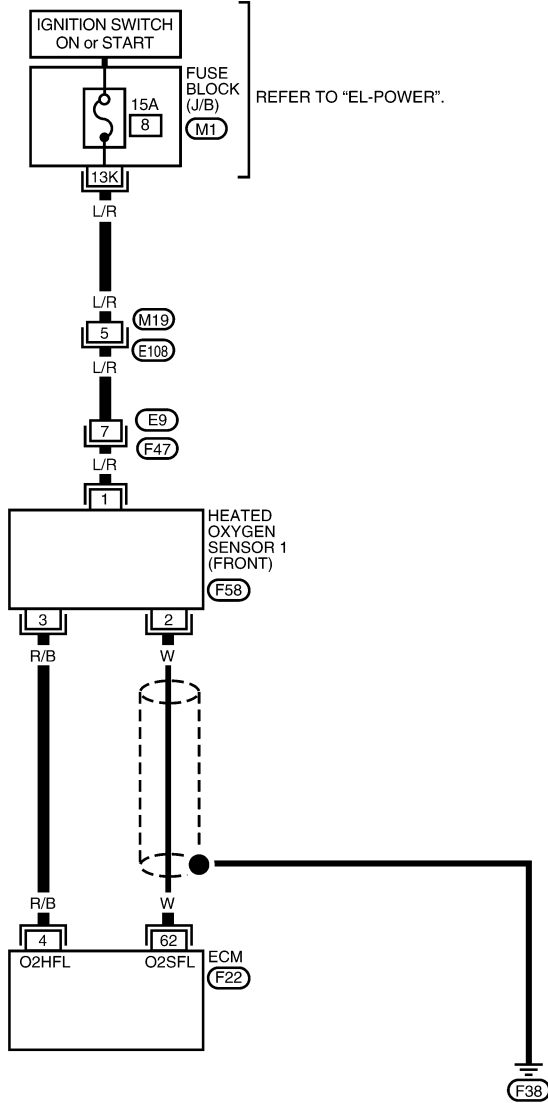
DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT) SR20DE

Wiring Diagram

Wiring Diagram

NIEC0854

EC-HO2S1H-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC

GI

MA

EM

LC

EC

FE

CL

MT

AT

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SU

BR

ST

RS

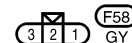
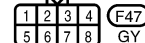
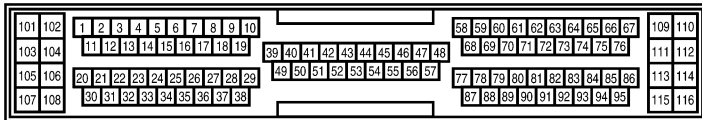
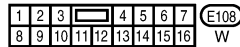
BT

HA

SC

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IDX



WEC581

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
4	R/B	HEATED OXYGEN SENSOR 1 HEATER (FRONT)	ENGINE RUNNING BELOW 3,600 RPM	0 - 1.0V
			ENGINE RUNNING ABOVE 3,600 RPM	BATTERY VOLTAGE

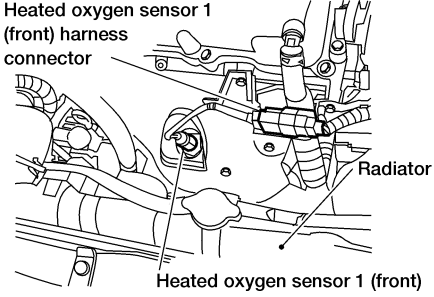
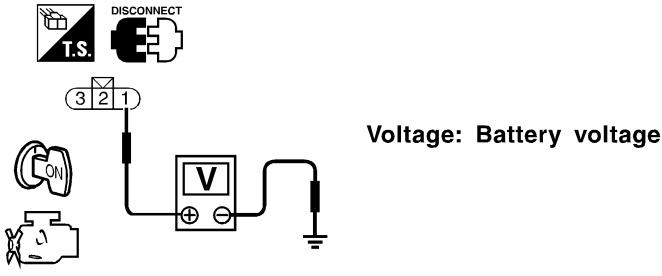
SEF568YA

DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT) SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0855

1	CHECK POWER SUPPLY		
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector. 	
		 <p style="text-align: center;">Heated oxygen sensor 1 (front)</p>	LEC274
		<ol style="list-style-type: none"> 3. Turn ignition switch "ON". 4. Check voltage between HO2S1 terminal 1 and ground with CONSULT-II or tester. 	
		 <p style="text-align: center;">Voltage: Battery voltage</p>	SEF934X
		OK or NG	
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M19, E108 ● Harness connectors F47, E9 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between heated oxygen sensor 1 (front) and fuse 	
		▶	Repair harness or connectors.

3	CHECK OUTPUT SIGNAL CIRCUIT		
		<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between HO2S1 terminal 3 and ECM terminal 4. Refer to "Wiring Diagram", EC-1581. Continuity should exist. 4. Also check harness for short to ground and short to power. 	
		OK or NG	
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

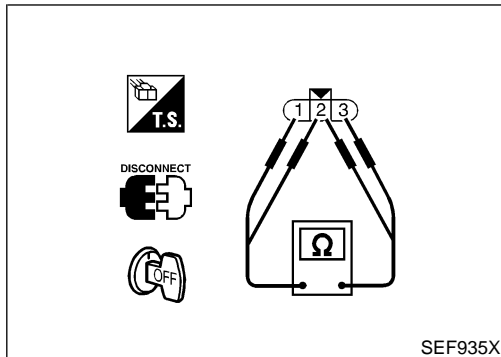
DTC P0135 HEATED OXYGEN SENSOR 1 HEATER (FRONT) SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 1 HEATER (FRONT)	
Refer to "Component Inspection", EC-1583.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 1 (front).

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶ INSPECTION END		

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Component Inspection

HEATED OXYGEN SENSOR 1 HEATER (FRONT)

NIEC0856

NIEC0856S01

Check resistance between terminals 3 and 1.

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

Check continuity between terminals 2 and 1, 3 and 2.

Continuity should not exist.

If NG, replace the heated oxygen sensor 1 (front).

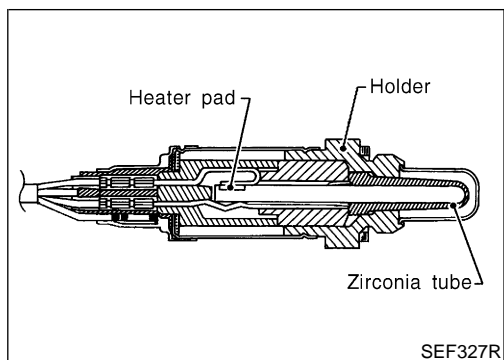
CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

SR20DE

Component Description



Component Description

NIEC0857

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

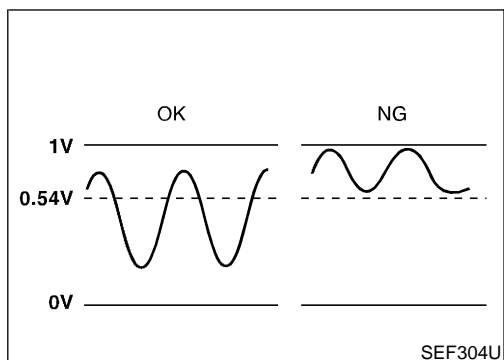
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0858

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revsing engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0859

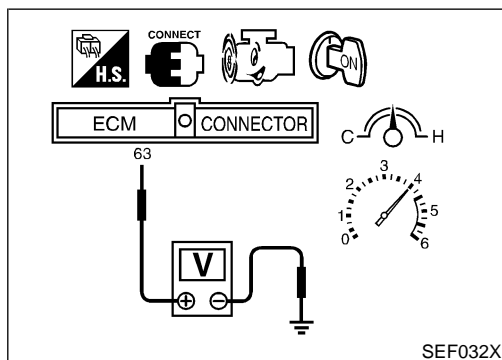
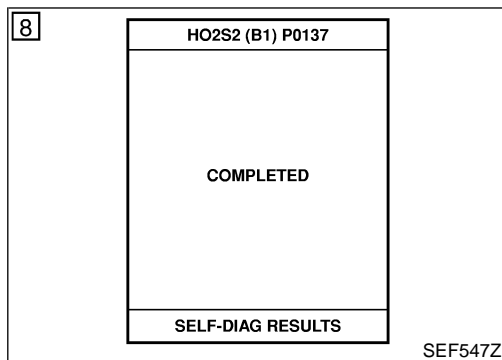
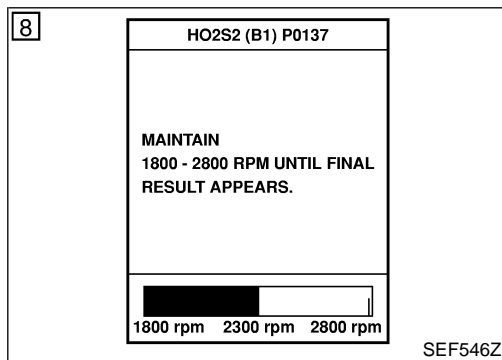
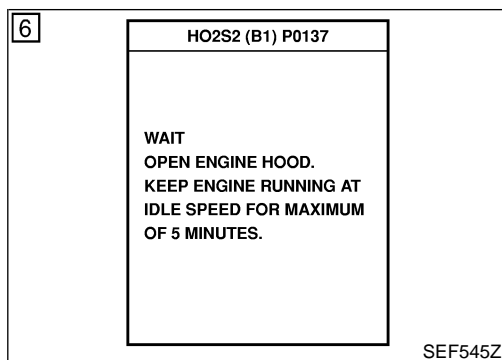
The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the minimum voltage of the sensor is sufficiently low during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0137	● The minimum voltage from the sensor does not reach the specified voltage.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

SR20DE

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC0860

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0137" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-1587. If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0861

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 0.54V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idle for 10 minutes, then check the voltage, or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-1587.

EC-1585

GI

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DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

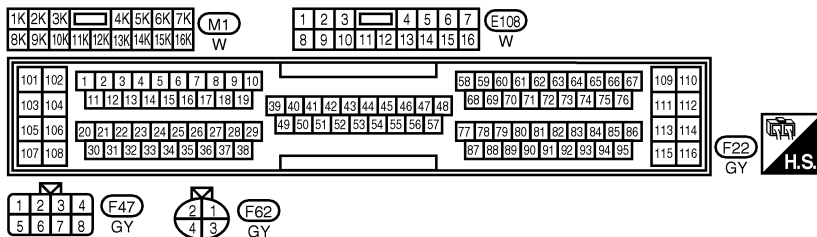
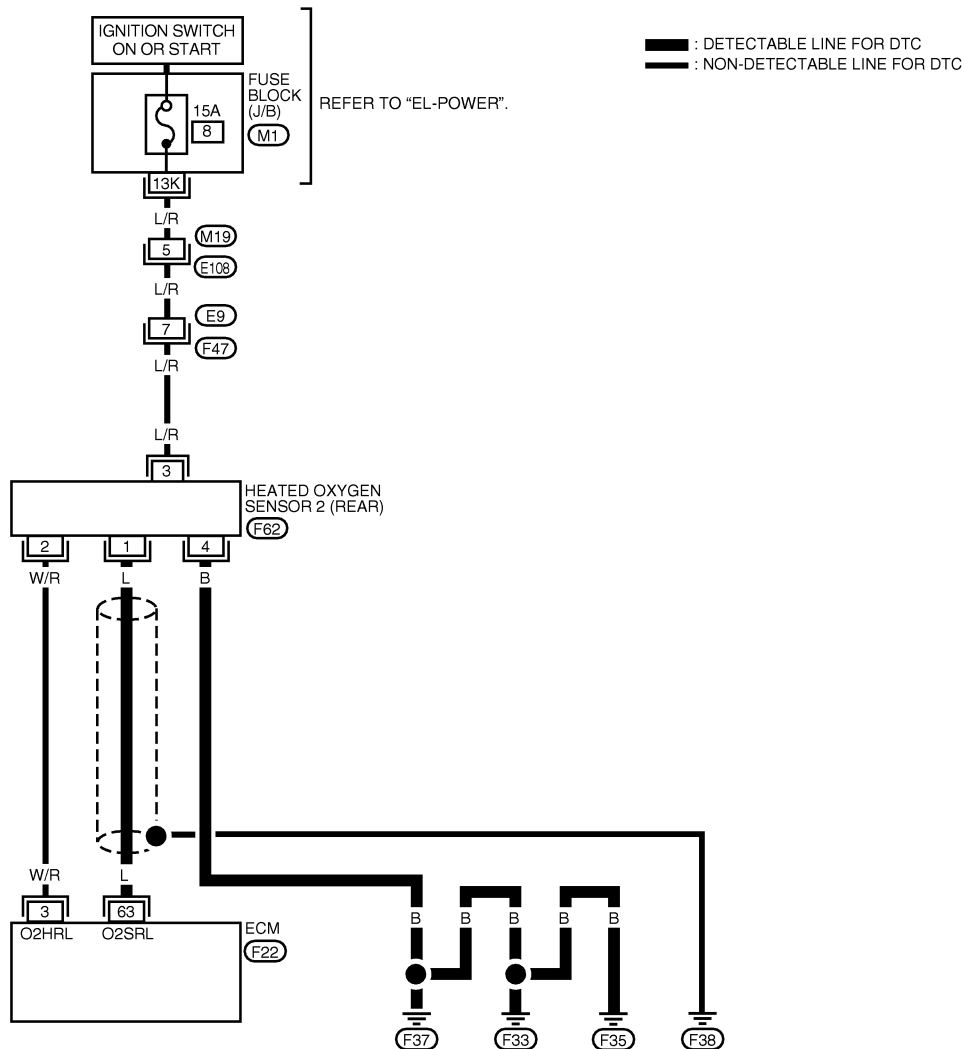
SR20DE

Wiring Diagram

Wiring Diagram

NIEC0862

EC-HO2S2-01



LEC200

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF569Y

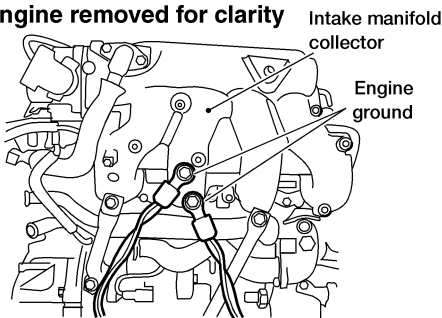
DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0863

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <p style="text-align: center;">Engine removed for clarity</p>  <p style="text-align: right;">LEC302</p>	
▶	GO TO 2.

GI

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DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

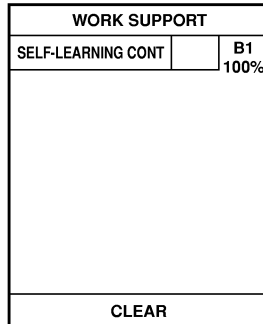
SR20DE

Diagnostic Procedure (Cont'd)

2 CLEAR THE SELF-LEARNING DATA

With CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
3. Clear the self-learning control coefficient by touching "CLEAR".

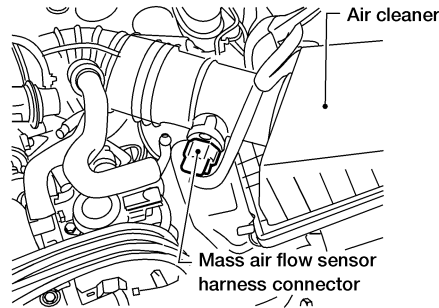


SEF215Z

4. Run engine for at least 10 minutes at idle speed.
Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.



LEC286

4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure 1st trip DTC P0100 is displayed.
6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433.
7. Make sure DTC P0000 is displayed.
8. Run engine for at least 10 minutes at idle speed.

Is the 1st trip DTC P0172 detected? Is it difficult to start engine?

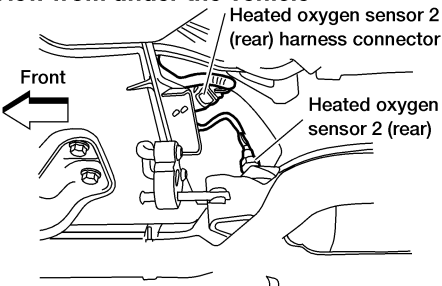
Yes or No

Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-1626.
No	▶	GO TO 3.

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p>  </div> <p style="text-align: right;">LEC277</p> <p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to "Wiring Diagram", EC-1586. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to "Wiring Diagram", EC-1586. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							
4	CHECK GROUND CIRCUIT	<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to "Wiring Diagram", EC-1586. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to power in harness or connectors.	<p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p>
OK	▶	GO TO 5.							
NG	▶	Repair open circuit or short to power in harness or connectors.							
5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	<p>Refer to "Component Inspection", EC-1590.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 2 (rear).</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace heated oxygen sensor 2 (rear).	<p>RS</p> <p>BT</p> <p>HA</p>
OK	▶	GO TO 6.							
NG	▶	Replace heated oxygen sensor 2 (rear).							
6	CHECK INTERMITTENT INCIDENT	<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>		▶	INSPECTION END	<p>SC</p> <p>EL</p> <p>IDX</p>			
	▶	INSPECTION END							

DTC P0137 HEATED OXYGEN SENSOR 2 (REAR) (MIN. VOLTAGE MONITORING)

SR20DE

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0864

NIEC0864S01

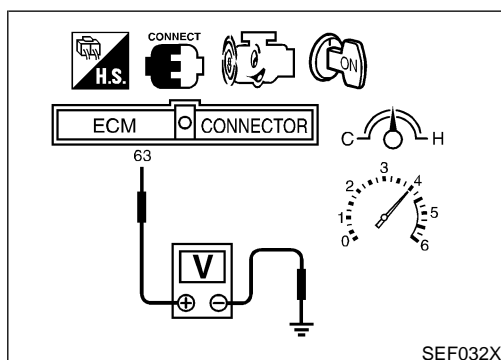
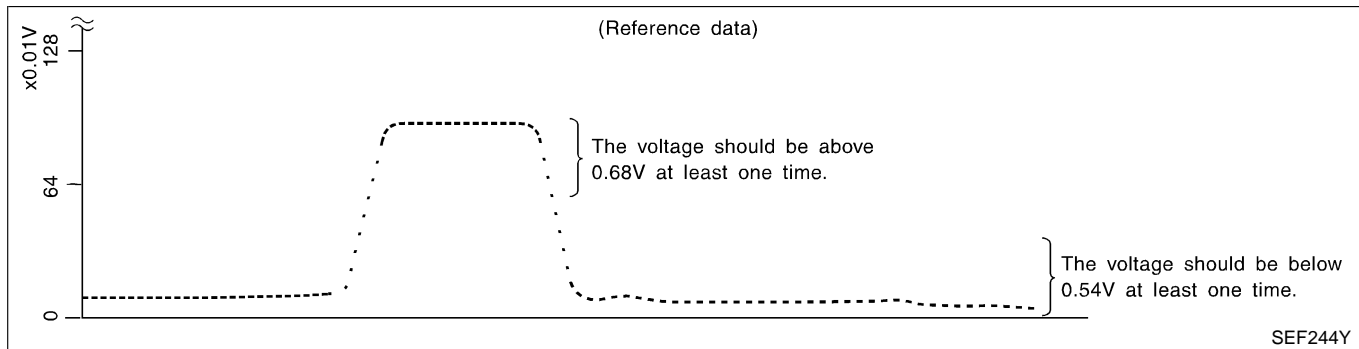
With CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%. "HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.68V at least once.

If the voltage is above 0.68V at step 4, step 5 is not necessary.

- 5) Check the voltage when revving up to 6,000 rpm under no load, or keep vehicle at idle for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).

The voltage should be below 0.54V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

**DTC P0137 HEATED OXYGEN SENSOR 2 (REAR)
(MIN. VOLTAGE MONITORING)**

SR20DE

Component Inspection (Cont'd)

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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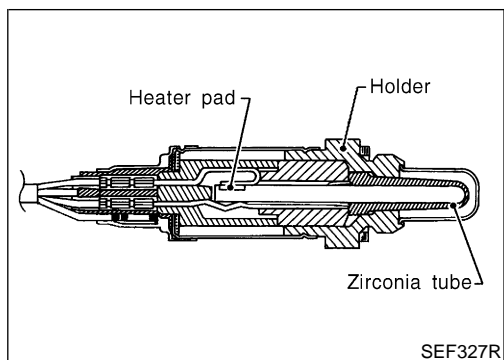
EL

IDX

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

Component Description



Component Description

NIEC0865

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

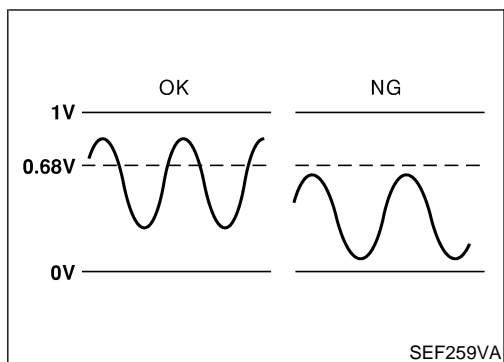
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0866

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0867

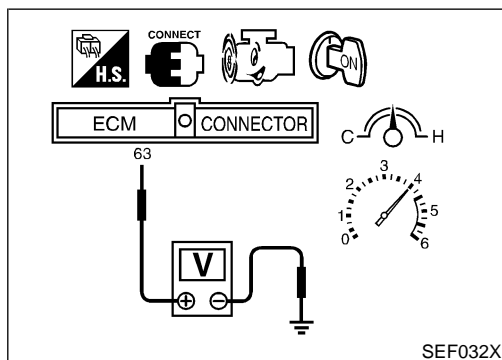
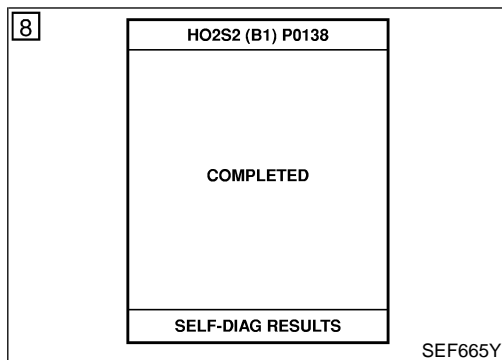
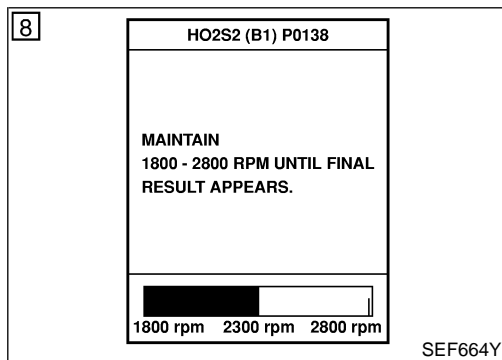
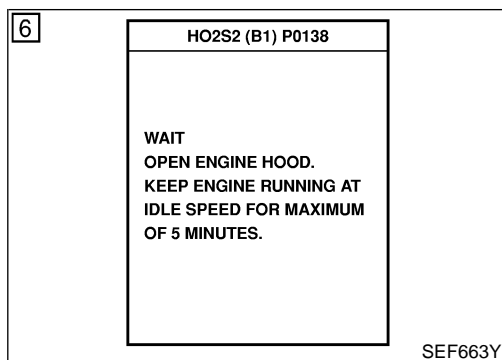
The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the maximum voltage of the sensor is sufficiently high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0138	<ul style="list-style-type: none"> ● The maximum voltage from the sensor does not reach the specified voltage. 	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC0868

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0138" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-1595. If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0869

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving engine up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idle for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be above 0.68V at least once during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-1595.

EC-1593

GI

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DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

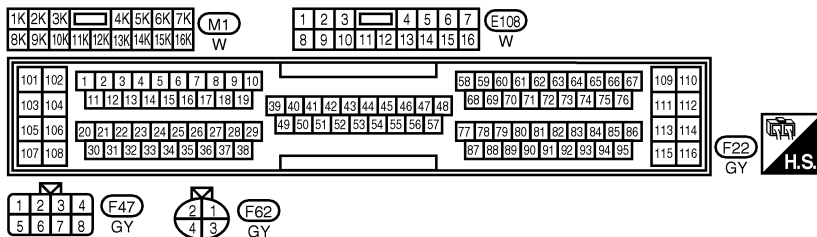
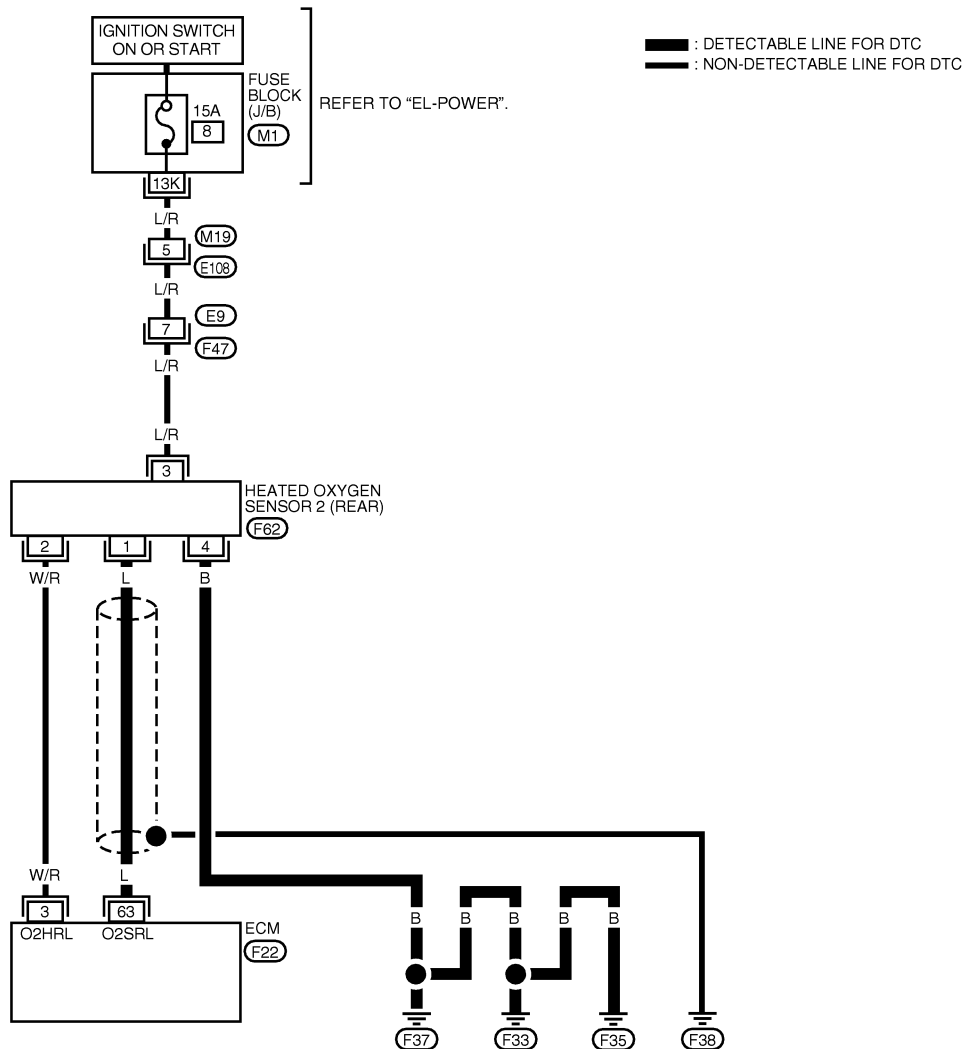
SR20DE

Wiring Diagram

Wiring Diagram

NIEC0870

EC-HO2S2-01



LEC200

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF569Y

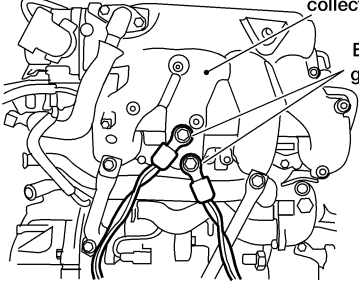
DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0871

1	RETIGHTEN GROUND SCREWS
<p>1. Turn ignition switch "OFF".</p> <p>2. Loosen and retighten engine ground screws.</p> <div><p>Engine removed for clarity</p><p>The diagram shows a top-down view of an engine block with several ground screws. Two screws are highlighted with circles and arrows. One arrow points to a screw labeled 'Intake manifold collector' and the other points to a screw labeled 'Engine ground'.</p></div> <p style="text-align: right;">LEC302</p>	
▶	GO TO 2.

GI

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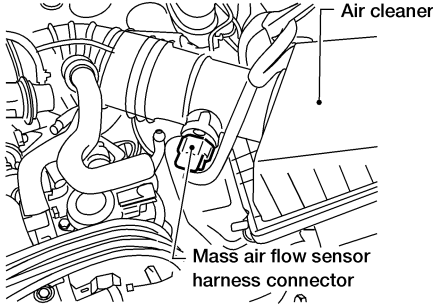
EL

IDX

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

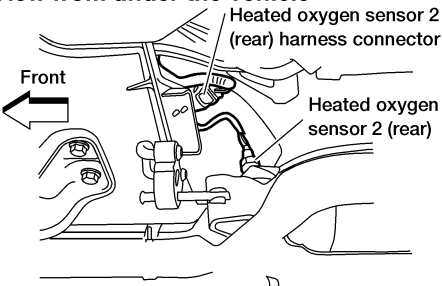
Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA								
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: 0 auto;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF215Z</p> <ol style="list-style-type: none"> 4. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p>		WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
CLEAR									
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0;">Air cleaner</p> <p style="margin: 0;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right; margin-right: 20px;">LEC286</p> <ol style="list-style-type: none"> 4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. <p>Is the 1st trip DTC P0171 detected? Is it difficult to start engine?</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%; padding: 2px;">Yes</td> <td style="width: 5%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0171. Refer to EC-1619.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 3.</td> </tr> </table>		Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-1619.	No	▶	GO TO 3.		
Yes	▶	Perform trouble diagnosis for DTC P0171. Refer to EC-1619.							
No	▶	GO TO 3.							

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT								
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p>  </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center;">EC</p>						
		<p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to "Wiring Diagram", EC-1594. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to "Wiring Diagram", EC-1594. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>FE</p> <p>CL</p> <p>MT</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>LEC277</p> <p>AT</p>
OK	▶	GO TO 4.							
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.							

4	CHECK GROUND CIRCUIT								
		<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to "Wiring Diagram", EC-1594. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>AX</p> <p>SU</p> <p>BR</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to power in harness or connectors.	<p>ST</p>
OK	▶	GO TO 5.							
NG	▶	Repair open circuit or short to power in harness or connectors.							

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)								
		<p>Refer to "Component Inspection", EC-1598.</p> <p style="text-align: center;">OK or NG</p>	<p>RS</p> <p>BT</p> <p>HA</p>						
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace heated oxygen sensor 2 (rear).</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace heated oxygen sensor 2 (rear).	<p>SC</p> <p>EL</p> <p>IDX</p>
OK	▶	GO TO 6.							
NG	▶	Replace heated oxygen sensor 2 (rear).							

6	CHECK INTERMITTENT INCIDENT					
		<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>	<p>SC</p> <p>EL</p> <p>IDX</p>			
		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>		▶	INSPECTION END	<p>EL</p> <p>IDX</p>
	▶	INSPECTION END				

DTC P0138 HEATED OXYGEN SENSOR 2 (REAR) (MAX. VOLTAGE MONITORING)

SR20DE

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0872

NIEC0872S01

With CONSULT-II

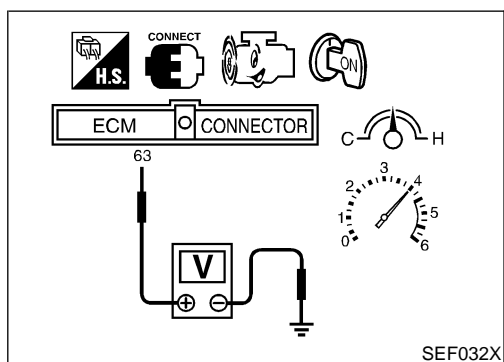
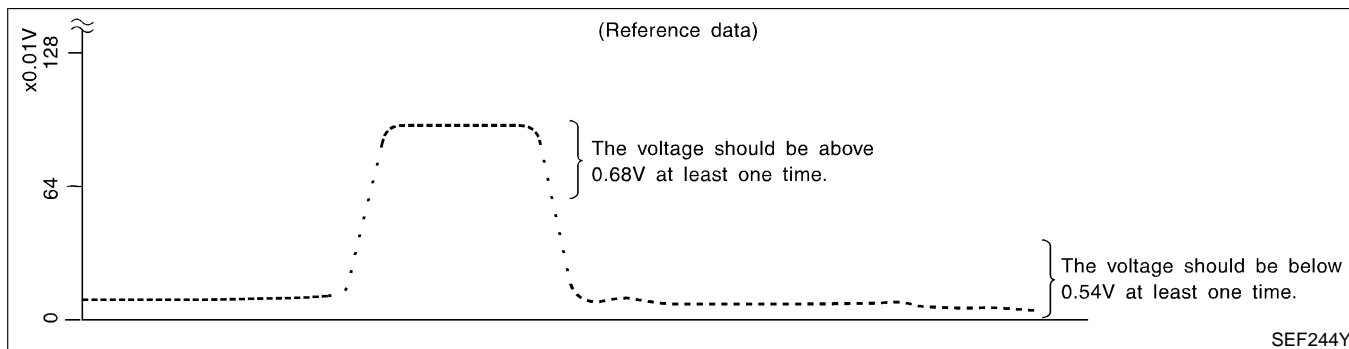
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes..
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary.
- 5) Check the voltage when revving up to 6,000 rpm under no load, or keep vehicle at idle for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should be below 0.54V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

**DTC P0138 HEATED OXYGEN SENSOR 2 (REAR)
(MAX. VOLTAGE MONITORING)**

SR20DE

Component Inspection (Cont'd)

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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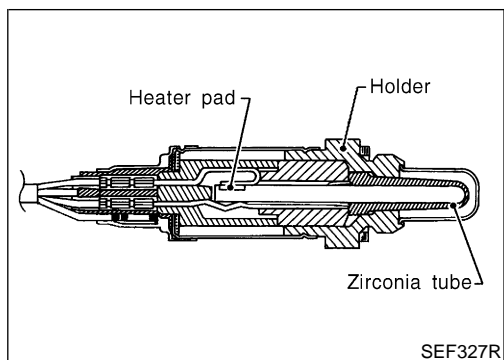
EL

IDX

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

Component Description



Component Description

NIEC0873

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

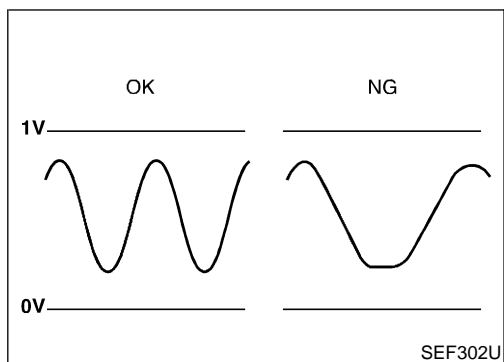
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0874

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
HO2S2 (B1)	● Engine: After warming up	Revsing engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)			LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0875

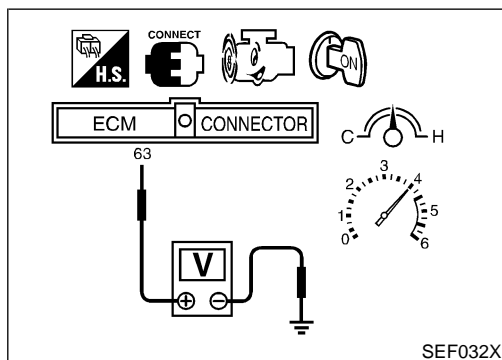
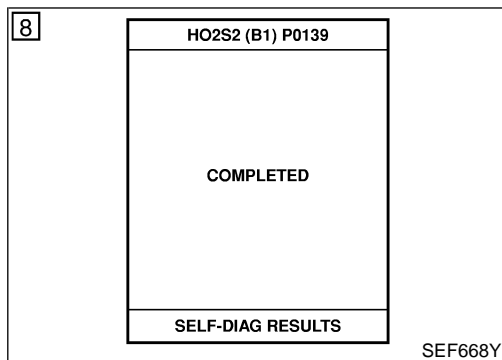
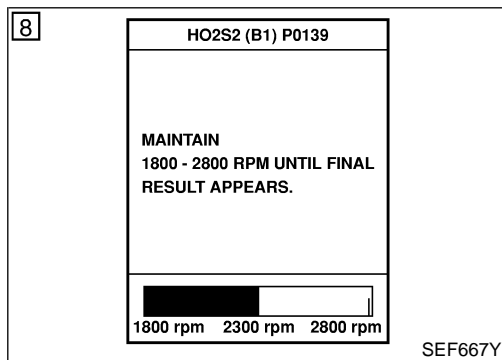
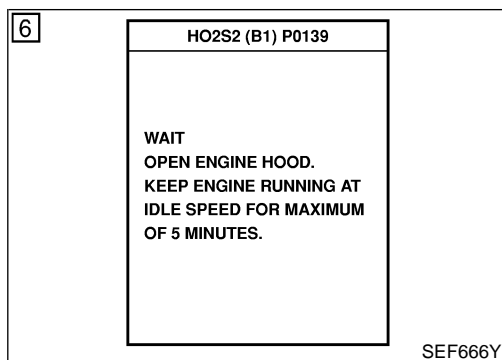
The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether the switching response of the sensor's voltage is faster than specified during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0139	● It takes more than the specified time for the sensor to respond between rich and lean.	<ul style="list-style-type: none"> ● Harness or connectors (The sensor circuit is open or shorted.) ● Heated oxygen sensor 2 (rear) ● Fuel pressure ● Injectors ● Intake air leaks

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

DTC Confirmation Procedure



DTC Confirmation Procedure

NIEC0876

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Open engine hood before conducting following procedure.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "COOLAN TEMP/S" indicates more than 70°C (158°F).
- 6) Select "HO2S2 (B1) P0139" of "HO2S2" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 7) Start engine and follow the instruction of CONSULT-II.
- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS".

If NG is displayed, refer to "Diagnostic Procedure", EC-1603. If "CANNOT BE DIAGNOSED" is displayed, perform the following.

- a) Stop engine and cool down until "COOLAN TEMP/S" indicates less than 70°C (158°F).
- b) Turn ignition switch "ON".
- c) Select "DATA MONITOR" mode with CONSULT-II.
- d) Start engine.
- e) Return to step 6 again when the "COOLAN TEMP/S" reaches to 70°C (158°F).

Overall Function Check

NIEC0877

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should change at more than 0.06V for 1 second during this procedure.
If the voltage can be confirmed in step 4, step 5 is not necessary.
- 5) Keep vehicle at idle for 10 minutes, then check the voltage, or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).
The voltage should change at more than 0.06V for 1 second during this procedure.
- 6) If NG, go to "Diagnostic Procedure", EC-1603.

EC-1601

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DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

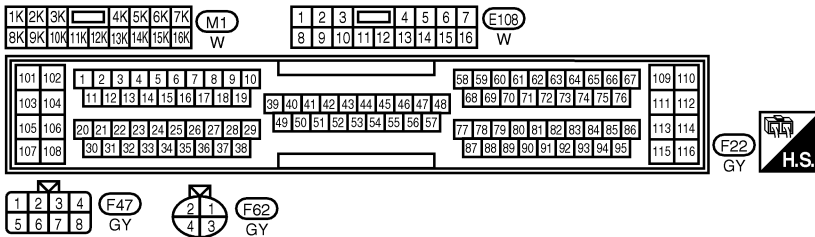
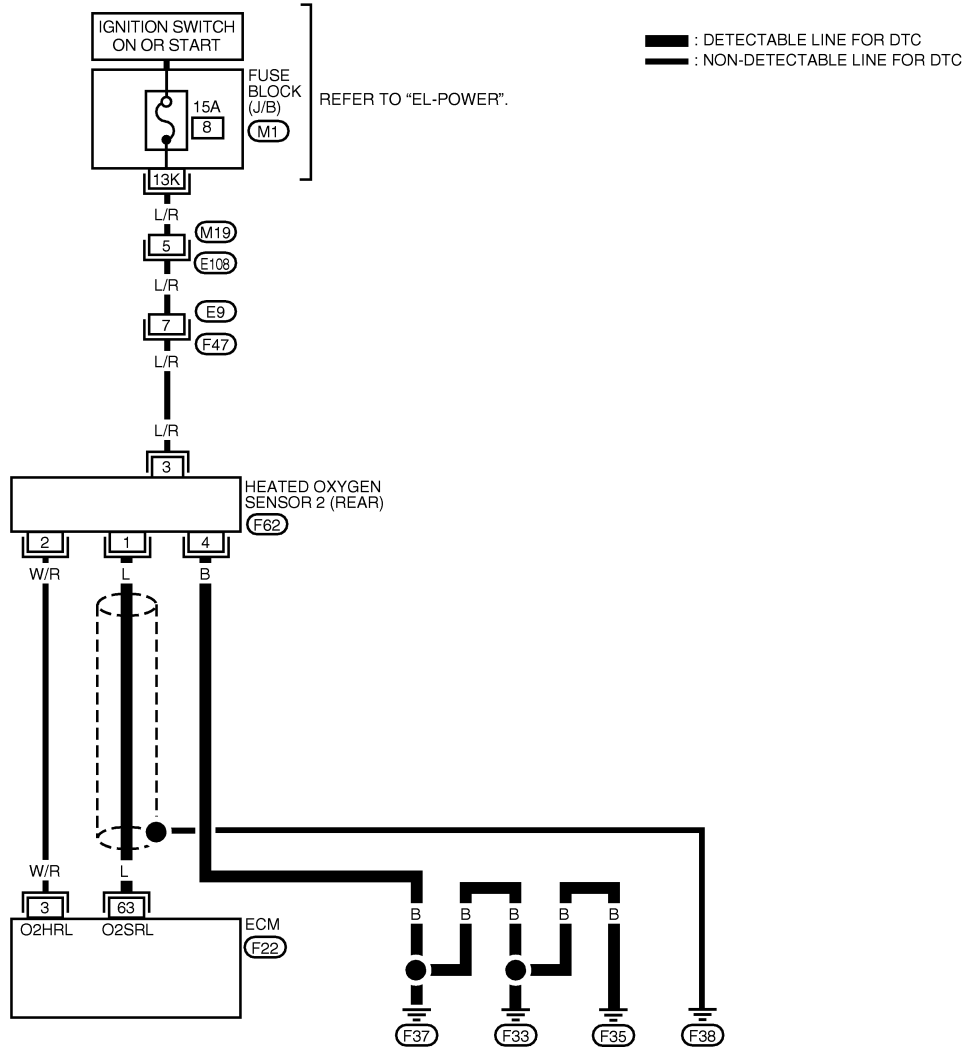
SR20DE

Wiring Diagram

Wiring Diagram

NIEC0878

EC-HO2S2-01



LEC200

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF569Y

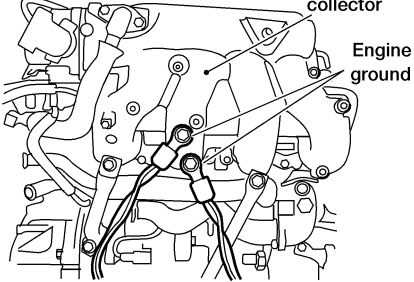
DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0879

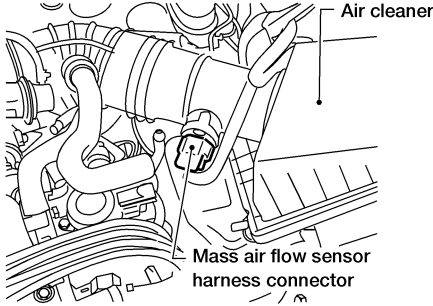
1	RETIGHTEN GROUND SCREWS
<ol style="list-style-type: none">1. Turn ignition switch "OFF".2. Loosen and retighten engine ground screws.	
<p>Engine removed for clarity</p>  <p>The diagram shows a top-down view of an engine block with several ground screws. Labels with arrows point to the 'Intake manifold collector' and 'Engine ground' screws. The engine is shown without its accessories for clarity.</p>	
LEC302	
▶	GO TO 2.

- GI
- MA
- EM
- LC
- EC**
- FE
- CL
- MT
- AT
- AX
- SU
- BR
- ST
- RS
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- SC
- EL
- IDX

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

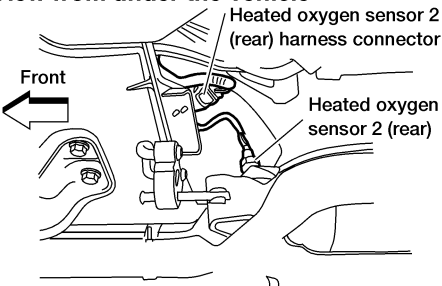
Diagnostic Procedure (Cont'd)

2	CLEAR THE SELF-LEARNING DATA								
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II. 3. Clear the self-learning control coefficient by touching "CLEAR". <div style="text-align: center; margin: 10px 0;"> <table border="1" style="border-collapse: collapse; width: 150px; margin: 0 auto;"> <tr> <th colspan="2" style="padding: 2px;">WORK SUPPORT</th> </tr> <tr> <td style="padding: 2px;">SELF-LEARNING CONT</td> <td style="padding: 2px; text-align: center;">B1 100%</td> </tr> <tr> <td colspan="2" style="height: 100px;"></td> </tr> <tr> <td colspan="2" style="text-align: center; padding: 2px;">CLEAR</td> </tr> </table> </div> <p style="text-align: right; margin-right: 20px;">SEF215Z</p> <ol style="list-style-type: none"> 4. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine? 		WORK SUPPORT		SELF-LEARNING CONT	B1 100%			CLEAR	
WORK SUPPORT									
SELF-LEARNING CONT	B1 100%								
CLEAR									
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Turn ignition switch "OFF". 3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0; font-size: small;">Air cleaner</p> <p style="margin: 0; font-size: small;">Mass air flow sensor harness connector</p> </div> <p style="text-align: right; margin-right: 20px;">LEC286</p> <ol style="list-style-type: none"> 4. Stop engine and reconnect mass air flow sensor harness connector. 5. Make sure 1st trip DTC P0100 is displayed. 6. Erase the 1st trip DTC memory. Refer to "HOW TO ERASE EMISSION-RELATED DIAGNOSTIC INFORMATION", EC-1433. 7. Make sure DTC P0000 is displayed. 8. Run engine for at least 10 minutes at idle speed. Is the 1st trip DTC P0172 detected? Is it difficult to start engine? <p style="text-align: center; margin: 5px 0;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%; padding: 2px;">Yes</td> <td style="width: 5%; text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">Perform trouble diagnosis for DTC P0172. Refer to EC-1626.</td> </tr> <tr> <td style="padding: 2px;">No</td> <td style="text-align: center; padding: 2px;">▶</td> <td style="padding: 2px;">GO TO 3.</td> </tr> </table>		Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-1626.	No	▶	GO TO 3.		
Yes	▶	Perform trouble diagnosis for DTC P0172. Refer to EC-1626.							
No	▶	GO TO 3.							

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK INPUT SIGNAL CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p>  </div> <p style="text-align: right;">LEC277</p> <p>3. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to "Wiring Diagram", EC-1602. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to "Wiring Diagram", EC-1602. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 4.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 4.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 2px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p>	
OK	▶	GO TO 4.								
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.								
	4	CHECK GROUND CIRCUIT	<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to "Wiring Diagram", EC-1602. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Repair open circuit or short to power in harness or connectors.</td> </tr> </table>	OK	▶	GO TO 5.	NG	▶	Repair open circuit or short to power in harness or connectors.	<p>AX</p> <p>SU</p> <p>BR</p> <p>ST</p>
OK	▶	GO TO 5.								
NG	▶	Repair open circuit or short to power in harness or connectors.								
	5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	<p>Refer to "Component Inspection", EC-1606.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>Replace heated oxygen sensor 2 (rear).</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace heated oxygen sensor 2 (rear).	<p>RS</p> <p>BT</p> <p>HA</p>
OK	▶	GO TO 6.								
NG	▶	Replace heated oxygen sensor 2 (rear).								
	6	CHECK INTERMITTENT INCIDENT	<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>INSPECTION END</td> </tr> </table>		▶	INSPECTION END	<p>SC</p> <p>EL</p> <p>IDX</p>			
	▶	INSPECTION END								

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

Component Inspection

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0880

NIEC0880S01

With CONSULT-II

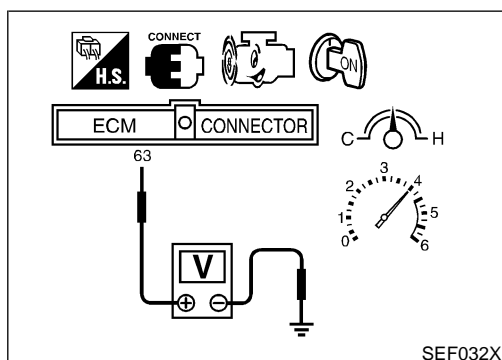
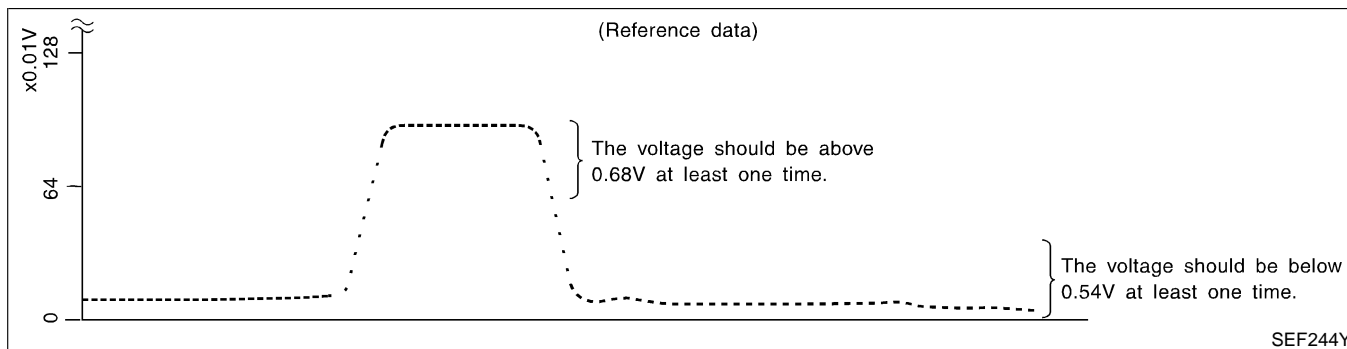
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times.

(Depress and release accelerator pedal as soon as possible.)

The voltage should be above 0.68V at least once.

If the voltage is above 0.68V at step 4, step 5 is not necessary.

- 5) Check the voltage when revving up to 6,000 rpm under no load, or keep vehicle at idle for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T).

The voltage should be below 0.54V at least once.

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

DTC P0139 HEATED OXYGEN SENSOR 2 (REAR) (RESPONSE MONITORING)

SR20DE

Component Inspection (Cont'd)

- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

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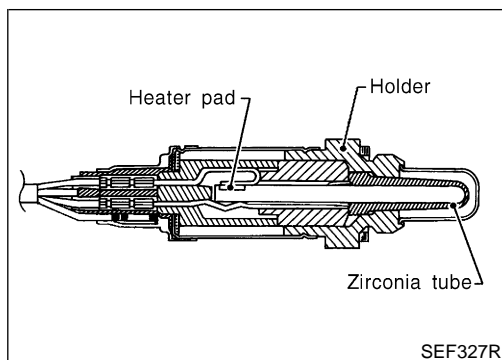
EL

IDX

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

SR20DE

Component Description



Component Description

NIEC0881

The heated oxygen sensor 2 (rear), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the heated oxygen sensor 1 (front) are shifted, the air fuel ratio is controlled to stoichiometric, by the signal from the heated oxygen sensor 2 (rear).

This sensor is made of ceramic zirconia. The zirconia generates voltage from approximately 1V in richer conditions to 0V in leaner conditions.

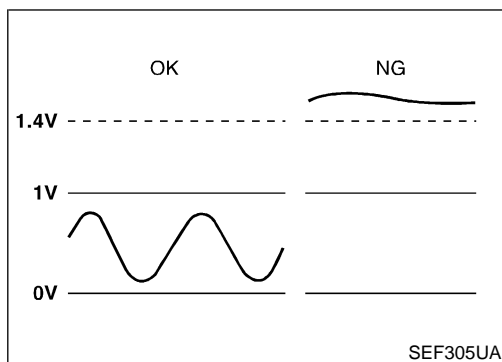
Under normal conditions the heated oxygen sensor 2 (rear) is not used for engine control operation.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0882

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 (B1)	<ul style="list-style-type: none"> Engine: After warming up Revving engine from idle to 3,000 rpm	0 - 0.3V ↔ Approx. 0.6 - 1.0V
HO2S2 MNTR (B1)		LEAN ↔ RICH



On Board Diagnosis Logic

NIEC0883

The heated oxygen sensor 2 (rear) has a much longer switching time between rich and lean than the heated oxygen sensor 1 (front). The oxygen storage capacity before the three way catalyst causes the longer switching time. To judge the malfunctions of heated oxygen sensor 2 (rear), ECM monitors whether or not the voltage is too high during various driving conditions such as fuel-cut.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0140	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Heated oxygen sensor 2 (rear)

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
B/FUEL SCHDL	XXX msec

SEF189Y

DTC Confirmation Procedure

NIEC0884

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and drive vehicle at a speed of more than 70 km/h

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

SR20DE

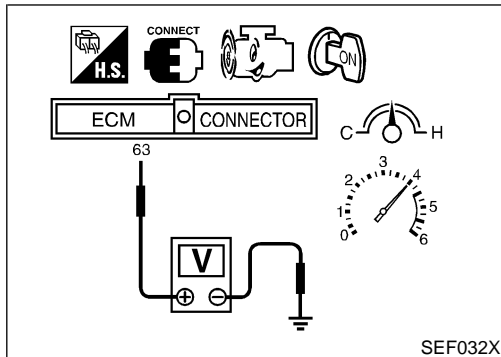
DTC Confirmation Procedure (Cont'd)

(43 MPH) for 2 consecutive minutes.

- 3) Stop vehicle with engine running.
- 4) Let engine idle for 1 minute.
- 5) Maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,400 - 3,400 rpm
VHCL SPEED SE	64 - 120 km/h (40 - 75 MPH)
B/FUEL SCHDL	0.5 - 3.9 msec
COOLAN TEMP/S	More than 70°C (158°F)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1611.



Overall Function Check

Use this procedure to check the overall function of the heated oxygen sensor 2 (rear) circuit. During this check, a 1st trip DTC might not be confirmed.

Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Check the voltage after revving up to 4,000 rpm under no load at least 10 times.
(Depress and release accelerator pedal as soon as possible.)
The voltage should be below 1.4V during this procedure.
- 5) If NG, go to "Diagnostic Procedure", EC-1611.

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

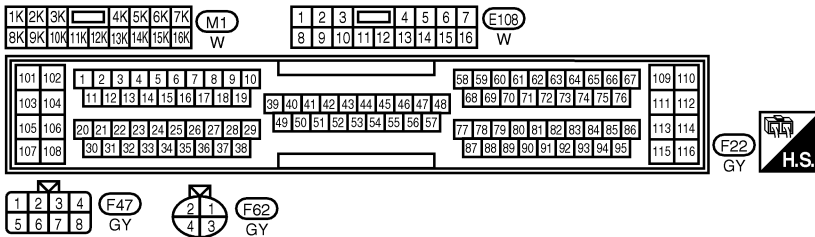
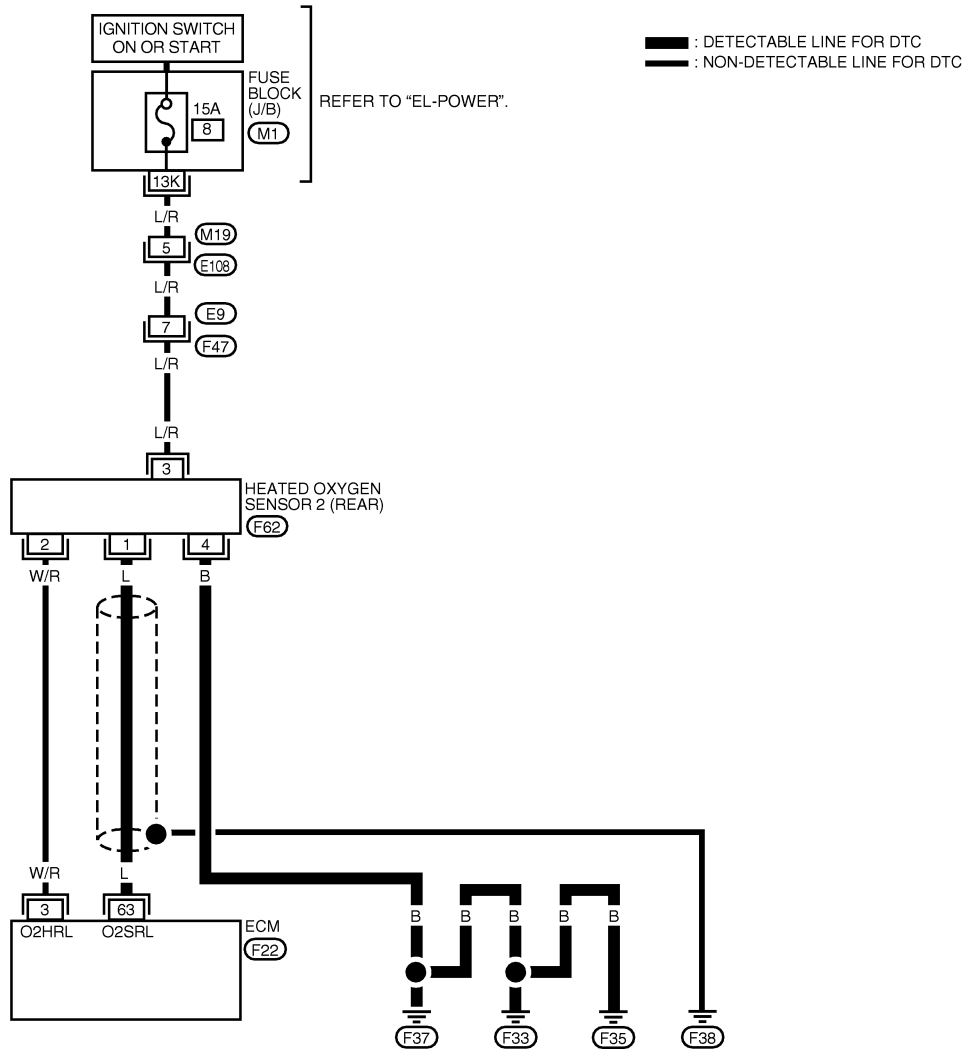
SR20DE

Wiring Diagram

Wiring Diagram

NIEC0886

EC-HO2S2-01



LEC200

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
63	L	HEATED OXYGEN SENSOR 2 (REAR)	ENGINE RUNNING FROM IDLE UP TO 2,000 RPM UNDER WARM-UP CONDITION	0 - APPROX. 1.0V

SEF569Y

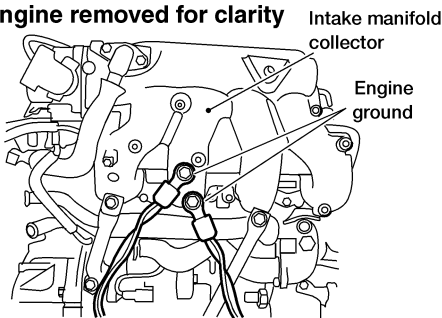
DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

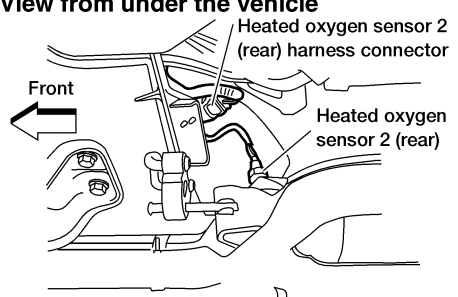
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0887

1	RETIGHTEN GROUND SCREWS	<p>1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.</p> <div style="text-align: center;"> <p>Engine removed for clarity</p>  <p>The diagram shows an engine with several ground screws. Labels include 'Intake manifold collector' and 'Engine ground'. Arrows point to specific ground screws on the engine block.</p> </div> <p style="text-align: right; font-size: small;">LEC302</p>	GI MA EM LC EC FE CL
▶ GO TO 2.			

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect heated oxygen sensor 2 (rear) harness connector and ECM harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p>  <p>The diagram shows the underside of a vehicle chassis. Labels include 'Heated oxygen sensor 2 (rear) harness connector' and 'Heated oxygen sensor 2 (rear)'. An arrow points to the 'Front' of the vehicle.</p> </div> <p style="text-align: right; font-size: small;">LEC277</p> <p>2. Check harness continuity between ECM terminal 63 and HO2S2 terminal 1. Refer to "Wiring Diagram", EC-1610. Continuity should exist.</p> <p>3. Check harness continuity between ECM terminal 63 (or HO2S2 terminal 1) and ground. Refer to "Wiring Diagram", EC-1610. Continuity should not exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	MT AT AX SU BR ST RS BT HA
OK ▶ GO TO 3.			
NG ▶ Repair open circuit or short to ground or short to power in harness or connectors.			

3	CHECK GROUND CIRCUIT	<p>1. Check harness continuity between HO2S2 terminal 4 and engine ground. Refer to "Wiring Diagram", EC-1610. Continuity should exist.</p> <p>2. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	SC EL IDX
OK ▶ GO TO 4.			
NG ▶ Repair open circuit or short to power in harness or connectors.			

DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK HARNESS CONNECTOR	
Check heated oxygen sensor 2 (rear) harness connector for water. Water should not exist.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair or replace harness connector.

5	CHECK HEATED OXYGEN SENSOR 2 (REAR)	
Refer to "Component Inspection", EC-1612.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace heated oxygen sensor 2 (rear).

6	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

ACTIVE TEST	
FUEL INJECTION	25 %
MONITOR	
ENG SPEED	XXX rpm
HO2S1 (B1)	XXX V
HO2S2 (B1)	XXX V
HO2S1 MNTR (B1)	RICH
HO2S2 MNTR (B1)	RICH

SEF662Y

Component Inspection HEATED OXYGEN SENSOR 2 (REAR)

NIEC0888

NIEC0888S01

④ With CONSULT-II

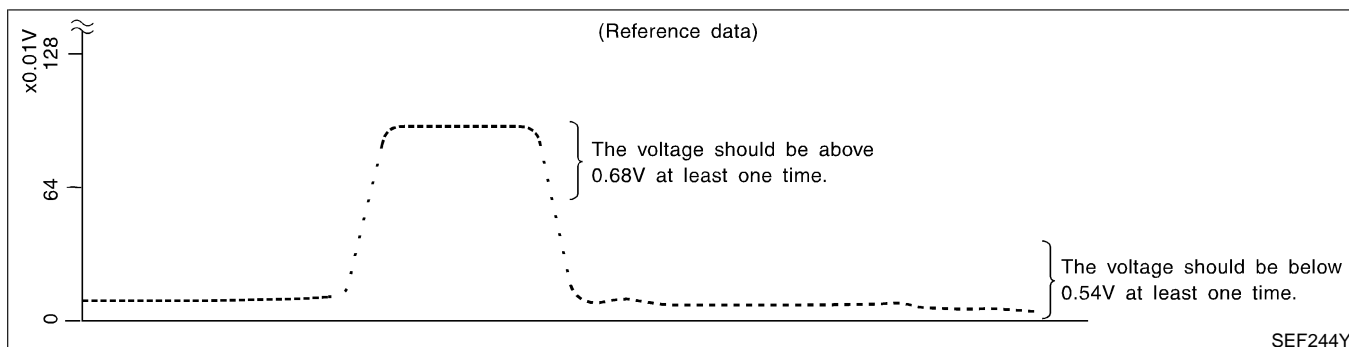
- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "HO2S2 (B1)" as the monitor item with CONSULT-II.
- 4) Check "HO2S2 (B1)" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.

"HO2S2 (B1)" should be above 0.68V at least once when the "FUEL INJECTION" is +25%.

"HO2S2 (B1)" should be below 0.54V at least once when the "FUEL INJECTION" is -25%.

CAUTION:

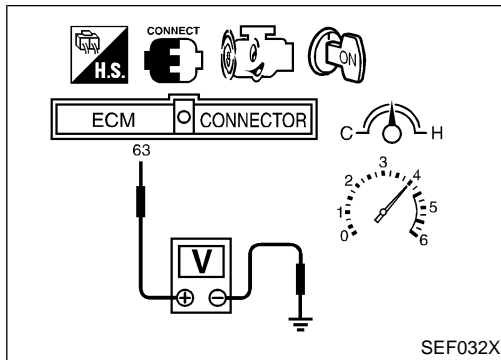
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.



DTC P0140 HEATED OXYGEN SENSOR 2 (REAR) (HIGH VOLTAGE)

SR20DE

Component Inspection (Cont'd)



⊗ Without CONSULT-II

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes. GI
- 2) Stop vehicle with engine running.
- 3) Set voltmeter probes between ECM terminals 63 [Heated oxygen sensor 2 (rear) signal] and engine ground. MA
- 4) Check the voltage when revving up to 4,000 rpm under no load at least 10 times. EM
(Depress and release accelerator pedal as soon as possible.)
The voltage should be above 0.68V at least once.
If the voltage is above 0.68V at step 4, step 5 is not necessary. LC
- 5) Check the voltage when revving up to 6,000 rpm under no load. Or keep vehicle at idling for 10 minutes, then check the voltage. Or check the voltage when coasting from 80 km/h (50 MPH) in 3rd gear position (M/T), D position with "OD" OFF (A/T). EC
The voltage should be below 0.54V at least once. FE

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. CL
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant. MT
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DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

SR20DE

Description

Description

NIEC0889

SYSTEM DESCRIPTION

NIEC0889S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Heated oxygen sensor 2 heater (rear) control	Heated oxygen sensor 2 heater (rear)

The ECM performs ON/OFF control of the heated oxygen sensor 2 heater (rear) corresponding to the engine speed.

OPERATION

NIEC0889S02

Engine speed rpm	Heated oxygen sensor 2 (rear) heater
Above 3,600	OFF
Below 3,600	ON

CONSULT-II Reference Value in Data Monitor Mode

NIEC0890

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
HO2S2 HTR (B1)	<ul style="list-style-type: none">Ignition switch: ON (Engine stopped)Engine speed: Above 3,600 rpm	OFF
	<ul style="list-style-type: none">Engine speed: Below 3,600 rpm [After driving for 2 minutes at a speed of 70 km/h (43 MPH) or more]	ON

On Board Diagnosis Logic

NIEC0891

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0141	<ul style="list-style-type: none">The current amperage in the heated oxygen sensor 2 heater (rear) circuit is out of the normal range. [An improper voltage drop signal is sent to ECM through the heated oxygen sensor 2 heater (rear).]	<ul style="list-style-type: none">Harness or connectors [The heated oxygen sensor 2 heater (rear) circuit is open or shorted.]Heated oxygen sensor 2 heater (rear)

DTC Confirmation Procedure

NIEC0892

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is in between 10.5V and 16V at idle.

DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

SR20DE

DTC Confirmation Procedure (Cont'd)

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V

SEF175Y

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 3) Stop vehicle and let engine idle for at least 6 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1617.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle and let engine idle for at least 6 seconds.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 5) Stop vehicle and let engine idle for at least 6 seconds.
- 6) Select "MODE 3" with GST.
- 7) If DTC is detected, go to "Diagnostic Procedure", EC-1617.

When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

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DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

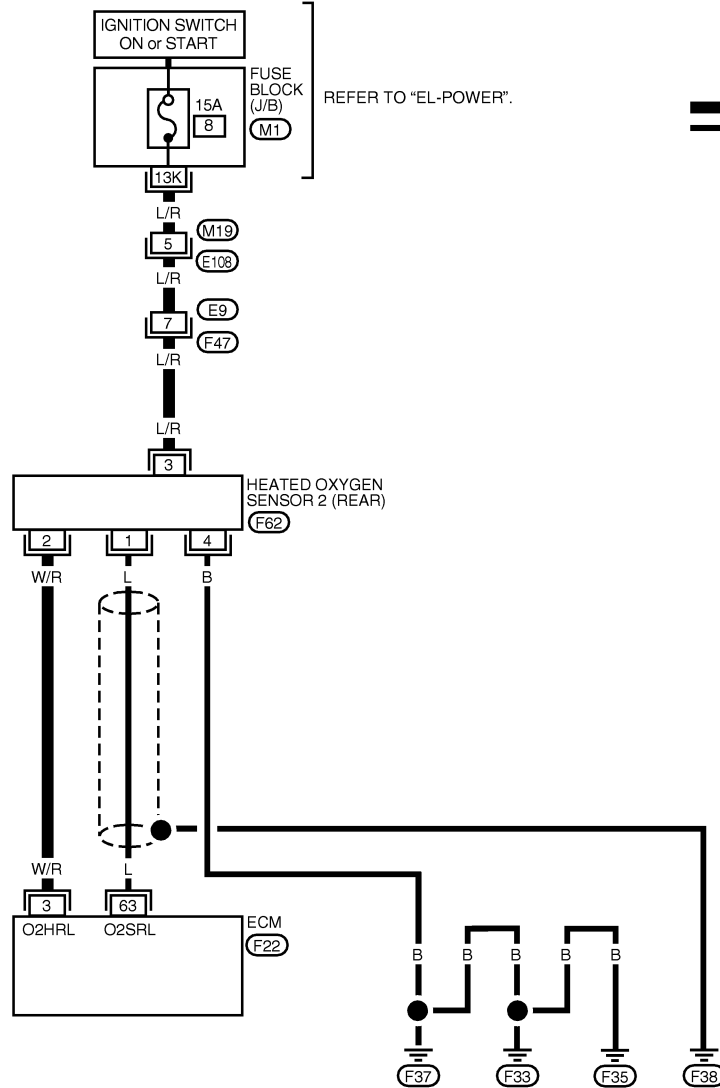
SR20DE

Wiring Diagram

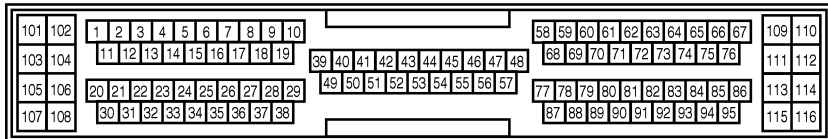
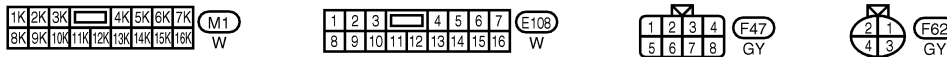
Wiring Diagram

NIEC0893

EC-HO2S2H-01



— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



LEC201

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
3	W/R	HEATED OXYGEN SENSOR 2 HEATER (REAR)	IGN ON	BATTERY VOLTAGE
			ENGINE RUNNING ABOVE 3,600 RPM	
			ENGINE RUNNING BELOW 3,600 RPM AFTER DRIVING FOR 2 MINUTES AT A SPEED OF 70 KM/H (43 MPH) OR MORE	0 - 1.0V

SEF570YA

Diagnostic Procedure

NIEC0894

1	CHECK POWER SUPPLY		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect heated oxygen sensor 2 (rear) harness connector.</p> <div style="text-align: center;"> <p>View from under the vehicle</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p>EC</p> <p>LEC277</p>
		<p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between HO2S2 terminal 3 and ground.</p> <div style="text-align: center;"> <p>Voltage: Battery voltage</p> </div>	<p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p> <p>SEF314X</p>
		OK or NG	
	OK	▶ GO TO 3.	<p>SU</p>
	NG	▶ GO TO 2.	<p>BR</p>

2	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M19, E108 ● Harness or connectors E9, F47 ● Fuse block (J/B) connector M1 ● 15A fuse ● Harness for open or short between heated oxygen sensor 2 (rear) and fuse 	<p>ST</p> <p>RS</p>
		▶ Repair harness or connectors.	<p>BT</p>

3	CHECK OUTPUT SIGNAL CIRCUIT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between HO2S2 terminal 2 and ECM terminal 3. Refer to "Wiring Diagram", EC-1616.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p>	<p>HA</p> <p>SC</p> <p>EL</p>
		OK or NG	<p>IDX</p>
	OK	▶ GO TO 4.	
	NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.	

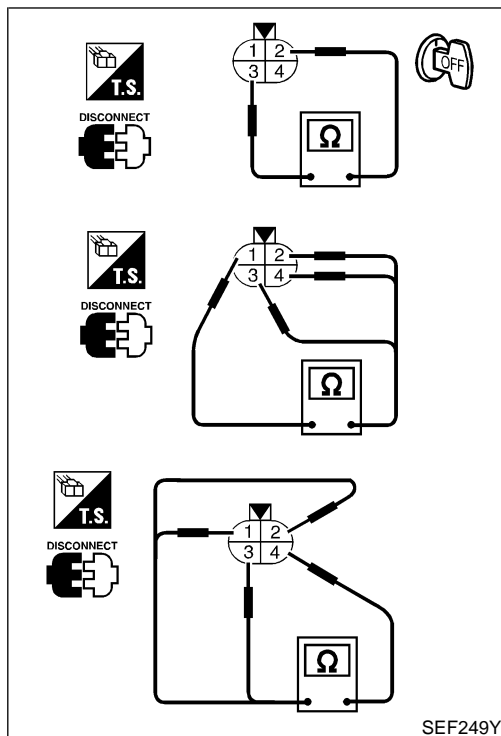
DTC P0141 HEATED OXYGEN SENSOR 2 HEATER (REAR)

SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK HEATED OXYGEN SENSOR 2 HEATER (REAR)	
Refer to "Component Inspection", EC-1618.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace heated oxygen sensor 2 (rear).

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END



Component Inspection

HEATED OXYGEN SENSOR 2 HEATER (REAR)

NIEC0895

NIEC0895S01

Check the following.

1. Check resistance between terminals 2 and 3.
Resistance: 2.3 - 4.3Ω at 25°C (77°F)
2. Check continuity.

Terminal No.	Continuity
1 and 2, 3, 4	No
4 and 1, 2, 3	

If NG, replace the heated oxygen sensor 2 (rear).

CAUTION:

- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.
- Before installing new oxygen sensor, clean exhaust system threads using Oxygen Sensor Thread Cleaner tool J-43897-18 or J-43897-12 and approved anti-seize lubricant.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0896

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too lean.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0171	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too lean.) 	<ul style="list-style-type: none"> Intake air leaks Heated oxygen sensor 1 (front) Injectors Exhaust gas leaks Incorrect fuel pressure Lack of fuel Mass air flow sensor

4

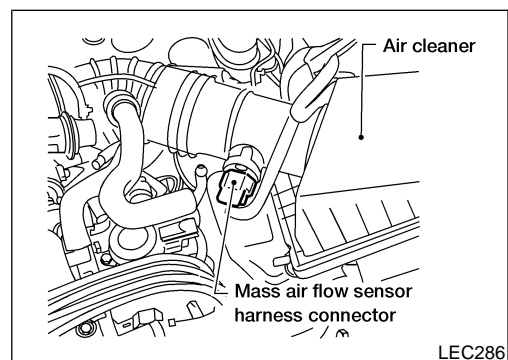
WORK SUPPORT	
SELF-LEARNING CONT	B1 100%
CLEAR	

SEF215Z

6

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y



DTC Confirmation Procedure

NIEC0897

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-1622.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-1622. If engine does not start, visually check for exhaust and intake air leak.

Ⓜ With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0171 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-1622.
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction.
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-1622. If engine does not start, visually check for exhaust and intake air leak.

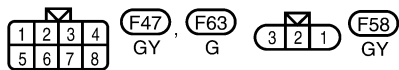
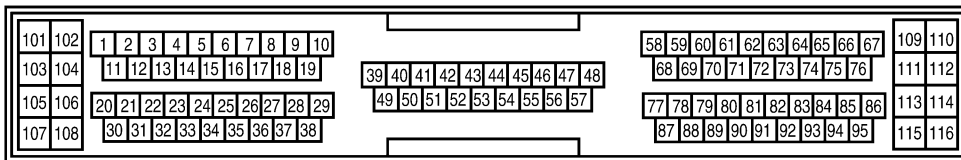
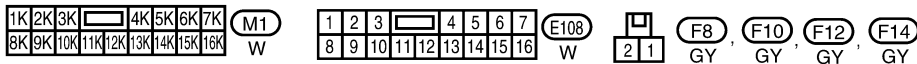
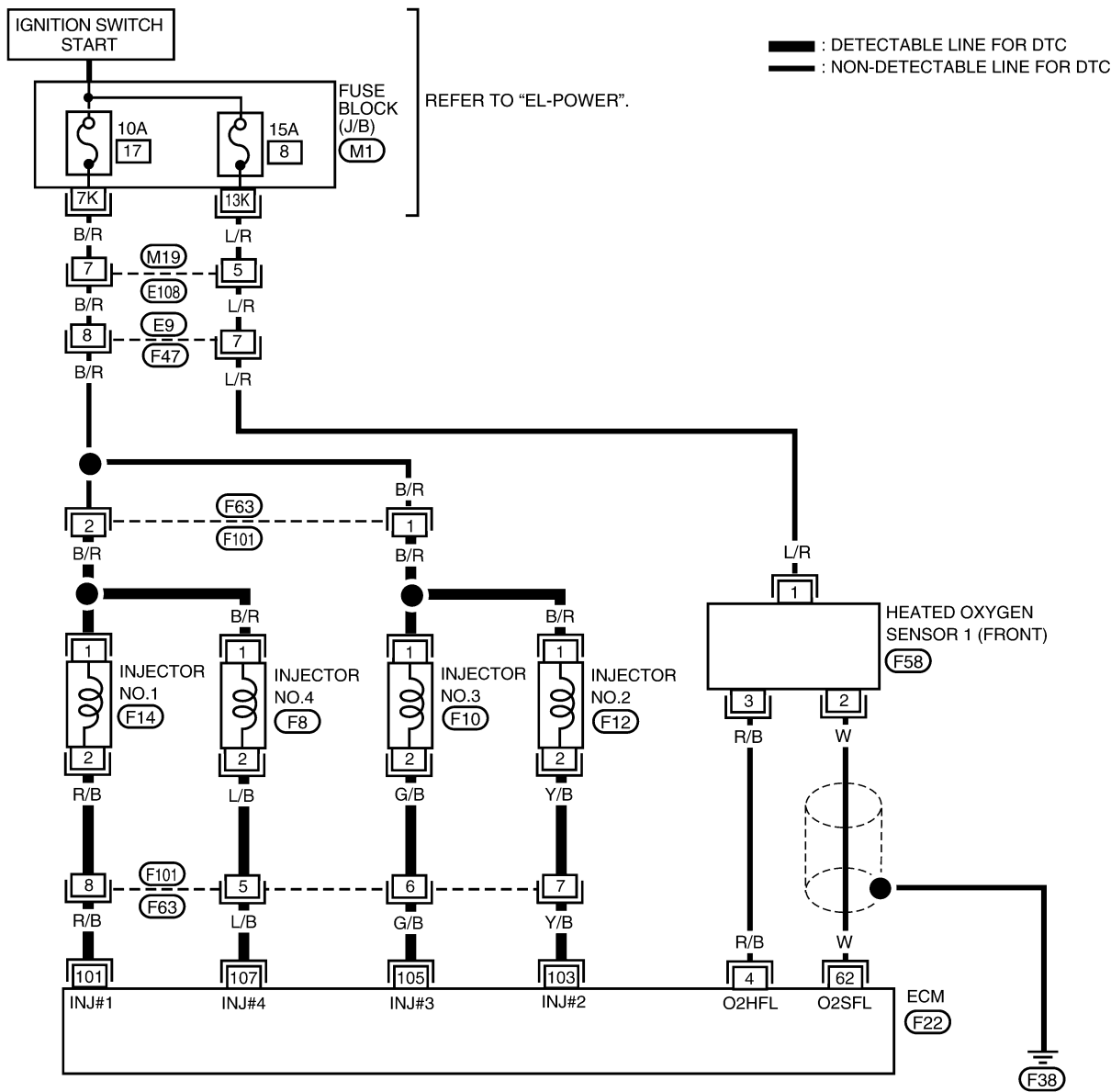
DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE
Wiring Diagram

Wiring Diagram

NIEC0898

EC-FUEL-01



WEC584

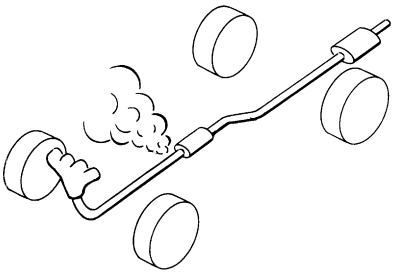
DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

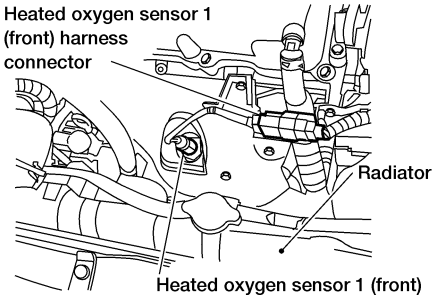
Diagnostic Procedure

Diagnostic Procedure

NIEC0899

1	CHECK EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before three way catalyst.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

2	CHECK FOR INTAKE AIR LEAK	
Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

3	CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p>		
		
LEC274		
<p>3. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to "Wiring Diagram", EC-1621. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to "Wiring Diagram", EC-1621. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

Diagnostic Procedure (Cont'd)



4	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-1403.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="padding-left: 20px;">At idling:</p> <p style="padding-left: 40px;">When fuel pressure regulator valve vacuum hose is connected. 235 kPa (2.4 kg/cm², 34 psi)</p> <p style="padding-left: 40px;">When fuel pressure regulator valve vacuum hose is disconnected. 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

GI
MA
EM
LC

EC

5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to EC-1914. ● Fuel pressure regulator Refer to EC-1404. ● Fuel lines. Refer to MA-19, "Checking Fuel Lines". ● Fuel filter for clogging 		
	▶	Repair or replace.

FE
CL
MT

6	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="padding-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="padding-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="padding-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-1507.

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DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

Diagnostic Procedure (Cont'd)

7 CHECK FUNCTION OF INJECTORS

④ With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

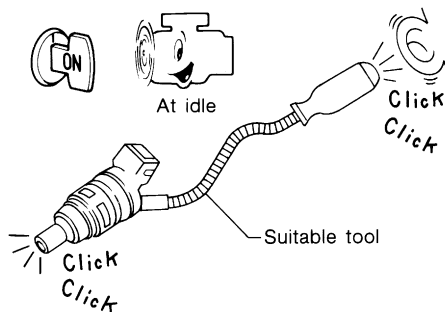
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

⊗ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 8.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-1905.

8 REMOVE INJECTOR

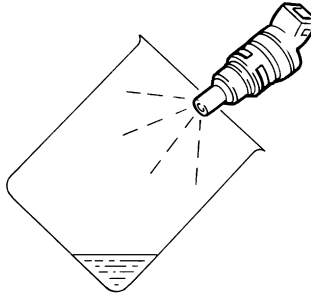
1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector with fuel tube assembly. Refer to EC-1404.
Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors should remain connected.

	▶	GO TO 9.
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DTC P0171 FUEL INJECTION SYSTEM FUNCTION (LEAN SIDE)

SR20DE

Diagnostic Procedure (Cont'd)

9	CHECK INJECTOR	
<p>1. Disconnect all ignition wires. 2. Place pans or saucers under each injector. 3. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.</p>		
		
<p>Fuel should be sprayed evenly for each cylinder.</p> <p>OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace injectors from which fuel does not spray out. Always replace O-ring with new one.

SEF595Q

10	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶ INSPECTION END		

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DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

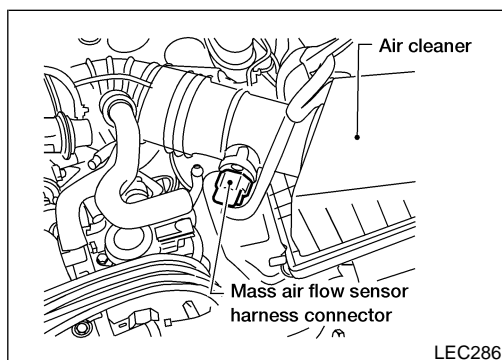
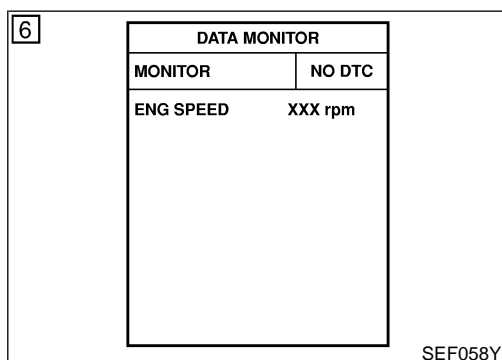
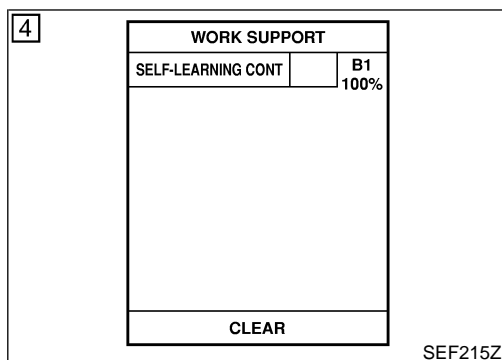
NIEC0900

With the Air/Fuel Mixture Ratio Self-Learning Control, the actual mixture ratio can be brought closely to the theoretical mixture ratio based on the mixture ratio feedback signal from the heated oxygen sensor 1 (front). The ECM calculates the necessary compensation to correct the offset between the actual and the theoretical ratios.

In case the amount of the compensation value is extremely large (The actual mixture ratio is too rich.), the ECM judges the condition as the fuel injection system malfunction and lights up the MIL (2 trip detection logic).

Sensor	Input Signal to ECM	ECM function	Actuator
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)	Fuel injection & mixture ratio control	Injectors

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0172	<ul style="list-style-type: none"> Fuel injection system does not operate properly. The amount of mixture ratio compensation is too large. (The mixture ratio is too rich.) 	<ul style="list-style-type: none"> Heated oxygen sensor 1 (front) Injectors Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor



DTC Confirmation Procedure

NIEC0901

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Turn ignition switch "ON" and select "SELF-LEARNING CONT" in "WORK SUPPORT" mode with CONSULT-II.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT-II.
- Start engine again and let it idle for at least 10 minutes. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-1629.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction.
- Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-1629. If engine does not start, remove ignition plugs and check for fouling, etc.

With GST

- Start engine and warm it up to normal operating temperature.
- Turn ignition switch "OFF" and wait at least 10 seconds.
- Disconnect mass air flow sensor harness connector. Then restart and run engine for at least 3 seconds at idle speed.
- Stop engine and reconnect mass air flow sensor harness connector.
- Select "MODE 7" with GST. Make sure 1st trip DTC P0100 is detected.
- Select "MODE 4" with GST and erase the 1st trip DTC P0100.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

DTC Confirmation Procedure (Cont'd)

- 7) Start engine again and run it for at least 10 minutes at idle speed.
- 8) Select "MODE 7" with GST. The 1st trip DTC P0172 should be detected at this stage, if a malfunction exists. If so, go to "Diagnostic Procedure", EC-1629. GI
- 9) If it is difficult to start engine at step 8, the fuel injection system has a malfunction. MA
- 10) Crank engine while depressing accelerator pedal. If engine starts, go to "Diagnostic Procedure", EC-1629. If engine does not start, remove ignition plugs and check for fouling, etc. EM

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DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

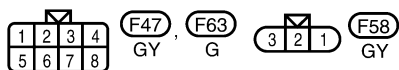
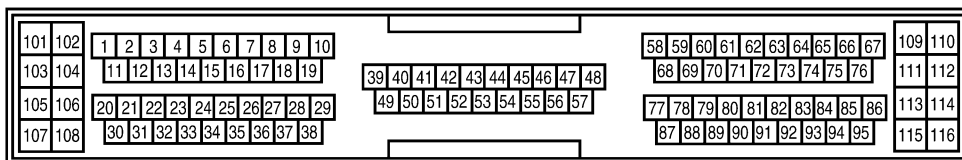
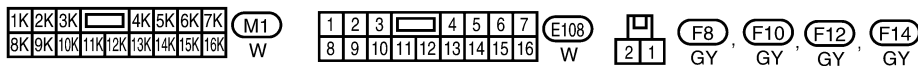
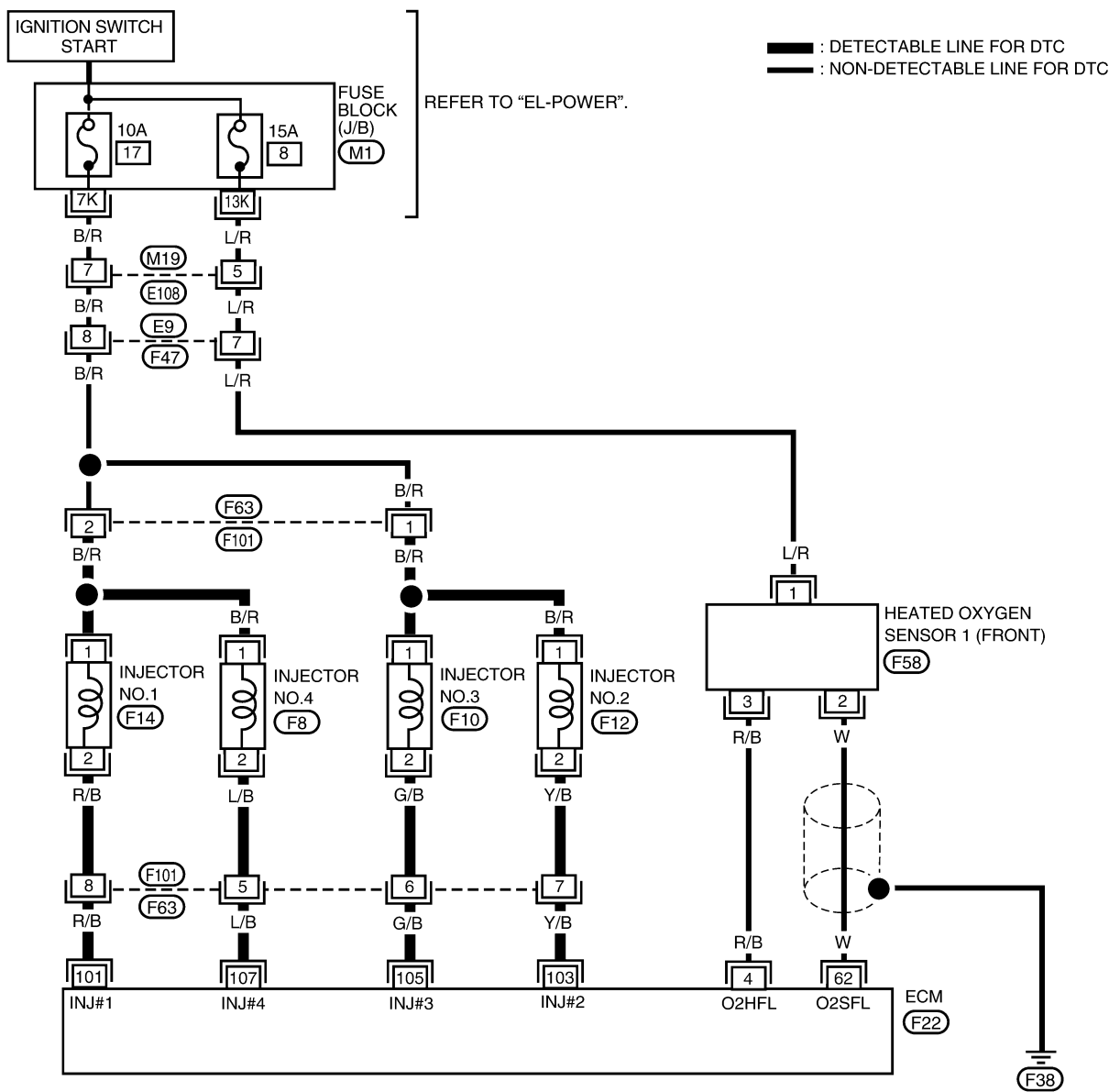
SR20DE

Wiring Diagram

Wiring Diagram

NIEC0902

EC-FUEL-01



WEC584

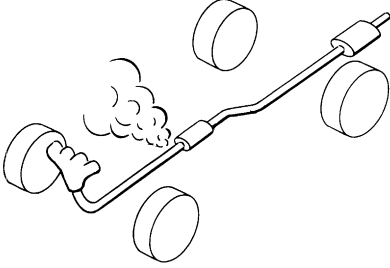
DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

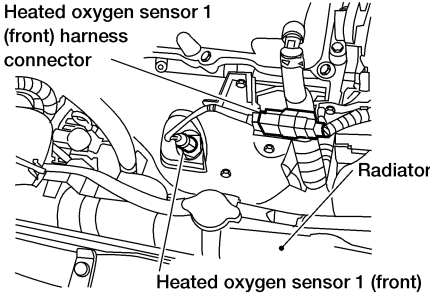
Diagnostic Procedure

Diagnostic Procedure

NIEC0903

1	CHECK FOR EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before the three way catalyst.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF099P</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

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2	CHECK HEATED OXYGEN SENSOR 1 (FRONT) CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect heated oxygen sensor 1 (front) harness connector and ECM harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC274</p> <p>3. Check harness continuity between ECM terminal 62 and HO2S1 terminal 2. Refer to "Wiring Diagram", EC-1628. Continuity should exist.</p> <p>4. Check harness continuity between ECM terminal 62 (or HO2S1 terminal 2) and ground. Refer to "Wiring Diagram", EC-1628. Continuity should not exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.



DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK FUEL PRESSURE	
<p>1. Release fuel pressure to zero. Refer to EC-1403.</p> <p>2. Install fuel pressure gauge and check fuel pressure.</p> <p style="margin-left: 20px;">At idling:</p> <p style="margin-left: 40px;">When fuel pressure regulator valve vacuum hose is connected. Approximately 235 kPa (2.4 kg/cm², 34 psi)</p> <p style="margin-left: 40px;">When fuel pressure regulator valve vacuum hose is disconnected. Approximately 294 kPa (3.0 kg/cm², 43 psi)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Fuel pump and circuit (Refer to EC-1914.) ● Fuel pressure regulator (Refer to EC-1404.) 		
▶		Repair or replace.

5	CHECK MASS AIR FLOW SENSOR	
<p> With CONSULT-II</p> <p>1. Install all removed parts.</p> <p>2. Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II.</p> <p style="margin-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p>		
<p> With GST</p> <p>1. Install all removed parts.</p> <p>2. Check mass air flow sensor signal in MODE 1 with GST.</p> <p style="margin-left: 20px;">at idling: 2.5 - 5.0 g-m/sec</p> <p style="margin-left: 20px;">at 2,500 rpm: 7.1 - 12.5 g-m/sec</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-1507.

DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

Diagnostic Procedure (Cont'd)

6 CHECK FUNCTION OF INJECTORS

☑ With CONSULT-II

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II.

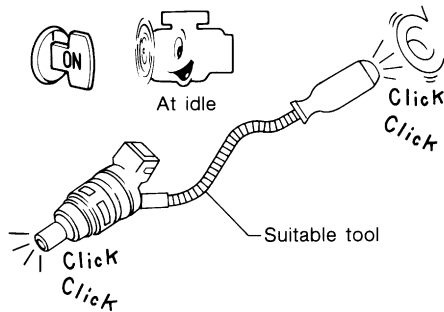
ACTIVE TEST	
POWER BALANCE	
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE-B1	XXX V
IACV-AAC/V	XXX step

SEF190Y

3. Make sure that each circuit produces a momentary engine speed drop.

☒ Without CONSULT-II

1. Start engine.
2. Listen to each injector operating sound.



MEC703B

Clicking noise should be heard.

OK or NG

OK	▶	GO TO 7.
NG	▶	Perform trouble diagnosis for "INJECTORS", EC-1906.

7 REMOVE INJECTOR

1. Confirm that the engine is cooled down and there are no fire hazards near the vehicle.
2. Turn ignition switch "OFF".
3. Remove injector assembly. Refer to EC-1404.
Keep fuel hose and all injectors connected to injector gallery.

▶ GO TO 8.

8 CHECK INJECTOR

1. Disconnect all injector harness connectors.
2. Disconnect all ignition wires.
3. Place pans or saucers under each injector.
4. Crank engine for about 3 seconds.
Make sure fuel does not drip from injector.

OK or NG

OK (Does not drip)	▶	GO TO 9.
NG (Drips)	▶	Replace the injectors from which fuel is dripping. Always replace O-ring with new one.

GI
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DTC P0172 FUEL INJECTION SYSTEM FUNCTION (RICH SIDE)

SR20DE

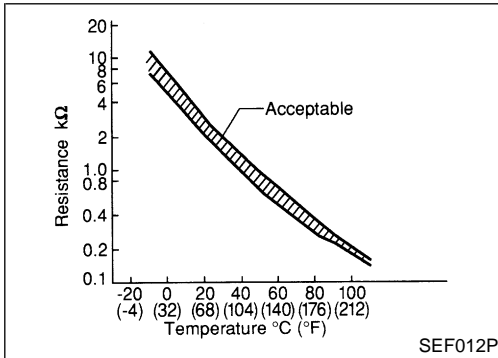
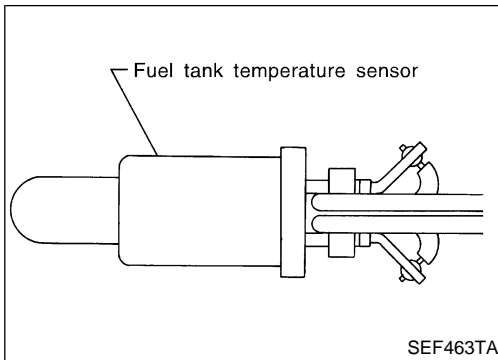
Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

DTC P0180 FUEL TANK TEMPERATURE SENSOR

SR20DE

Component Description



Component Description

NIEC0904

The fuel tank temperature sensor is used to detect the fuel temperature inside the fuel tank. The sensor modifies a voltage signal from the ECM. The modified signal returns to the ECM as the fuel temperature input. The sensor uses a thermistor which is sensitive to the change in temperature. The electrical resistance of the thermistor decreases as temperature increases.

GI
MA
EM
LC

<Reference data>

Fluid temperature °C (°F)	Voltage* V	Resistance kΩ
20 (68)	3.5	2.3 - 2.7
50 (122)	2.2	0.79 - 0.90

EC

FE

*: These data are reference values and are measured between ECM terminal 82 (Fuel tank temperature sensor) and ground.

CL

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

MT

AT

AX

SU

BR

On Board Diagnosis Logic

NIEC0905

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0180	<ul style="list-style-type: none"> An excessively high or low voltage is sent to ECM. Rationally incorrect voltage is sent to ECM, compared with the voltage signals from engine coolant temperature sensor and intake air temperature sensor. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Fuel tank temperature sensor

ST

RS

BT

HA

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

NIEC0906

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

SC

EL

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1636.

IDX

DTC P0180 FUEL TANK TEMPERATURE SENSOR

SR20DE

DTC Confirmation Procedure (Cont'd)

If the result is OK, go to following step.

- 4) Check "COOLAN TEMP/S" signal.
If the signal is less than 60°C (140°F), the result will be OK.
If the signal is above 60°C (140°F), go to the following step.
- 5) Cool engine down until "COOLAN TEMP/S" signal is less than 60°C (140°F).
- 6) Wait at least 10 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1636.



With GST

Follow the procedure "With CONSULT-II" above.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

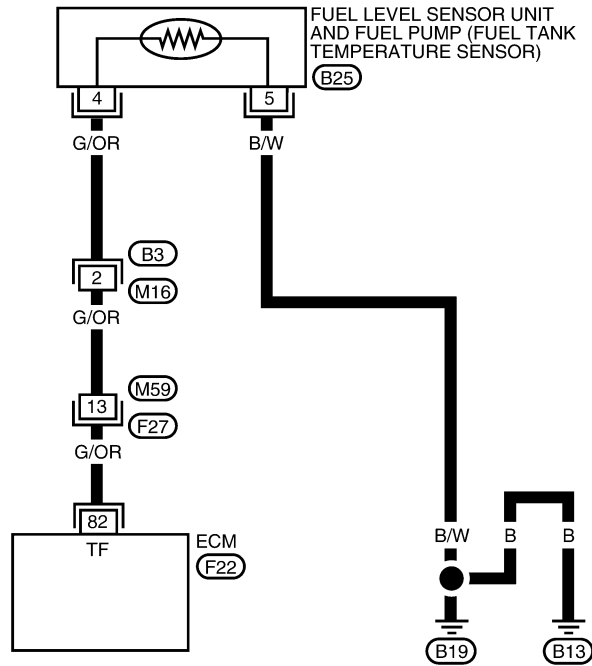
SR20DE
Wiring Diagram

Wiring Diagram

NIEC0907

EC-FTTS-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



1	2	3	4	5	6	7	8	9	(B3)		
10	11	12	13	14	15	16	17	18	19	20	W

(B25)	5	4	3	2	1	GY
-------	---	---	---	---	---	----

101	102	1	2	3	4	5	6	7	8	9	10									58	59	60	61	62	63	64	65	66	67	109	110												
103	104	11	12	13	14	15	16	17	18	19										39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112			
105	106	20	21	22	23	24	25	26	27	28	29									49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114			
107	108	30	31	32	33	34	35	36	37	38																																115	116

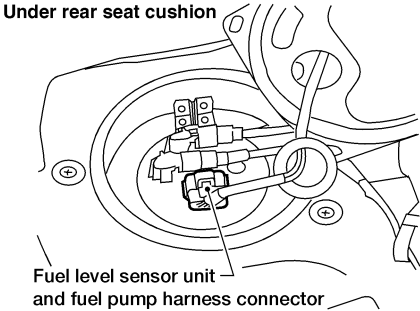
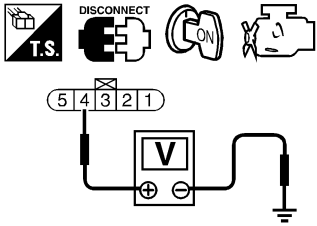


1	2	3	4	5	6	7	(F27)		
8	9	10	11	12	13	14	15	16	BR

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Diagnostic Procedure

NIEC0908

1	CHECK POWER SUPPLY		
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector.</p> <div style="text-align: center;"> <p>Under rear seat cushion</p>  <p>Fuel level sensor unit and fuel pump harness connector</p> </div> <p style="text-align: right;"><small>LEC304</small></p> <p>3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit and fuel pump terminal 4 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Voltage: Approximately 5V</p> </div> <p style="text-align: right;"><small>SEF586X</small></p> <p style="text-align: center;">OK or NG</p>			
OK		▶	GO TO 3.
NG		▶	GO TO 2.

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connectors M59, F27 ● Harness for open or short between ECM and fuel level sensor unit and fuel pump 			
		▶	Repair harness or connector.

3	CHECK GROUND CIRCUIT		
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit and fuel pump terminal 5 and body ground. Refer to "Wiring Diagram", EC-1635. Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>			
OK		▶	GO TO 4.
NG		▶	Repair open circuit or short to power in harness or connectors.

DTC P0180 FUEL TANK TEMPERATURE SENSOR

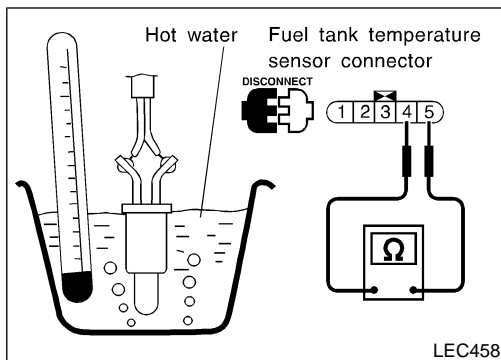
SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK FUEL TANK TEMPERATURE SENSOR	
Refer to "Component Inspection", EC-1637.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel tank temperature sensor.

5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END

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Component Inspection

FUEL TANK TEMPERATURE SENSOR

NIEC0909

NIEC0909S01

Check resistance by heating with hot water or heat gun as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace fuel tank temperature sensor.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

System Description

System Description

NIEC0910

COOLING FAN CONTROL

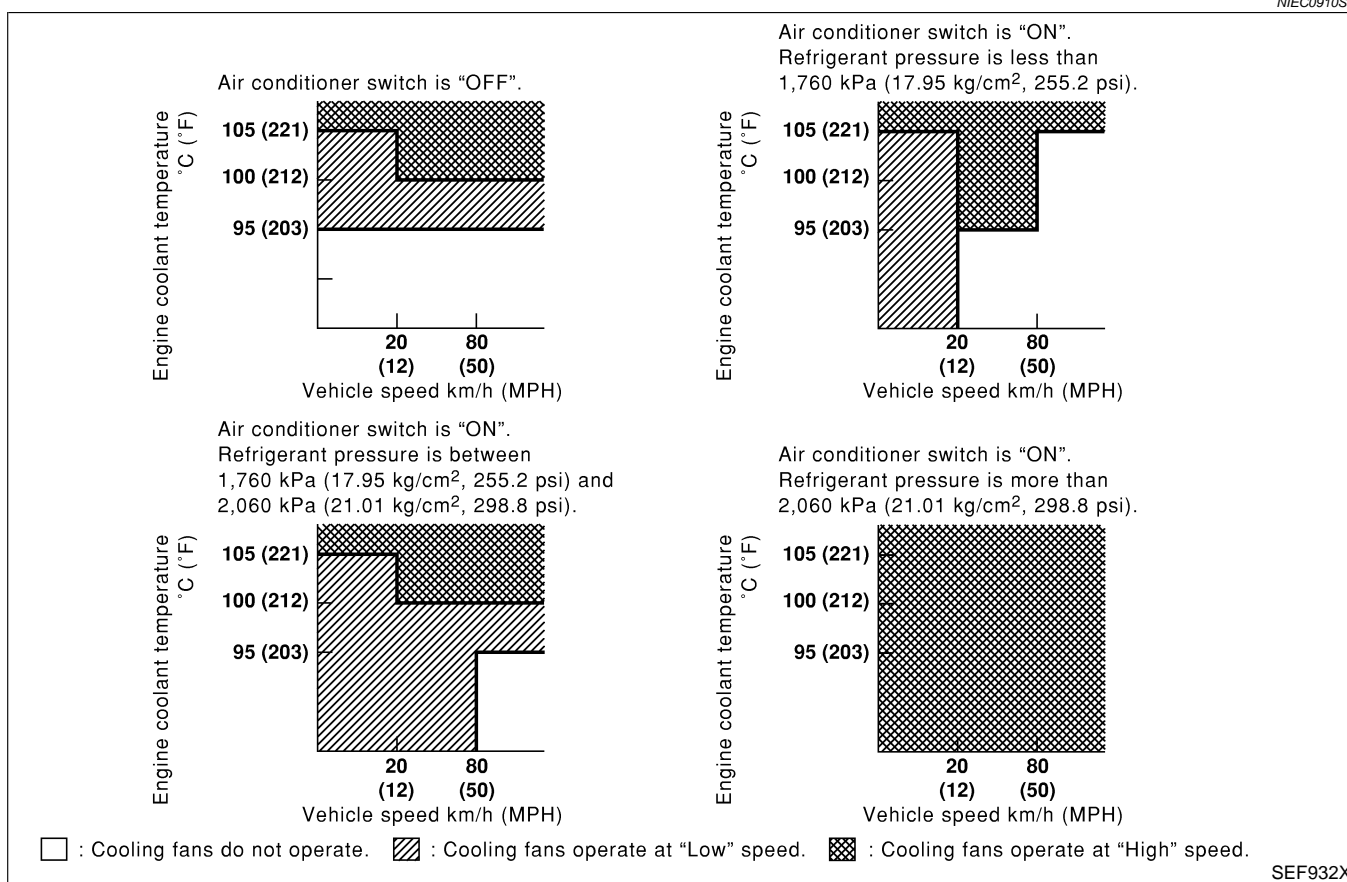
NIEC0910S01

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	Cooling fan control	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC0910S02



SEF932X

CONSULT-II Reference Value in Data Monitor Mode

NIEC0911

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	• Engine: After warming up, idle the engine	Air conditioner switch: OFF
		Air conditioner switch: ON (Compressor operates)

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION	SPECIFICATION
COOLING FAN	Engine coolant temperature is below 95°C (203°F)	OFF
	● After warming up engine, idle the engine. ● Air conditioner switch: OFF Engine coolant temperature is between 95°C (203°F) and 105°C (221°F)	LOW
	Engine coolant temperature is above 105°C (221°F)	HIGH

GI

MA

EM

LC

On Board Diagnosis Logic

NIEC0912

This diagnosis checks whether the engine coolant temperature is extraordinary high, even when the load is not heavy. When malfunction is detected, the malfunction indicator lamp (MIL) will light up even in the first trip. Malfunction is detected when engine coolant temperature is excessively high under normal engine speed.

EC

FE

CL

MT

Possible Cause

NIEC0913

- Harness or connectors (The cooling fan circuit is open or shorted)
- Cooling fan
- Thermostat
- Improper ignition timing
- Engine coolant temperature sensor
- Blocked radiator
- Blocked front end (Improper fitting of nose mask)
- Crushed vehicle frontal area (Vehicle damage from a collision but not repaired)
- Blocked air passage by improper installation of front fog lamp or fog lamps.
- Improper mixture ratio of coolant
- Damaged bumper

AT

AX

SU

BR

ST

RS

For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-1655.

BT

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-17, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-20, "Changing Engine Oil".

HA

- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-15, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.

SC

EL

IDX

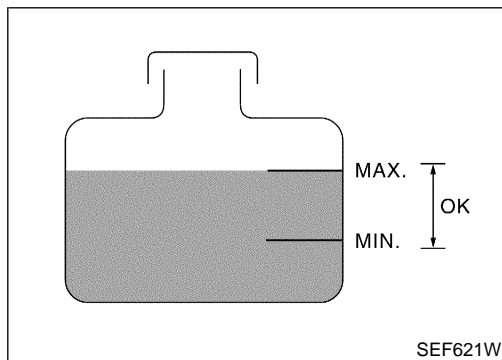
Overall Function Check

Use this procedure to check the overall function of the coolant overtemperature enrichment protection check, a DTC might not be confirmed. NIEC0914

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high-pressure fluid escaping from the radiator.

Wrap a thick cloth around the cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.



WITH CONSULT-II

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NIEC0914S01

Allow engine to cool before checking coolant level and mixture ratio.

- If the coolant level in the reservoir and/or radiator is below the proper range, go to “Diagnostic Procedure”, EC-1644.
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, “Changing Engine Coolant”.
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, “Anti-freeze Coolant Mixture Ratio”.
 - b) After refilling coolant, run engine to ensure that no water-flow noise is emitted.
 - c) After checking or replacing coolant, go to step 3 below.
- 2) Ask the customer if engine coolant has been added. If it has been added, go to “Diagnostic Procedure”, EC-1644. After repair, go to the next step.
 - 3) Start engine and let it idle.
 - 4) Make sure that A/C switch is “OFF” and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-19**, “TROUBLE DIAGNOSES”. After repair, go to the next step.
 - 5) Perform “ENG COOLANT TEMP” in “ACTIVE TEST” mode with CONSULT-II at idle.
 - a) Set “ENG COOLANT TEMP” to 95°C (203°F) and make sure that cooling fan operates at low speed. If NG, go to “Diagnostic Procedure”, EC-1644.
 - b) Set “ENG COOLANT TEMP” to 105°C (221°F) and make sure that cooling fan operates at high speed. If NG, go to “Diagnostic Procedure”, EC-1644. After repair, go to the next step.
 - 6) Check for blocked coolant passage.
 - a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows. If NG, go to “Diagnostic Procedure”, EC-1644. After repair, go to the next step.

Be extremely careful not to touch any moving or adjacent parts.
 - 7) Check for blocked radiator air passage.
 - a) When market fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator.
 - b) Check the front end for clogging caused by insects or debris.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Overall Function Check (Cont'd)

- c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step. GI
- 8) Check function of ECT sensor.
Refer to step 7 of "Diagnostic Procedure", EC-1644.
If NG, replace ECT sensor and go to the next step. MA
- 9) Check ignition timing. Refer to basic inspection, EC-1461.
Make sure that ignition timing is $15^{\circ}\pm 2^{\circ}$ at idle.
If NG, adjust ignition timing and then recheck. EM

WITH GST

- 1) Check the coolant level and mixture ratio (using coolant tester) in the reservoir tank and radiator. NIEC0914S02 LC
Allow engine to cool before checking coolant level and mixture ratio.
 - If the coolant level in the reservoir and/or radiator is below the proper range, and go to "Diagnostic Procedure", EC-1644. EC
 - If the coolant mixture ratio is out of the range of 45 to 55%, replace the coolant in the following procedure **MA-17**, "Changing Engine Coolant". FE
- a) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant from a kettle. Be sure to use coolant with the proper mixture ratio. Refer to **MA-15**, "Anti-freeze Coolant Mixture Ratio". CL
- b) After refilling coolant, run engine to ensure that no water-flow noise is emitted. MT
- c) After checking or replacing coolant, go to step 3 below. AT
- 2) Ask the customer if engine coolant has been added. If it has been added, go to "Diagnostic Procedure", EC-1644. After repair, go to the next step. AX
- 3) Start engine and let it idle. SU
- 4) Make sure that A/C switch is "OFF" and air conditioner is not operating. If NG, check air conditioner circuit. Refer to **HA-19**, "TROUBLE DIAGNOSES". After repair, go to the next step. BR
- 5) Turn ignition switch "OFF" ST
- 6) Disconnect engine coolant temperature sensor harness connector. RS
- 7) Connect 150Ω resistor to engine coolant temperature sensor. RS
- 8) Start engine and make sure that cooling fan operates.
Be careful not to overheat engine.
If NG, go to "Diagnostic Procedure", EC-1644. After repair, go to the next step. BT
- 9) Check for blocked coolant passage. HA
- a) Warm up engine to normal operating temperature, then grasp radiator upper hose and lower hose and make sure that coolant flows.
If NG, go to "Diagnostic Procedure", EC-1644. After repair, go to the next step. SC
- Be extremely careful not to touch any moving or adjacent parts.** EL
- 10) Check for blocked radiator air passage. ID
 - a) When aftermarket fog lamps have been installed, check for damaged fans and clogging in the condenser and radiator. IDX
 - b) Check the front end for clogging caused by insects or debris.
 - c) Check for improper fitting of front-end cover, damaged radiator grille or bumper, damaged vehicle front.
If NG, take appropriate action and then go to the next step.

EC-1641

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Overall Function Check (Cont'd)

- 11) Check function of ECT sensor.
Refer to step 6 of "Diagnostic Procedure", EC-1644.
If NG, replace ECT sensor and go to the next step.
- 12) Check ignition timing. Refer to basic inspection, EC-1461.
Make sure that ignition timing is $15^{\circ} \pm 2^{\circ}$ at idle.
If NG, adjust ignition timing and then recheck.

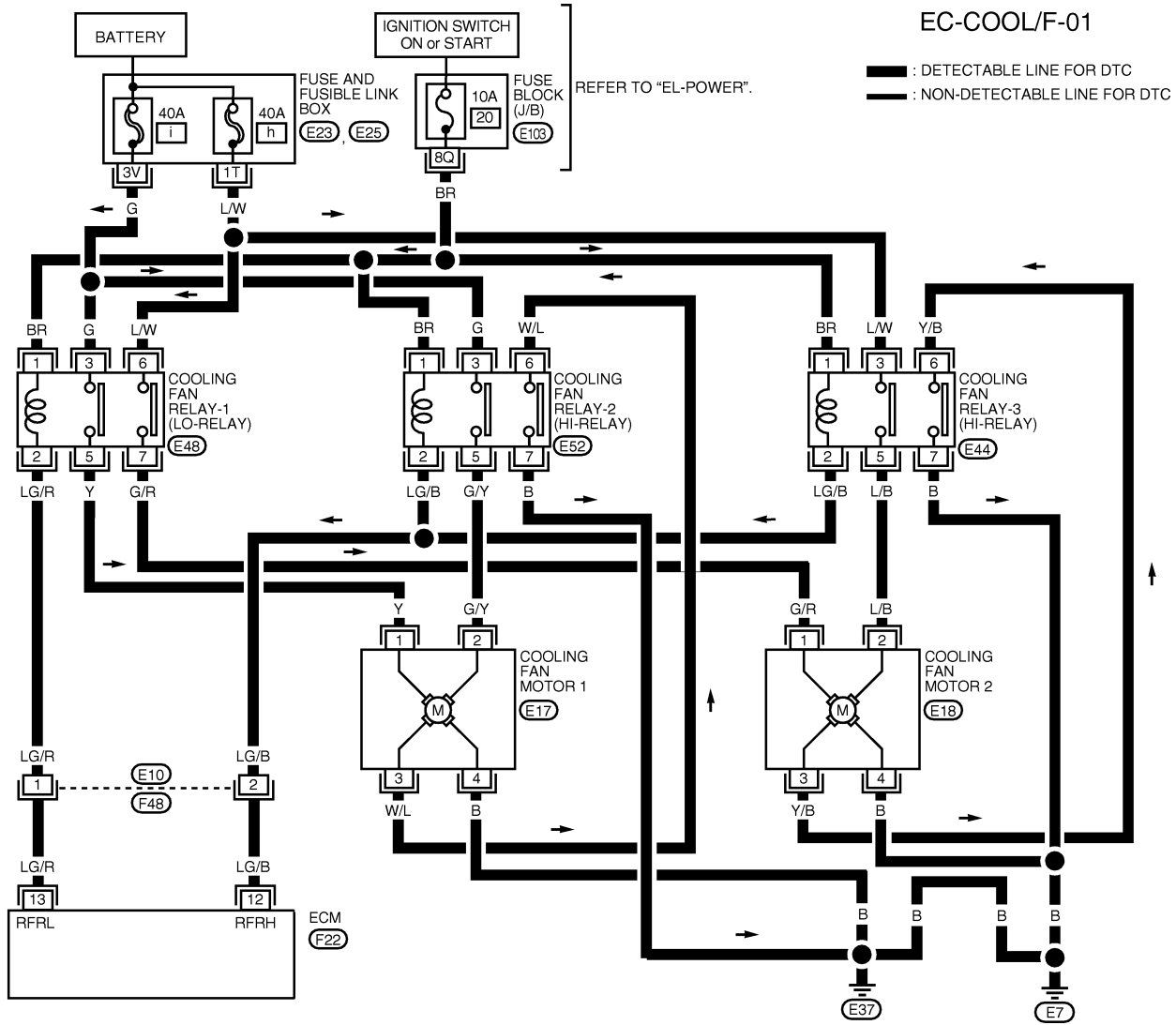
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

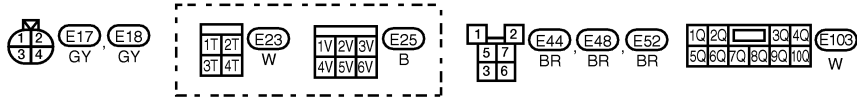
Wiring Diagram

Wiring Diagram

=NIEC0915

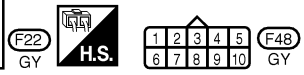


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107	108	30	31	32	33	34	35	36	37	38											87	88	89	90	91	92	93	94	95	115	116	



LEC222

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

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IDX

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DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

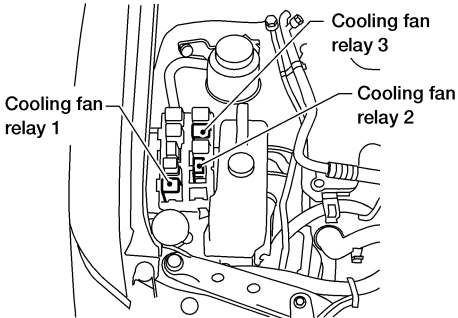
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0916

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p>📖 With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3.</p>																										
																										
LEC272																										
<p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p>																										
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
ACTIVE TEST																										
COOLING FAN	LOW																									
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COOLAN TEMP/S	XXX °C																									
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<p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p>																										
OK or NG																										
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1650.)																								

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN HIGH SPEED OPERATION																									
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Disconnect cooling fan relay-1. 4. Turn ignition switch "ON". 5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																										
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	HIGH	MONITOR		COOLAN TEMP/S	XXX °C																
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MONITOR																										
COOLAN TEMP/S	XXX °C																									
6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.																										
OK or NG																										
OK	▶	GO TO 6.																								
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1653.)																								

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SEF785Z

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

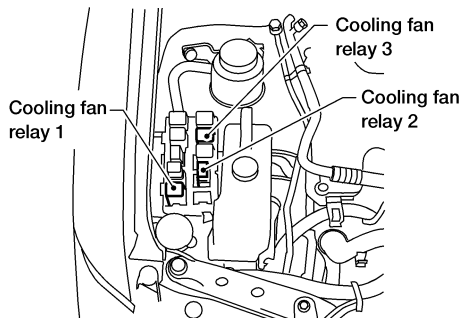
SR20DE

Diagnostic Procedure (Cont'd)

4 CHECK COOLING FAN LOW SPEED OPERATION

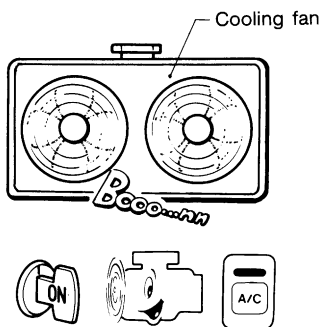
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



LEC272

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



SEC163BA

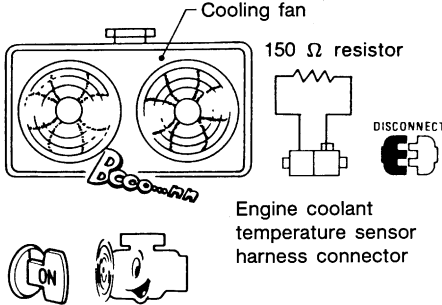
OK or NG

OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1650.)

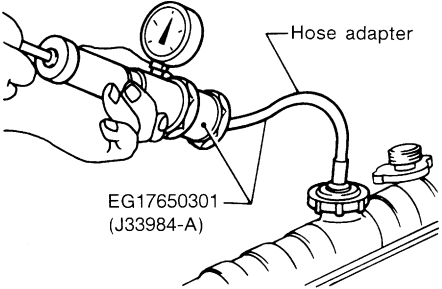
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Disconnect cooling fan relay-1. 4. Turn air conditioner switch and blower fan switch "OFF". 5. Disconnect engine coolant temperature sensor harness connector. 6. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 7. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed. 		
		
MEF613EA		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1653.)

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6	CHECK COOLING SYSTEM FOR LEAK	
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops. Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>		
		
SLC754A		
Pressure should not drop.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

7	DETECT MALFUNCTIONING PART	
<p>Check the following for leak.</p> <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump (Refer to LC-30, "Water Pump".) 		
▶		
Repair or replace.		

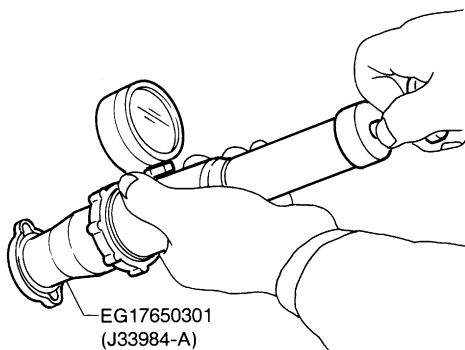
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

8 CHECK RADIATOR CAP

Apply pressure to cap with a tester and check radiator cap relief pressure.



SLC755A

Radiator cap relief pressure:
59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)

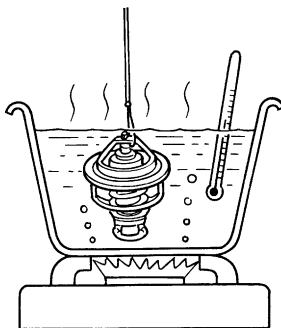
OK or NG

OK ► GO TO 9.

NG ► Replace radiator cap.

9 CHECK THERMOSTAT

1. Remove thermostat.
2. Check valve seating condition at normal room temperatures.
It should seat tightly.
3. Check valve opening temperature and valve lift.



Valve opening temperature:
76.5°C (170°F) [standard]

Valve lift:
More than 8 mm/90°C (0.31 in/194°F)

4. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to **LC-31**, "Thermostat".

OK or NG

OK ► GO TO 10.

NG ► Replace thermostat

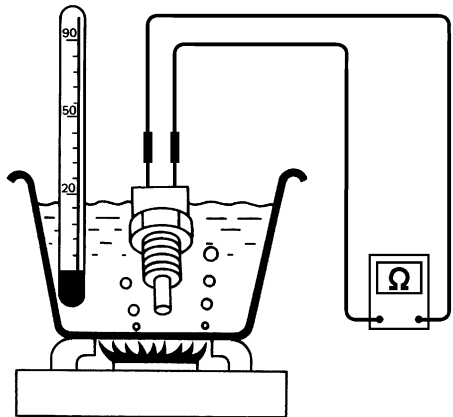
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

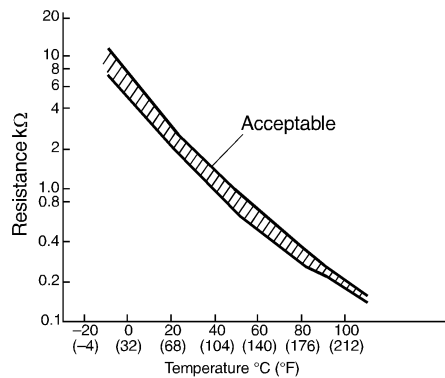
10 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Remove engine coolant temperature sensor.
2. Check resistance between engine coolant temperature sensor terminals 1 and 2 as shown in the figure.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

- | | | |
|----|---|--|
| OK | ▶ | GO TO 11. |
| NG | ▶ | Replace engine coolant temperature sensor. |

11 CHECK MAIN 12 CAUSES

If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-1655.

▶ **INSPECTION END**

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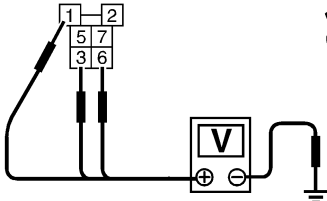
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC0916S01

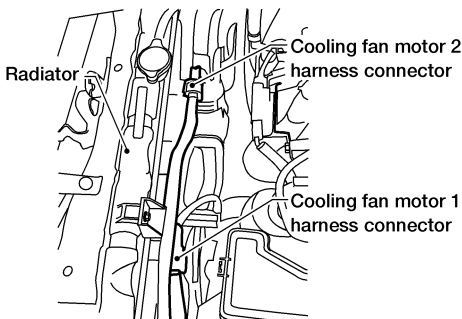
1	CHECK COOLING FAN POWER SUPPLY CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">    </div> <div style="text-align: center;">  </div> <div style="text-align: center;"> <p>Voltage: Battery voltage</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  </div> <p style="text-align: right;">SEF590X</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 40A fusible links ● Harness for open or short between cooling fan relay-1 and fuse ● Harness for open or short between cooling fan relay-1 and battery 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT		
		<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC289</p> <p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram", EC-1643. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to "Wiring Diagram", EC-1643. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; text-align: center;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

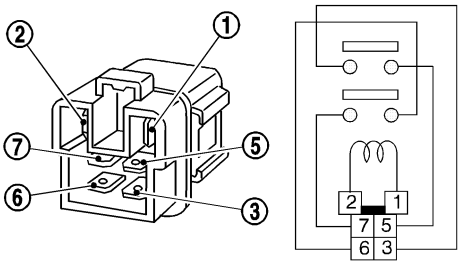
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT		
		<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram", EC-1643. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>SU</p> <p>BR</p> <p>ST</p> <p>RS</p>
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	

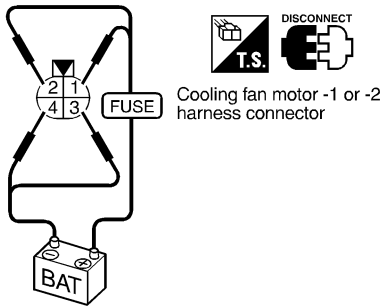
5	DETECT MALFUNCTIONING PART		
		<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relay-1 and ECM 	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK COOLING FAN RELAY-1	Check continuity between cooling fan relay-1 terminals 3 and 5, 6 and 7 under the following conditions.							
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Conditions</th> <th style="width: 30%;">Continuity</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td>No current supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Conditions	Continuity	12V direct current supply between terminals 1 and 2	Yes	No current supply	No
Conditions	Continuity								
12V direct current supply between terminals 1 and 2	Yes								
No current supply	No								
SEF591X									
OK or NG									
OK	▶	GO TO 7.							
NG	▶	Replace cooling fan relay.							

7	CHECK COOLING FAN MOTORS-1 AND -2	Supply battery voltage between the following terminals and check operation.														
		<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2"></th> <th rowspan="2">Speed</th> <th colspan="2">Terminals</th> </tr> <tr> <th>(+)</th> <th>(-)</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Cooling fan motor -1 or -2</td> <td>Low</td> <td style="text-align: center;">1</td> <td style="text-align: center;">4</td> </tr> <tr> <td>High</td> <td style="text-align: center;">1, 2</td> <td style="text-align: center;">3, 4</td> </tr> </tbody> </table>			Speed	Terminals		(+)	(-)	Cooling fan motor -1 or -2	Low	1	4	High	1, 2	3, 4
	Speed	Terminals														
		(+)	(-)													
Cooling fan motor -1 or -2	Low	1	4													
	High	1, 2	3, 4													
SEF937X																
OK or NG																
OK	▶	GO TO 8.														
NG	▶	Replace cooling fan motors.														

8	CHECK INTERMITTENT INCIDENT	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
		▶	INSPECTION END

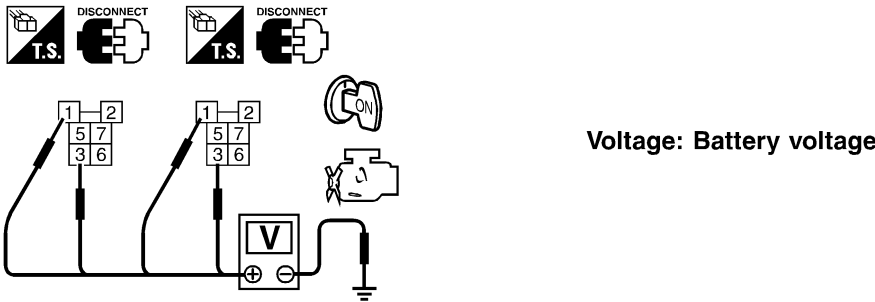
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC0916S02

1	CHECK COOLING FAN POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF593X</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 and fuse ● Harness for open or short between cooling fan relays-2 and -3 and fusible link 	AT AX
	▶	Repair harness or connectors.	

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector. 3. Check harness continuity between the following:</p> <ul style="list-style-type: none"> ● Cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2 ● Cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3 ● Cooling fan relay-2 terminal 7 and body ground. <p>Refer to "Wiring Diagram", EC-1643. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power. 5. Check harness continuity between the following:</p> <ul style="list-style-type: none"> ● Cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2 ● Cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3 ● Cooling fan relay-3 terminal 7 and body ground. <p>Refer to "Wiring Diagram", EC-1643. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p>	SU BR ST RS BT HA SC EL IDX
		OK or NG	
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

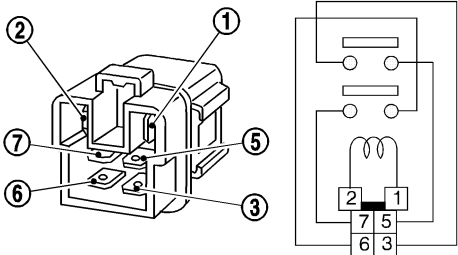
DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

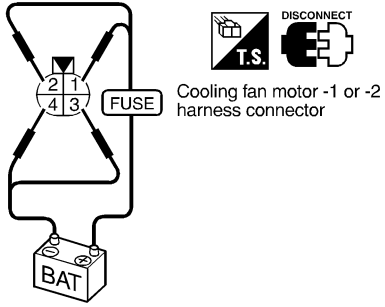
Diagnostic Procedure (Cont'd)

4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to "Wiring Diagram", EC-1643. <b style="color: blue;">Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relays-2 and -3 and ECM 		
▶ Repair open circuit or short to ground or short to power in harness or connectors.		

6	CHECK COOLING FAN RELAYS-2 AND -3	
Check continuity between cooling fan relay-2, -3 terminals 3 and 5, 6 and 7 under the following conditions.		
		
SEF591X		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

7	CHECK COOLING FAN MOTORS-1 AND -2	
Supply battery voltage between the following terminals and check operation.		
		
SEF937X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor -1 or -2	Low	1	4
	High	1, 2	3, 4

DTC P0217 COOLANT OVERTEMPERATURE ENRICHMENT PROTECTION

SR20DE

Diagnostic Procedure (Cont'd)

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	INSPECTION END

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Main 12 Causes of Overheating

NIEC0917

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> ● Blocked radiator ● Blocked condenser ● Blocked radiator grille ● Blocked bumper 	<ul style="list-style-type: none"> ● Visual 	No blocking	—
	2	<ul style="list-style-type: none"> ● Coolant mixture 	<ul style="list-style-type: none"> ● Coolant tester 	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> ● Coolant level 	<ul style="list-style-type: none"> ● Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> ● Radiator cap 	<ul style="list-style-type: none"> ● Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-28 , "System Check".
ON*2	5	<ul style="list-style-type: none"> ● Coolant leaks 	<ul style="list-style-type: none"> ● Visual 	No leaks	See LC-28 , "System Check".
ON*2	6	<ul style="list-style-type: none"> ● Thermostat 	<ul style="list-style-type: none"> ● Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-31 , "Thermostat" and LC-33 , "Radiator".
ON*1	7	<ul style="list-style-type: none"> ● Cooling fan 	<ul style="list-style-type: none"> ● CONSULT-II 	Operating	See trouble diagnosis for DTC P0217 (EC-1638).
OFF	8	<ul style="list-style-type: none"> ● Combustion gas leak 	<ul style="list-style-type: none"> ● Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> ● Coolant temperature gauge 	<ul style="list-style-type: none"> ● Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> ● Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> ● Visual 	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> ● Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> ● Visual 	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> ● Cylinder head 	<ul style="list-style-type: none"> ● Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-110 , "Inspection".
	12	<ul style="list-style-type: none"> ● Cylinder block and pistons 	<ul style="list-style-type: none"> ● Visual 	No scuffing on cylinder walls or piston	See EM-132 , "Inspection".

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*1: Turn the ignition switch ON.
 *2: Engine running at 3,000 rpm for 10 minutes.
 *3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.
 *4: After 60 minutes of cool down time.
 For more information, refer to **LC-19**, "OVERHEATING CAUSE ANALYSIS".

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0918

When a misfire occurs, engine speed will fluctuate (vary). If the engine speed fluctuates enough to cause the crankshaft position sensor (OBD) to vary, ECM can determine that a misfire is occurring.

Sensor	Input Signal to ECM	ECM function
Crankshaft position sensor (OBD)	Engine speed	On board diagnosis of misfire

The misfire detection logic consists of the following two conditions.

1. One Trip Detection Logic (Three Way Catalyst Damage)

On the first trip that a misfire condition occurs that can damage the three way catalyst (TWC) due to overheating, the MIL will blink.

When a misfire condition occurs, the ECM monitors the crankshaft position sensor (OBD) signal every 200 engine revolutions, for a change.

When the misfire conditions decreases to a level that will not damage the TWC, the MIL will turn off. If another misfire conditions occurs that can damage the TWC on a second trip, the MIL will blink.

When the misfire condition decreases to a level that will not damage the TWC, the MIL will remain on. If another misfire condition occurs that can damage the TWC, the MIL will begin to blink again.
2. Two Trip Detection Logic (Exhaust quality deterioration)

For misfire conditions that will not cause damage to the TWC (but will affect vehicle emissions), the MIL will only light when the misfire is detected on a second trip. During this condition, the ECM monitors the crankshaft position sensor (OBD) signal every 1,000 engine revolutions.

A misfire malfunction can be detected on any one cylinder or on multiple cylinders.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0300	<ul style="list-style-type: none"> ● Multiple cylinders misfire. 	<ul style="list-style-type: none"> ● Improper spark plug ● Insufficient compression ● Incorrect fuel pressure ● EGR volume control valve ● The injector circuit is open or shorted ● Injectors ● Intake air leak ● The ignition secondary circuit is open or shorted ● Lack of fuel ● Drive plate/Flywheel ● Heated oxygen sensor 1 (front) ● Incorrect distributor roter
P0301	<ul style="list-style-type: none"> ● No. 1 cylinder misfires. 	
P0302	<ul style="list-style-type: none"> ● No. 2 cylinder misfires. 	
P0303	<ul style="list-style-type: none"> ● No. 3 cylinder misfires. 	
P0304	<ul style="list-style-type: none"> ● No. 4 cylinder misfires. 	

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC Confirmation Procedure

NIEC0919

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine again and drive at 1,500 to 3,000 rpm for at least 3 minutes.
Hold the accelerator pedal as steady as possible.

NOTE:

Refer to the freeze frame data for the test driving conditions.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1657.

With GST

Follow the procedure "With CONSULT-II" above.

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0920

1	CHECK FOR INTAKE AIR LEAK
1. Start engine and run it at idle speed. 2. Listen for the sound of the intake air leak.	
OK or NG	
OK	▶ GO TO 2.
NG	▶ Discover air leak location and repair.

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LC

2	CHECK FOR EXHAUST SYSTEM CLOGGING
Stop engine and visually check exhaust tube, three way catalyst and muffler for dents.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ Repair or replace it.

EC

FE

3	CHECK EGR FUNCTION
Perform DTC Confirmation Procedure for DTC P1402 EGR FUNCTION (OPEN). Refer to EC-1820.	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Repair EGR system.

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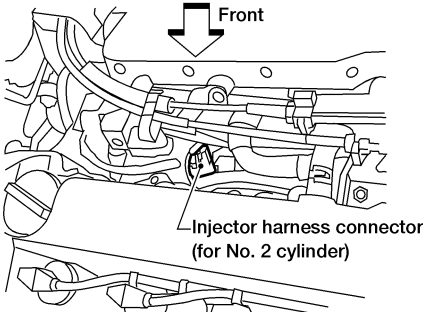
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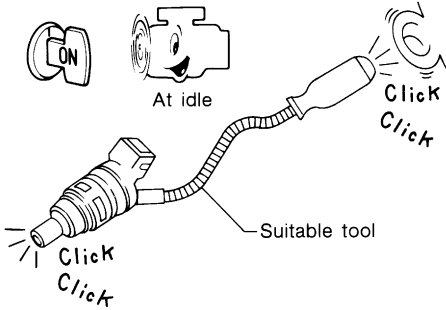
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DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure (Cont'd)

4	PERFORM POWER BALANCE TEST																
<p>④ With CONSULT-II 1. Perform "POWER BALANCE" in "ACTIVE TEST" mode.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse; text-align: center;"> <tr><td colspan="2">ACTIVE TEST</td></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><td colspan="2">MONITOR</td></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> <p style="text-align: right; margin-right: 20px;">SEF190Y</p> <p>2. Is there any cylinder which does not produce a momentary engine speed drop?</p>		ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step				
ACTIVE TEST																	
POWER BALANCE																	
MONITOR																	
ENG SPEED	XXX rpm																
MAS A/F SE-B1	XXX V																
IACV-AAC/V	XXX step																
<p>⊗ Without CONSULT-II When disconnecting each injector harness connector one at a time, is there any cylinder which does not produce a momentary engine speed drop?</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Front</p> <p style="margin-left: 100px;">Injector harness connector (for No. 2 cylinder)</p> </div> <p style="text-align: right; margin-right: 20px;">LEC290</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 8.</td> </tr> </table>		Yes	▶	GO TO 5.	No	▶	GO TO 8.										
Yes	▶	GO TO 5.															
No	▶	GO TO 8.															

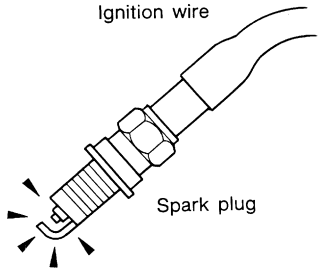
5	CHECK INJECTOR						
<p>Does each injector make an operating sound at idle?</p> <div style="text-align: center;">  <p style="margin-left: 100px;">ON</p> <p style="margin-left: 100px;">At idle</p> <p style="margin-left: 100px;">Click</p> <p style="margin-left: 100px;">Click</p> <p style="margin-left: 100px;">Suitable tool</p> <p style="margin-left: 100px;">Click</p> <p style="margin-left: 100px;">Click</p> </div> <p style="text-align: right; margin-right: 20px;">MEC703B</p> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>Check injector(s) and circuit(s). Refer to EC-1905.</td> </tr> </table>		Yes	▶	GO TO 6.	No	▶	Check injector(s) and circuit(s). Refer to EC-1905.
Yes	▶	GO TO 6.					
No	▶	Check injector(s) and circuit(s). Refer to EC-1905.					

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SIGNAL CIRCUIT	
Refer to "Diagnostic Procedure", EC-1901.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Repair or replace malfunctioning parts.

7	CHECK IGNITION SPARK	
<ol style="list-style-type: none"> 1. Turn Ignition switch "OFF". 2. Disconnect ignition wire from spark plug. 3. Connect a known good spark plug to the ignition wire. 4. Place end of spark plug against a suitable ground and crank engine. 5. Check for spark. 		
		
SEF282G		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

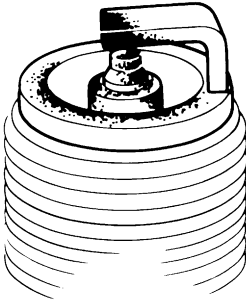
8	CHECK IGNITION WIRES	
Refer to "Component Inspection", EC-1662.		
OK or NG		
OK	▶	Check distributor rotor head for incorrect parts. Check ignition coil, power transistor and their circuits. Refer to EC-1899.
NG	▶	Replace.

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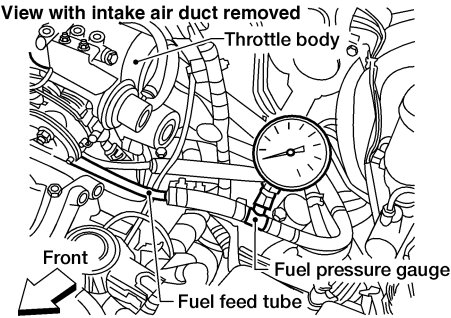
DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure (Cont'd)

9	CHECK SPARK PLUGS	Remove the spark plugs and check for fouling, etc.	
			
SEF156I			
OK or NG			
OK	▶	GO TO 10.	
NG	▶	Repair or replace spark plug(s) with standard type one(s). For spark plug type, refer to MA-16 , "ENGINE MAINTENANCE".	

10	CHECK COMPRESSION PRESSURE	Refer to EM-88 , "Measurement of Compression Pressure".	
<ul style="list-style-type: none"> ● Check compression pressure. <ul style="list-style-type: none"> Standard: 1,275 kPa (13.0 kg/cm², 185 psi)/300 rpm Minimum: 1,079 kPa (11.0 kg/cm², 156 psi)/300 rpm Difference between each cylinder: 98 kPa (1.0 kg/cm², 14 psi)/300 rpm 			
OK or NG			
OK	▶	GO TO 11.	
NG	▶	Check pistons, piston rings, valves, valve seats and cylinder head gaskets.	

11	CHECK FUEL PRESSURE	<ol style="list-style-type: none"> 1. Install any parts removed. 2. Release fuel pressure to zero. Refer to EC-1403. 3. Install fuel pressure gauge and check fuel pressure. 	
			
LEC335			
At idle: Approx. 235 kPa (2.4 kg/cm², 34 psi)			
OK or NG			
OK	▶	GO TO 13.	
NG	▶	GO TO 12.	

DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure (Cont'd)

12	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Fuel pump and circuit Refer to EC-1914. ● Fuel pressure regulator Refer to EC-1404. ● Fuel lines. Refer to MA-29, "Checking Fuel Lines". ● Fuel filter for clogging 		
▶		Repair or replace.

GI
MA
EM

13	CHECK IGNITION TIMING	
Perform "Basic Inspection", EC-1461.		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Adjust ignition timing.

LC

EC

14	CHECK HEATED OXYGEN SENSOR 1 (FRONT)	
Refer to "Component Inspection", EC-1550.		
OK or NG		
OK	▶	GO TO 15.
NG	▶	Replace heated oxygen sensor 1 (front).

FE

CL

MT

15	CHECK MASS AIR FLOW SENSOR	
ⓘ With CONSULT-II Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT-II. at idling: 2.5 - 5.0 g-m/sec at 2,500 rpm: 7.1 - 12.5 g-m/sec		
ⓘ With GST Check mass air flow sensor signal in MODE 1 with GST. at idling: 2.5 - 5.0 g-m/sec at 2,500 rpm: 7.1 - 12.5 g-m/sec		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

AT

AX

SU

BR

ST

RS

16	CHECK CONNECTORS	
Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-1507.		
OK or NG		
NG	▶	Repair or replace it.

BT

HA

SC

17	CHECK SYMPTOM MATRIX CHART	
Check items on the rough idle symptom in "Symptom Matrix Chart", EC-1477.		
OK or NG		
OK	▶	GO TO 18.
NG	▶	Repair or replace.

EL

IDX

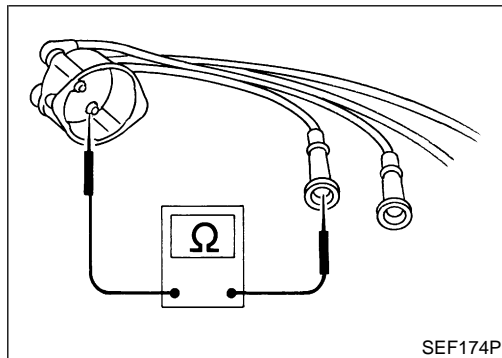
DTC P0300 - P0304 NO. 4 - 1 CYLINDER MISFIRE, MULTIPLE CYLINDER MISFIRE

SR20DE

Diagnostic Procedure (Cont'd)

18	ERASE THE 1ST TRIP DTC
Some tests may cause a 1st trip DTC to be set. Erase the 1st trip DTC from the ECM memory after performing the tests. Refer to EC-1433.	
▶ GO TO 19.	

19	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶ INSPECTION END	



Component Inspection

IGNITION WIRES

NIEC0921

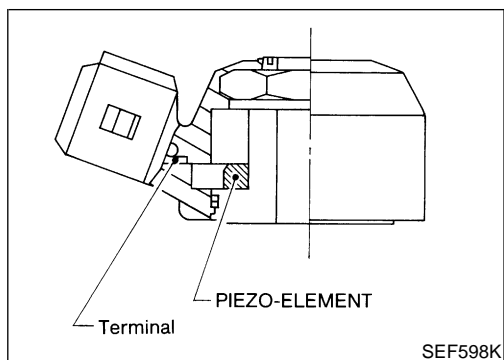
NIEC0921S01

1. Inspect wires for cracks, damage, burned terminals and for improper fit.
2. Measure the resistance of wires to their distributor cap terminal. Move each wire while testing to check for intermittent breaks.

Resistance:

13.6 - 18.4 kΩ/m (4.15 - 5.61 kΩ/ft) at 25°C (77°F)

If the resistance exceeds the above specification, inspect ignition wire to distributor cap connection. Clean connection or replace the ignition wire with a new one.



Component Description

The knock sensor is attached to the cylinder block. It senses engine knocking using a piezoelectric element. A knocking vibration from the cylinder block is sensed as vibrational pressure. This pressure is converted into a voltage signal and sent to the ECM. **Freeze frame data will not be stored in the ECM for the knock sensor. The MIL will not light for knock sensor malfunction. The knock sensor has one trip detection logic.**

NIEC0922

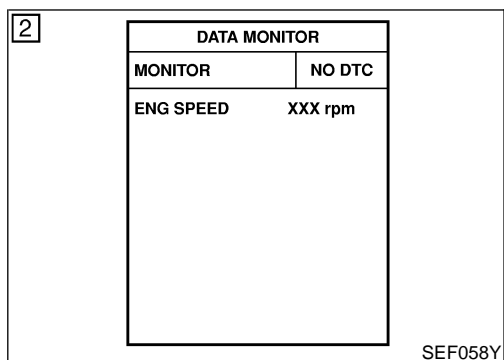
GI
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On Board Diagnosis Logic

NIEC0923

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0325	<ul style="list-style-type: none"> An excessively low or high voltage from the knock sensor is sent to ECM. 	<ul style="list-style-type: none"> Harness or connectors (The knock sensor circuit is open or shorted.) Knock sensor

EC
FE
CL



DTC Confirmation Procedure

NIEC0924

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

With CONSULT-II

- Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- Start engine and run it for at least 5 seconds at idle speed.
- If DTC is detected, go to "Diagnostic Procedure", EC-1665.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0325 KNOCK SENSOR (KS)

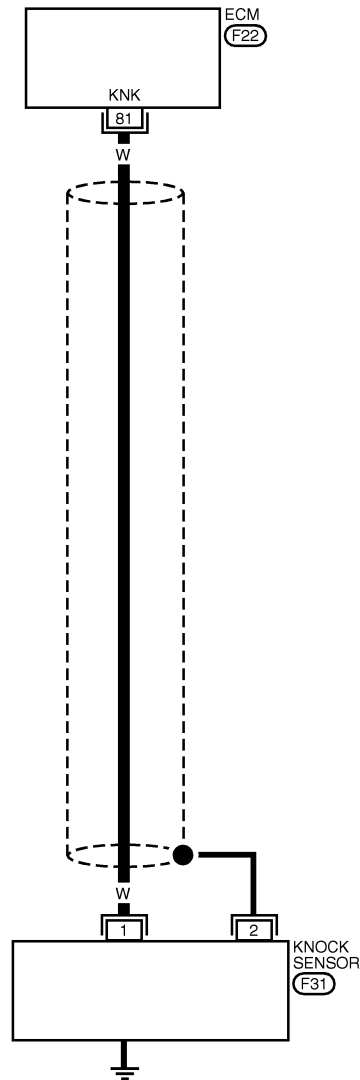
SR20DE

Wiring Diagram

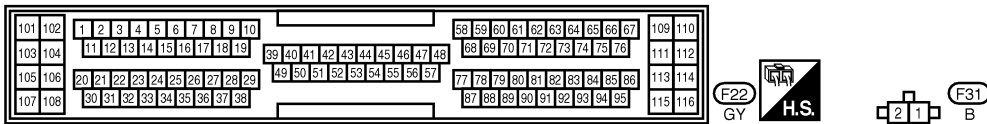
Wiring Diagram

NIEC0925

EC-KS-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC196

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

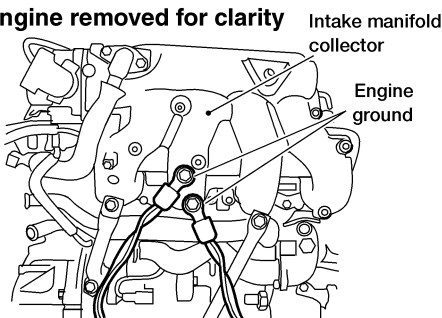
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
81	W	KNOCK SENSOR	ENGINE RUNNING AT IDLE SPEED	APPROX. 2.5V

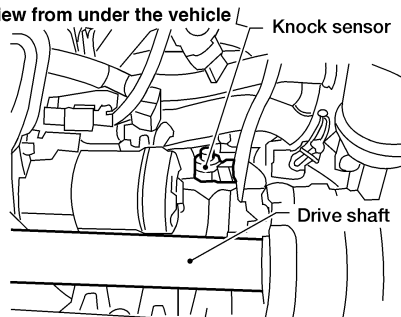
SEF572Y

Diagnostic Procedure

NIEC0926

1	RETIGHTEN GROUND SCREWS
Loosen and retighten engine ground screws.	
<p>Engine removed for clarity</p>  <p>The diagram shows an engine with several ground screws. Labels include 'Intake manifold collector' and 'Engine ground'. A note says 'Engine removed for clarity'.</p>	
LEC302	
▶	GO TO 2.

GI
MA
EM
LC
EC

2	CHECK INPUT SIGNAL CIRCUIT-1
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and knock sensor harness connector.</p>	
<p>View from under the vehicle</p>  <p>The diagram shows the underside of a vehicle. Labels include 'Knock sensor' and 'Drive shaft'.</p>	
LEC296	
<p>3. Check harness continuity between knock sensor terminal 1 and ECM terminal 81. Refer to "Wiring Diagram", EC-1664. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 3.
NG	▶ Repair harness or connector.

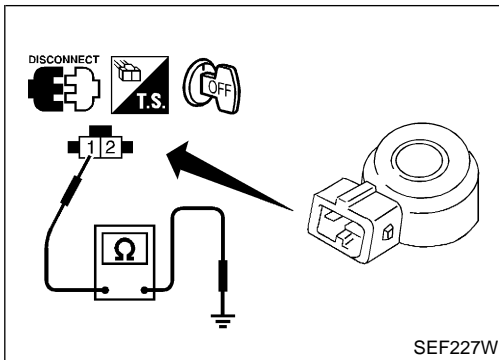
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3	CHECK KNOCK SENSOR
<p>Knock sensor Refer to "Component Inspection", EC-1666.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 4.
NG	▶ Replace knock sensor.

BT
HA
SC
EL

4	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

IDX



Component Inspection

KNOCK SENSOR

NIEC0927

NIEC0927S01

- Use an ohmmeter which can measure more than 10 MΩ.
1. Disconnect knock sensor harness connector.
 2. Check resistance between terminal 1 and ground.

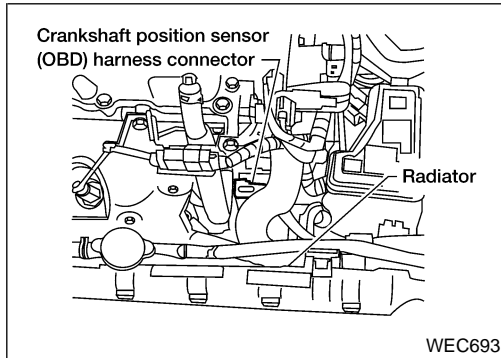
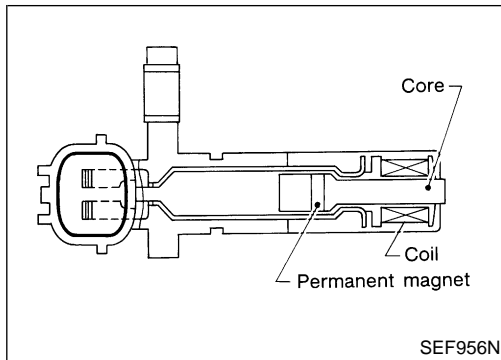
Resistance: 500 - 620 kΩ [at 20°C (68°F)]

CAUTION:

Discard any knock sensors that have been dropped or physically damaged. Use only new ones.

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) SR20DE

Component Description



Component Description

NIEC0928

The crankshaft position sensor (OBD) is located on the transaxle housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

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On Board Diagnosis Logic

NIEC0929

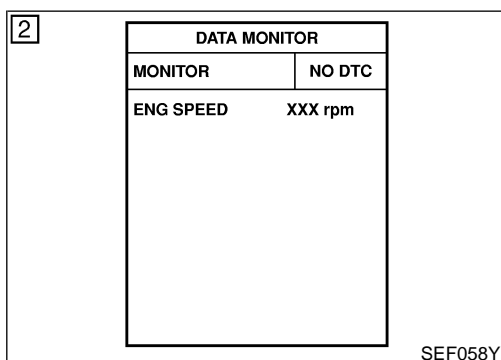
DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0335	<ul style="list-style-type: none"> The proper pulse signal from the crankshaft position sensor (OBD) is not sent to ECM while the engine is running at the specified engine speed. 	<ul style="list-style-type: none"> Harness or connectors (The crankshaft position sensor (OBD) circuit is open.) Crankshaft position sensor (OBD)

AT

AX

SU

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DTC Confirmation Procedure

NIEC0930

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 10 seconds at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1669.

With GST

Follow the procedure "With CONSULT-II" above.

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DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) SR20DE

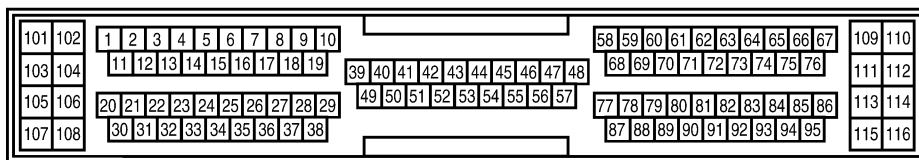
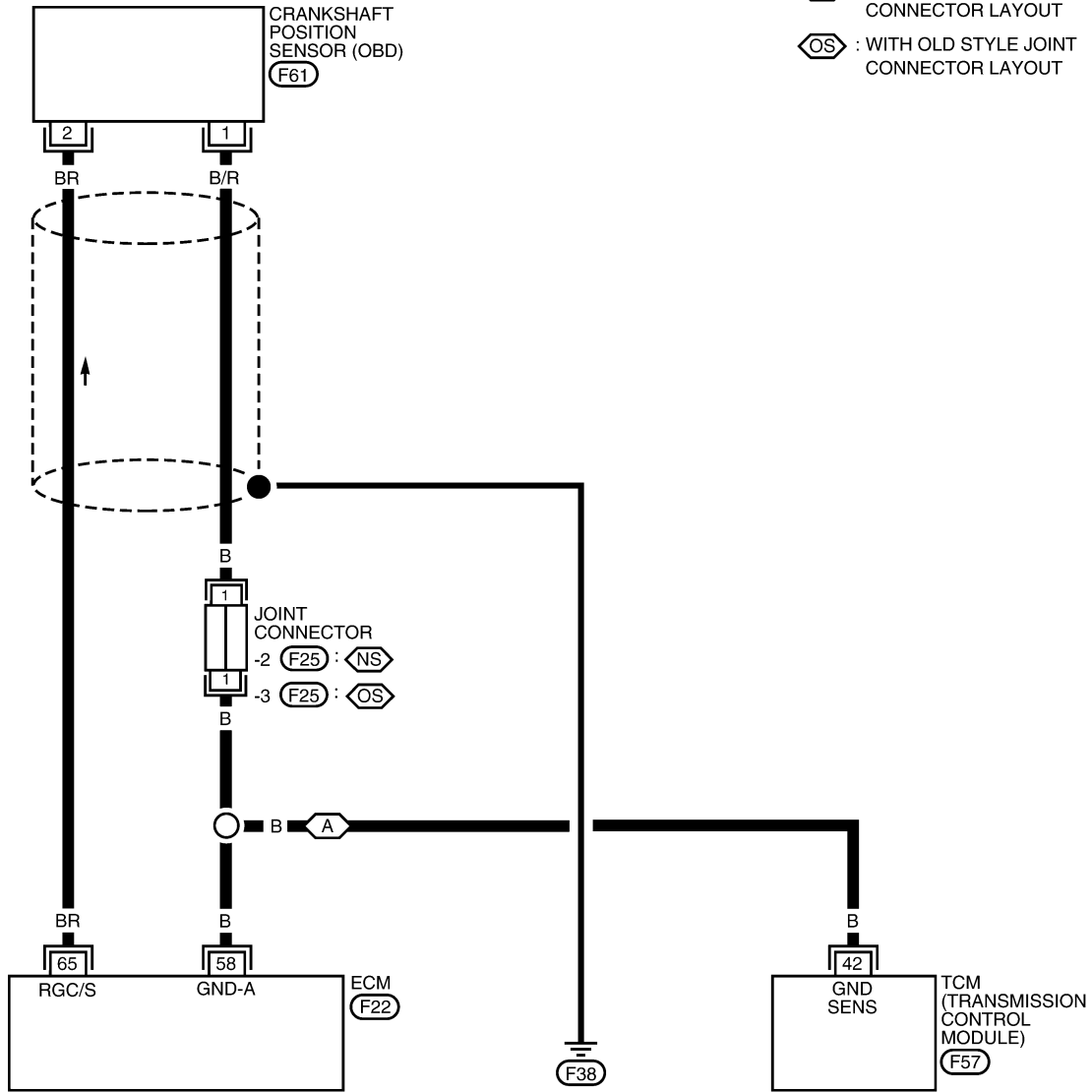
Wiring Diagram


Wiring Diagram

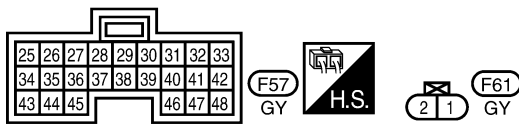
NIEC0931

EC-CKPS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T
-  : WITH NEW STYLE JOINT CONNECTOR LAYOUT
-  : WITH OLD STYLE JOINT CONNECTOR LAYOUT



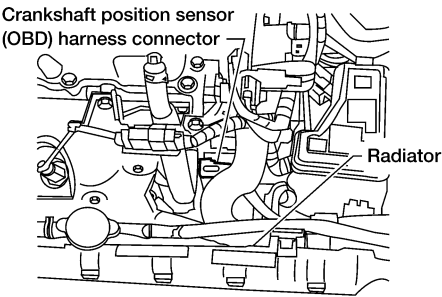
REFER TO THE FOLLOWING.
 - JOINT CONNECTOR

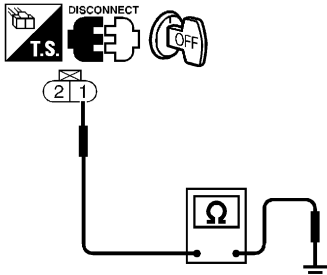


WEC951

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) SR20DE

Diagnostic Procedure (Cont'd)

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.</p> <div style="text-align: center;">  <p style="font-size: small;">Crankshaft position sensor (OBD) harness connector</p> <p style="font-size: small;">Radiator</p> </div> <p style="text-align: right; font-size: x-small;">WEC693</p> <p>2. Check continuity between ECM terminal 65 and CKPS terminal 2. Refer to "Wiring Diagram", EC-1668. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 3.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

3	CHECK GROUND CIRCUIT	<p>1. Reconnect ECM harness connector.</p> <p>2. Check harness continuity between CKPS terminal 1 and engine ground.</p> <div style="text-align: center;">  </div> <p style="text-align: right; font-size: x-small;">SEF229W</p> <p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between crankshaft position sensor (OBD) and ECM ● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module) <p style="text-align: center;">▶ Repair open circuit or short to power in harness or connectors.</p>	
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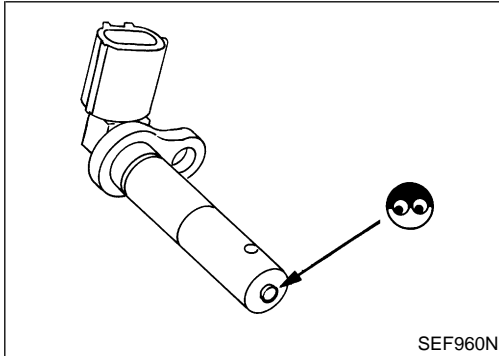
5	CHECK CRANKSHAFT POSITION SENSOR (OBD)	<p>Refer to "Component Inspection", EC-1671.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 6.	
NG	▶	Replace crankshaft position sensor (OBD).	

DTC P0335 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

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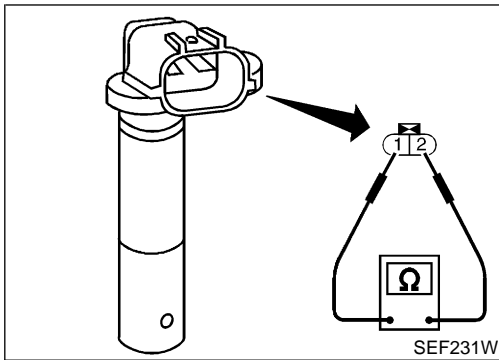


Component Inspection CRANKSHAFT POSITION SENSOR (OBD)

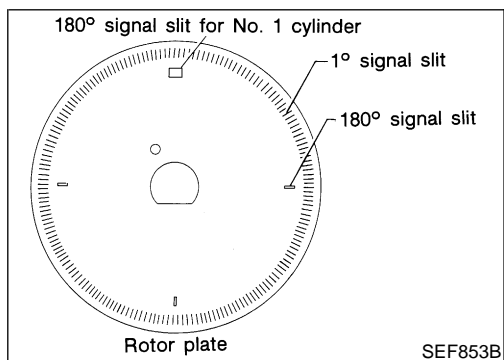
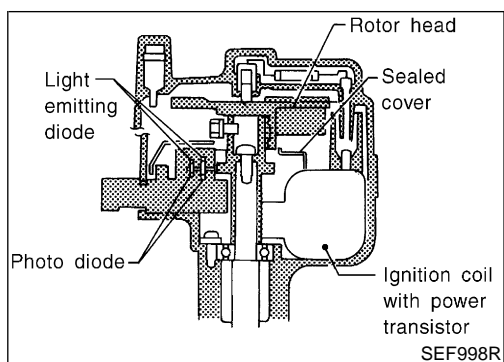
NIEC0933

NIEC0933S01

1. Disconnect crankshaft position sensor (OBD) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.
5. Check resistance as shown in the figure.
Resistance: 166 - 204 Ω [at 20°C (68°F)]
If NG, replace crankshaft position sensor (OBD).



Component Description



Component Description

NIEC0934

The camshaft position sensor is a basic component of the engine control system. It monitors engine speed and piston position. These input signals to the engine control system are used to control fuel injection, ignition timing and other functions.

The camshaft position sensor has a rotor plate and a wave-forming circuit. The rotor plate has 360 slits for a 1° (POS) signal and 4 slits for a 180° (REF) signal. The wave-forming circuit consists of Light Emitting Diodes (LED) and photo diodes.

The rotor plate is positioned between the LED and the photo diode. The LED transmits light to the photo diode. As the rotor plate turns, the slits cut the light to generate rough-shaped pulses. These pulses are converted into on-off signals by the wave-forming circuit and sent to the ECM.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

On Board Diagnosis Logic

NIEC0935

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0340	<ul style="list-style-type: none"> Either 1° or 180° signal is not sent to ECM for the first few seconds during engine cranking. 	<ul style="list-style-type: none"> Harness or connectors (The camshaft position sensor circuit is open or shorted.) Camshaft position sensor Starter motor (Refer to SC-10, "STARTING SYSTEM".) Starting system circuit (Refer to SC-10, "STARTING SYSTEM".) Dead (Weak) battery
	<ul style="list-style-type: none"> Either 1° or 180° signal is not sent to ECM often enough while the engine speed is higher than the specified engine speed. 	
	<ul style="list-style-type: none"> The relation between 1° and 180° signal is not in the normal range during the specified engine speed. 	

DTC Confirmation Procedure

NIEC0936

Perform "Procedure for malfunction A" first. If DTC cannot be confirmed, perform "Procedure for malfunction B and C".

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V.

2

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC0936S01

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Crank engine for at least 2 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1675.

With GST

Follow the procedure "With CONSULT-II" above.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION B AND C

NIEC0936S02

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and run it for at least 2 seconds at idle speed.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1675.

With GST

Follow the procedure "With CONSULT-II" above.

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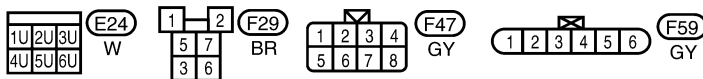
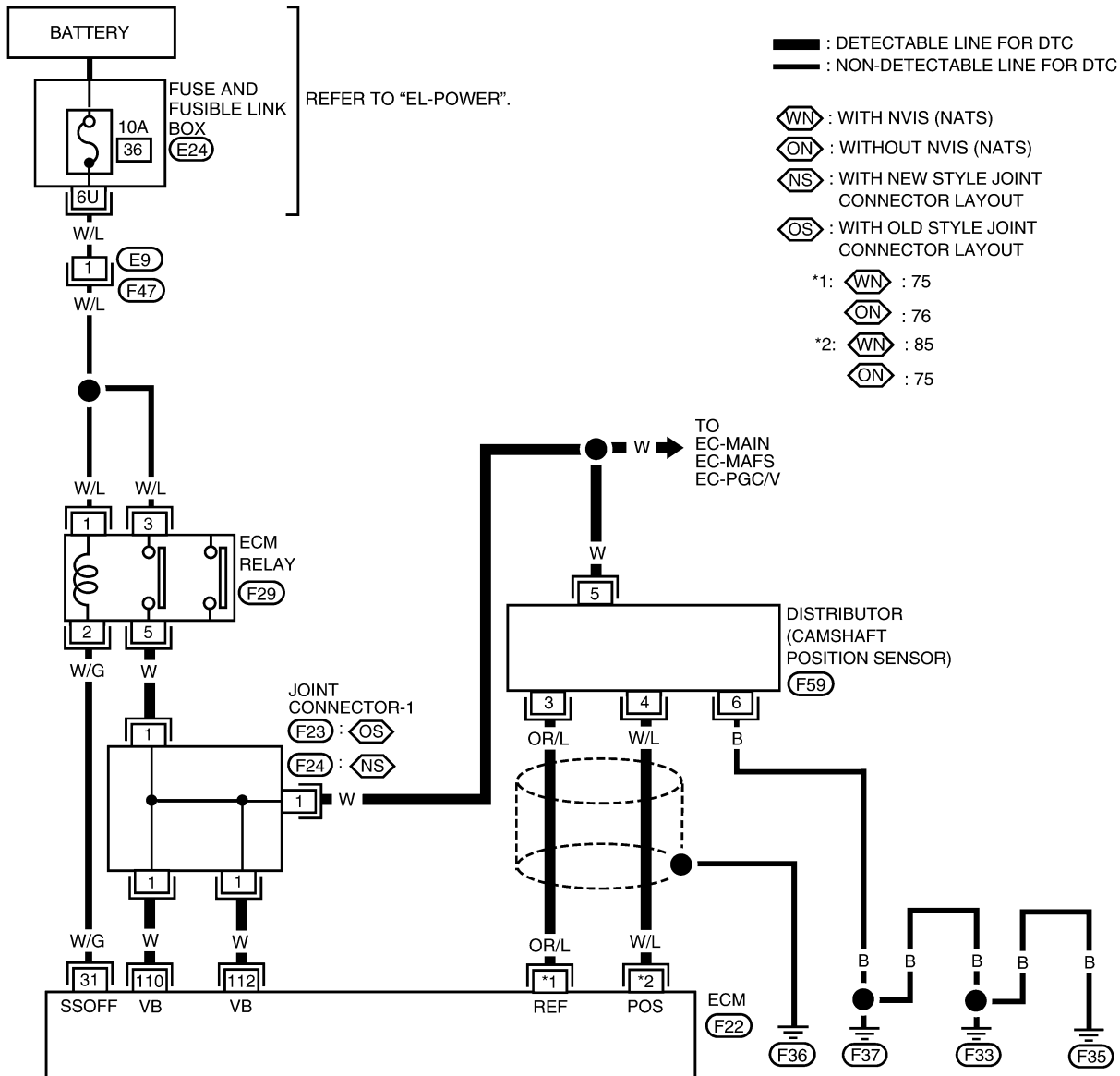
EL

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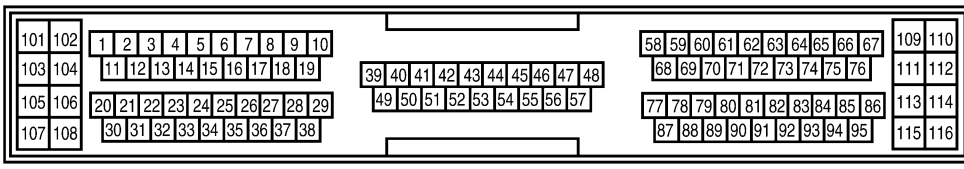
Wiring Diagram

NIEC0937

EC-CMPS-01



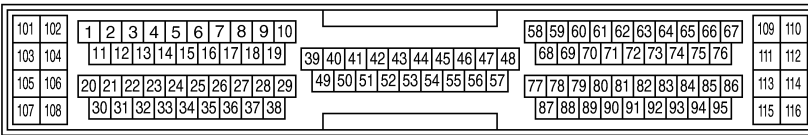
REFER TO THE FOLLOWING.
F24 - JOINT CONNECTOR



DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

SR20DE

Wiring Diagram (Cont'd)



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
66 75 (With NVIS) 76 85 (Without NVIS)	OR/L OR/L OR/L OR/L	CAMSHAFT POSITION SENSOR (REFERENCE SIGNAL)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	0.1 - 0.4V (V)
			ENGINE RUNNING AT 2,000 RPM	0.1 - 0.4V (V)
75 (Without NVIS) 85 (With NVIS)	W/L W/L	CAMSHAFT POSITION SENSOR (POSITION SIGNAL)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	APPROX. 2.6V (V)
			ENGINE RUNNING AT 2,000 RPM	APPROX. 2.5V (V)

SEF574YA

Diagnostic Procedure

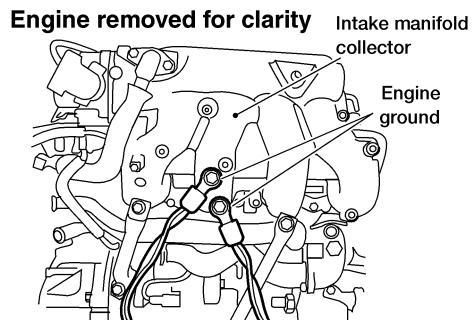
NIEC0938

1	CHECK STARTING SYSTEM	
Does the engine turn over? (Does the starter motor operate?)		
Yes or No		
Yes	▶	GO TO 2.
No	▶	Check starting system. (Refer to SC-10 , "STARTING SYSTEM".)

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2 RETIGHTEN GROUND SCREWS

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.

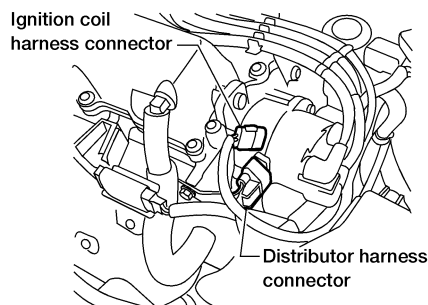


LEC302

▶ GO TO 3.

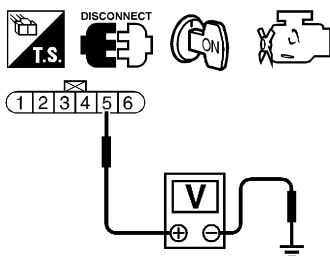
3 CHECK POWER SUPPLY

1. Disconnect distributor harness connector.



LEC283

2. Turn ignition switch "ON".
3. Check voltage between distributor harness connector terminal 5 and ground with CONSULT-II or tester.



SEF040S

Voltage: Battery voltage

OK or NG

- | | | |
|----|---|----------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | GO TO 4. |

DTC P0340 CAMSHAFT POSITION SENSOR (CMPS)

SR20DE

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-1 ● Harness for open or short between distributor and ECM relay ● Harness for open or short between distributor and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI
MA

5	CHECK INPUT SIGNAL CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between distributor harness connector terminal 3 and ECM terminals 66, 75 (with NVIS) or 76, 85 (without NVIS), distributor harness connector terminal 4 and ECM terminal 85 (with NVIS) or 75 (without NVIS). Refer to "Wiring Diagram", EC-1674. Continuity should exist. 4. Also check harness for short to ground and short to power.</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

EM
LC
EC

6	CHECK GROUND CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between distributor harness connector terminal 6 and engine ground. Refer to "Wiring Diagram", EC-1674. Continuity should exist. 3. Also check harness for short to power.</p>	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Repair open circuit or short to power in harness or connectors.

FE
CL
MT

7	CHECK CAMSHAFT POSITION SENSOR
<p>Refer to "Component Inspection", EC-1678.</p>	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Replace camshaft position sensor.

AT
AX
SU

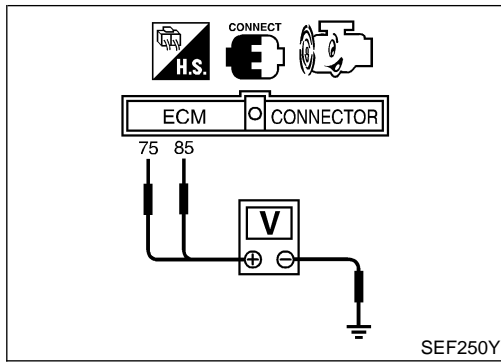
8	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>	
▶	INSPECTION END

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IDX



Component Inspection CAMSHAFT POSITION SENSOR

-NIEC0939

NIEC0939S01

1. Start engine and warm it up to normal operating temperature.
2. Check voltage between ECM terminals 75, 85 and engine ground under the following conditions.

With NVIS model:

Terminal 75 (or 66) and engine ground

Without NVIS model:

Terminal 85 (or 76) and engine ground

Condition	Idle	2,000 rpm
Voltage	0.1 - 0.4V	0.1 - 0.4V
Pulse signal	<p>SEF006W</p>	<p>SEF007W</p>

Terminal 85 (with NVIS) or 75 (without NVIS) and engine ground

Condition	Idle	2,000 rpm
Voltage	Approximately 2.5V	Approximately 2.4V
Pulse signal	<p>SEF004W</p>	<p>SEF005W</p>

If NG, replace distributor assembly with camshaft position sensor.

Description SYSTEM DESCRIPTION

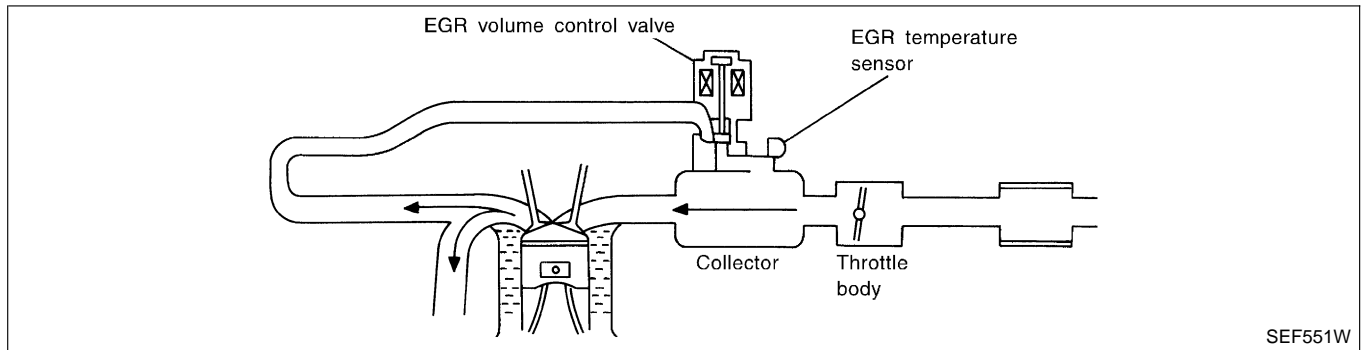
NIEC0940

NIEC0940S01

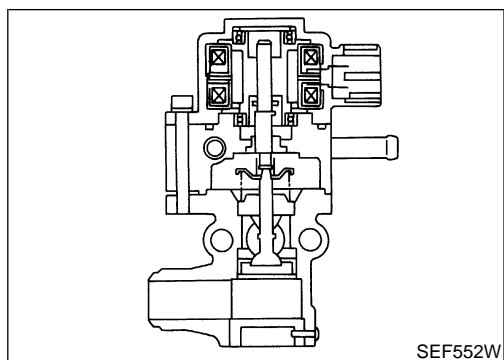
Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR by-pass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage



Description (Cont'd)



COMPONENT DESCRIPTION

EGR volume control valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

NIEC0940S02

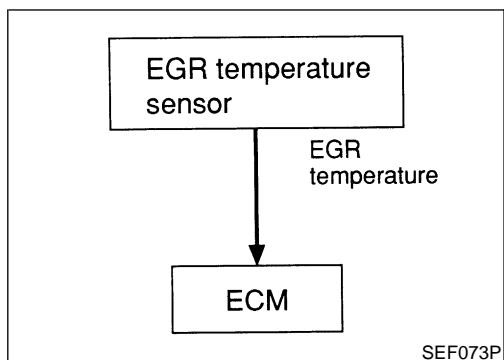
NIEC0940S0201

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

NIEC0941

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load 	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 steps



On Board Diagnosis Logic

If the absence of EGR flow is detected by EGR temperature sensor under the condition that calls for EGR, a low-flow malfunction is diagnosed.

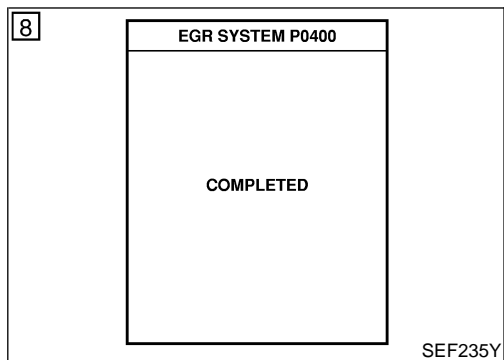
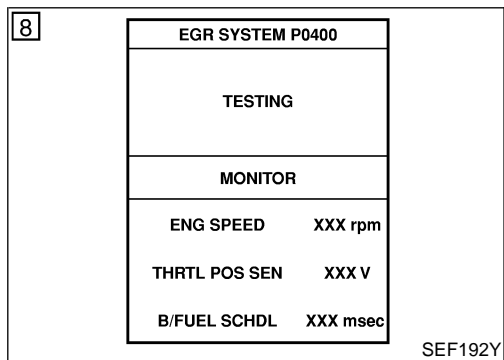
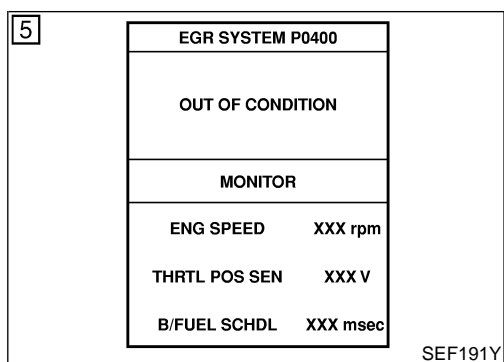
Malfunction is detected when no EGR flow is detected under condition that calls for EGR.

NIEC0942

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve stuck closed
- Dead (Weak) battery
- EGR passage clogged
- EGR temperature sensor and circuit
- Exhaust gas leaks

NIEC0943



DTC Confirmation Procedure

NIEC0944

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- P0400 will not be displayed at "SELF-DIAG RESULTS" mode with CONSULT-II even though DTC work support test result is NG.

TESTING CONDITION:

- Before performing the following procedure, confirm battery voltage is more than 10V at idle, then stop engine immediately.
- For best results, perform the test at a temperature of 5°C (41°F) or higher.

WITH CONSULT-II

NIEC0944S01

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON"
- 3) Check "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.

Confirm COOLAN TEMP/S value is within the range listed below.

COOLAN TEMP/S: Less than 40°C (104°F)

If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the engine coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

- 4) Start engine and let it idle monitoring "COOLAN TEMP/S" value. When the "COOLAN TEMP/S" value reaches 70°C (158°F), immediately go to the next step.
- 5) Select "EGR SYSTEM P0400" of "EGR SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) Accelerate vehicle to a speed of 40 km/h (25 MPH) once and then stop vehicle with engine running.
If "COMPLETED" appears on CONSULT-II screen, go to step 10.
If "COMPLETED" does not appear on CONSULT-II screen, go to the following step.
- 8) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 9) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions until "TESTING" changes to "COMPLETED". (It will take approximately 30 seconds or more.)

ENG SPEED	1,800 - 2,800 rpm
Vehicle speed	More than 10 km/h (6 MPH)
B/FUEL SCHDL	5.0 - 8.5 msec
THRTL POS SEN	(X + 0.05) – (X + 0.87) V X = Voltage value measured at step 8
Selector lever	Suitable position

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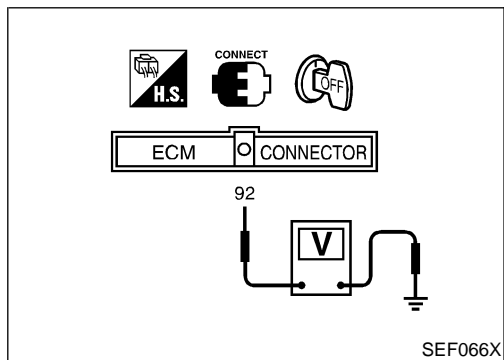
SC

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If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 10) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1684.



WITH GST

NIEC0944S02

- 1) Turn ignition switch "OFF" and wait at least 10 seconds.
- 2) Turn ignition switch "ON".
- 3) Check engine coolant temperature in MODE 1 with GST.
Engine coolant temperature: Less than 40°C (104°F)
 If the value is out of range, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to lower the coolant temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.
- 4) Start engine and let it idle monitoring the value of "COOLAN TEMP/S". When the engine coolant temperature reaches 70°C (158°F), immediately go to the next step.
- 5) Maintain the following conditions for at least 1 minute.
Engine speed: 1,800 - 2,800 rpm
Vehicle speed: More than 10 km/h (6 MPH)
Voltage between ECM terminal 92 and ground: 0.86 - 2.0V
Selector lever: Suitable position
- 6) Stop vehicle.
- 7) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 8) Repeat step 3 to 5.
- 9) Select "MODE 3" with GST.
- 10) If DTC is detected, go to "Diagnostic Procedure", EC-1684.
 - **When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.**

DTC P0400 EGR FUNCTION (CLOSE)

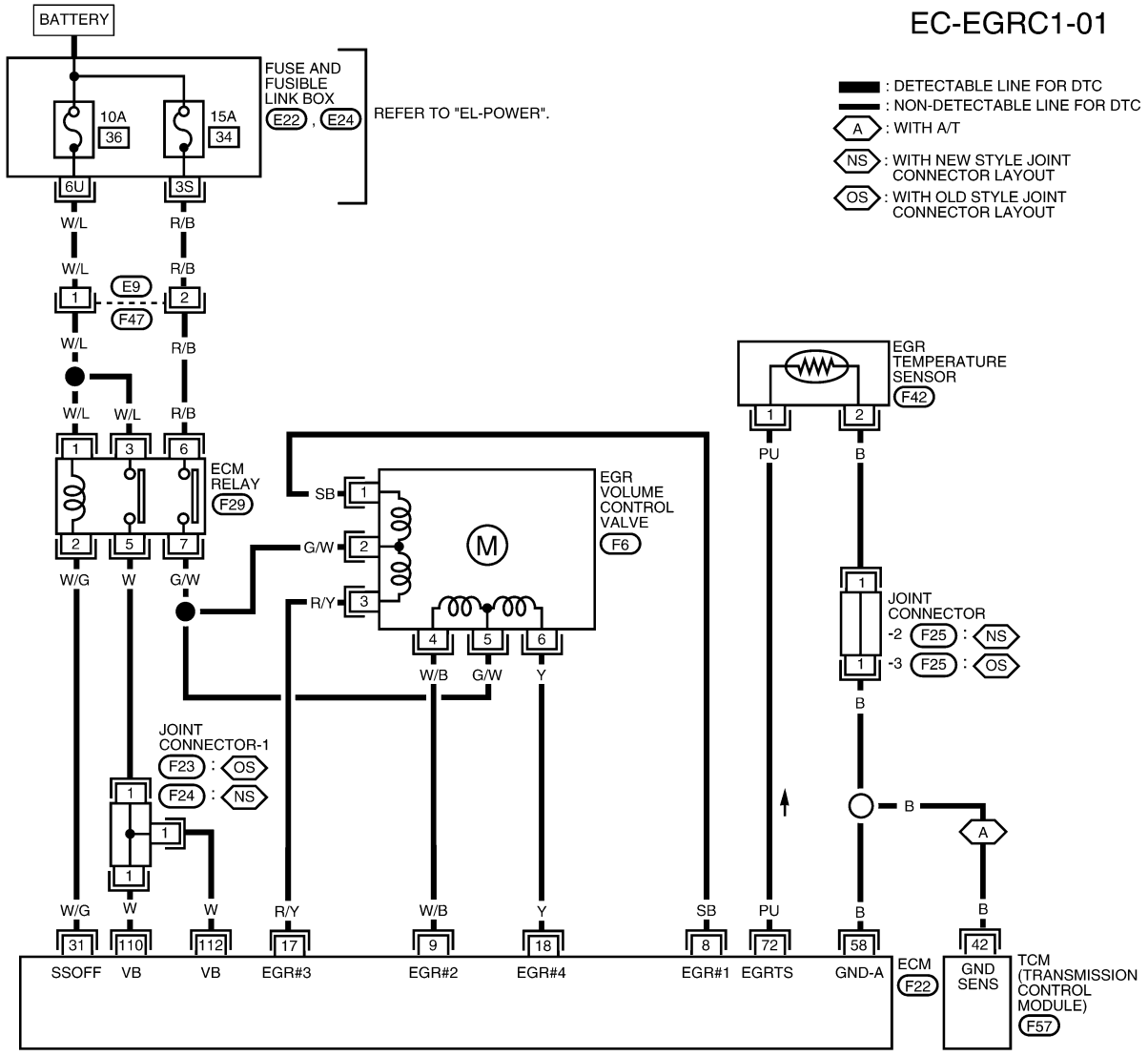
SR20DE

Wiring Diagram

Wiring Diagram

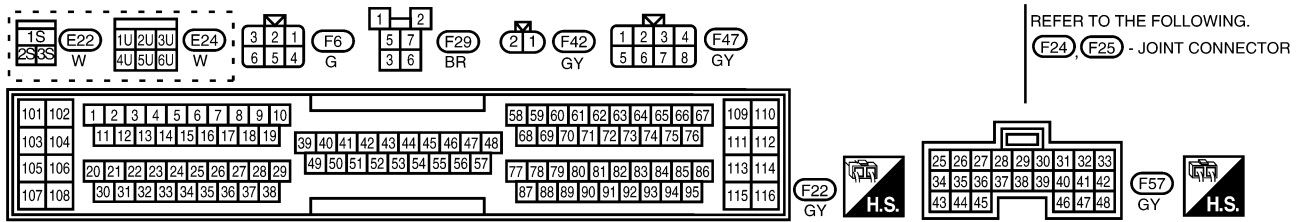
NIEC0945

EC-EGRC1-01



- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- : WITH A/T
- : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- : WITH OLD STYLE JOINT CONNECTOR LAYOUT

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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

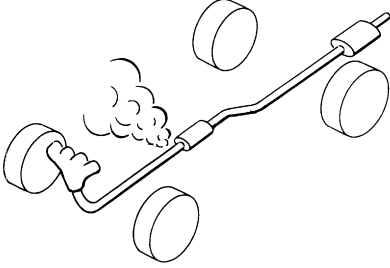
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

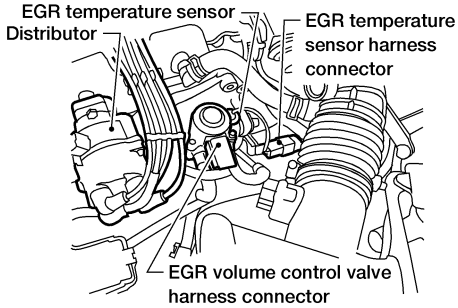
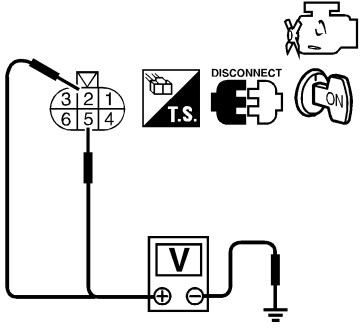
WEC953

SEF575Y

Diagnostic Procedure

NIEC0946

1	CHECK EXHAUST SYSTEM	
1. Start engine. 2. Check exhaust pipes and muffler for leaks.		
		
SEF099P		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace exhaust system.

2	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT	
1. Disconnect EGR volume control valve harness connector.		
		
LEC285		
2. Turn ignition switch "ON".		
3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.		
		
Voltage: Battery voltage		
SEF327X		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0400 EGR FUNCTION (CLOSE)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT										
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-1683.</p> <table border="1"><thead><tr><th>ECM terminal</th><th>EGR volume control valve</th></tr></thead><tbody><tr><td>8</td><td>1</td></tr><tr><td>9</td><td>4</td></tr><tr><td>17</td><td>3</td></tr><tr><td>18</td><td>6</td></tr></tbody></table> <p>Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6
ECM terminal	EGR volume control valve										
8	1										
9	4										
17	3										
18	6										
OK	▶▶ GO TO 4.										
NG	▶▶ Repair open circuit or short to ground or short to power in harness or connectors.										

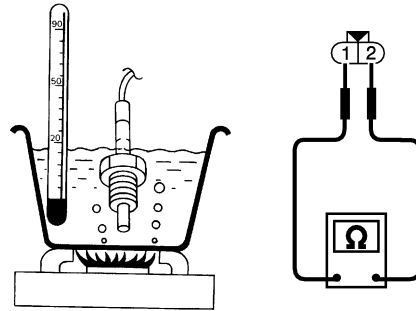
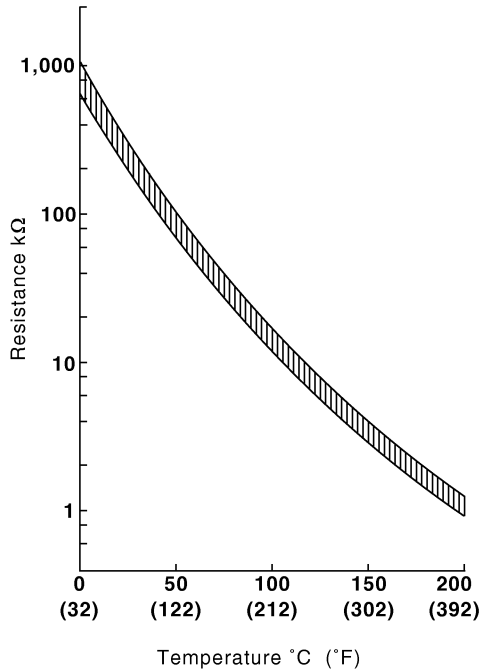
MTBL0389

4	CHECK EGR PASSAGE
<p>Check EGR passage for clogging and cracks.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶▶ GO TO 5.
NG	▶▶ Repair or replace EGR passage.

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5 CHECK EGR TEMPERATURE SENSOR AND CIRCUIT

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

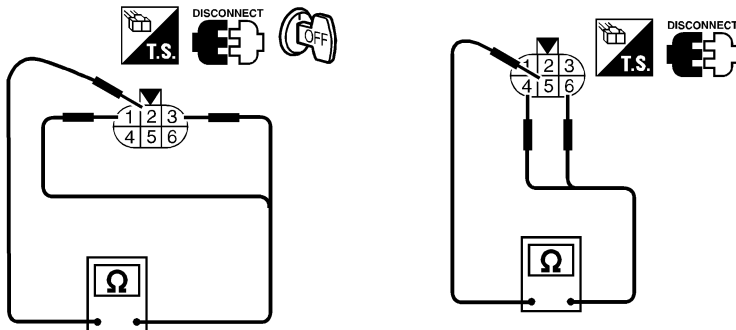
SEF483YA

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 6. |
| NG | ▶ | Replace EGR temperature sensor. |

6 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

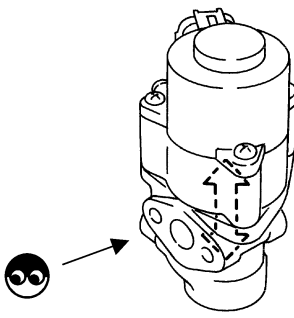
OK or NG

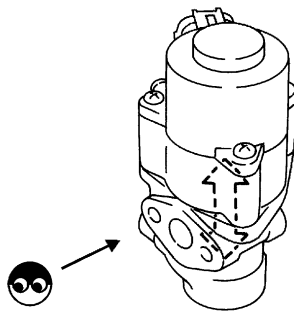
- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 7. |
| OK (Without CONSULT-II) | ▶ | GO TO 8. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P0400 EGR FUNCTION (CLOSE)

SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK EGR VOLUME CONTROL VALVE-II	<p>Ⓟ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 20px;"> <table border="1" style="border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table> <div style="text-align: center;">  <p style="margin-top: 10px;">OK or NG</p> </div> </div> <div style="text-align: right; margin-top: 10px;">SEF067Y</div>	ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																
ACTIVE TEST																										
EGR VOL CONT/V	20 step																									
MONITOR																										
ENG SPEED	XXX rpm																									
OK	▶	GO TO 9.																								
NG	▶	Replace EGR volume control valve.																								

8	CHECK EGR VOLUME CONTROL VALVE-II	<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. <div style="display: flex; justify-content: center; align-items: center; margin-top: 20px;"> <div style="text-align: center;">  <p style="margin-top: 10px;">OK or NG</p> </div> <div style="text-align: right; margin-top: 10px;">SEF560W</div> </div>
OK	▶	GO TO 9.
NG	▶	Replace EGR volume control valve.

9	CHECK INTERMITTENT INCIDENT	<p>Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>
	▶	INSPECTION END

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Description
SYSTEM DESCRIPTION

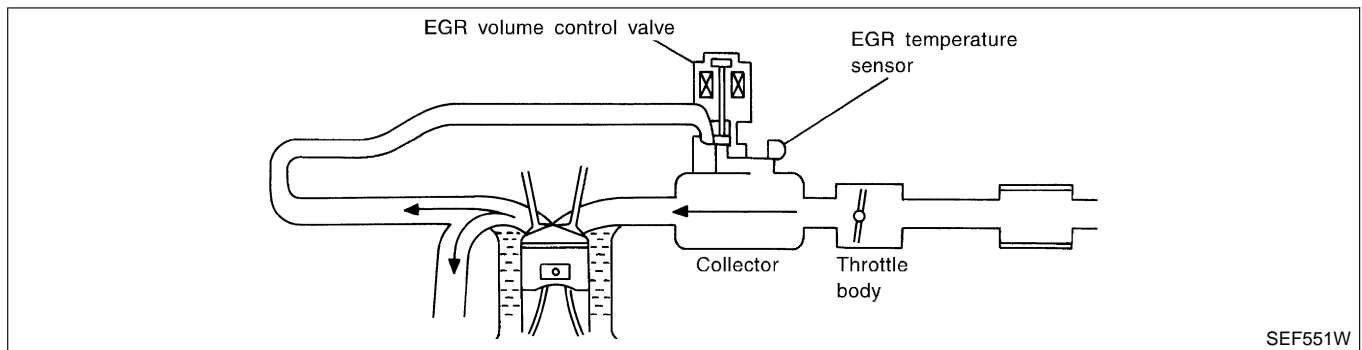
NIEC0947

NIEC0947S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
PNP switch	Park/Neutral position signal		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR bypass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

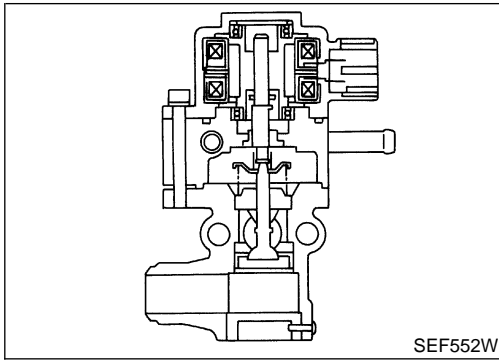


SEF551W

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

SR20DE

Description (Cont'd)



SEF552W

COMPONENT DESCRIPTION

NIEC0947S02

EGR volume control valve

NIEC0947S0201

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0948

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EGR VOL CON/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle
	Revvng engine up to 3,000 rpm quickly	10 - 55 steps

On Board Diagnosis Logic

NIEC0949

Malfunction is detected when an improper voltage signal is sent to ECM through the valve.

FAIL-SAFE MODE

NIEC0949S01

When the ECM enters the fail-safe mode, the MIL illuminates.

Detected items	Engine operating condition in fail-safe mode
EGR volume control valve circuit	Engine speed will not rise more than 2,800 rpm due to the fuel cut.

Possible Cause

NIEC0950

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve

DTC Confirmation Procedure

NIEC0951

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10V at idle.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C

SEF174Y

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

SR20DE

DTC Confirmation Procedure (Cont'd)

WITH CONSULT-II

NIEC0951S01

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Rev engine from idle to 2,000 rpm 10 times.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1692.

WITH GST

NIEC0951S02

Follow the procedure "With CONSULT-II" above.

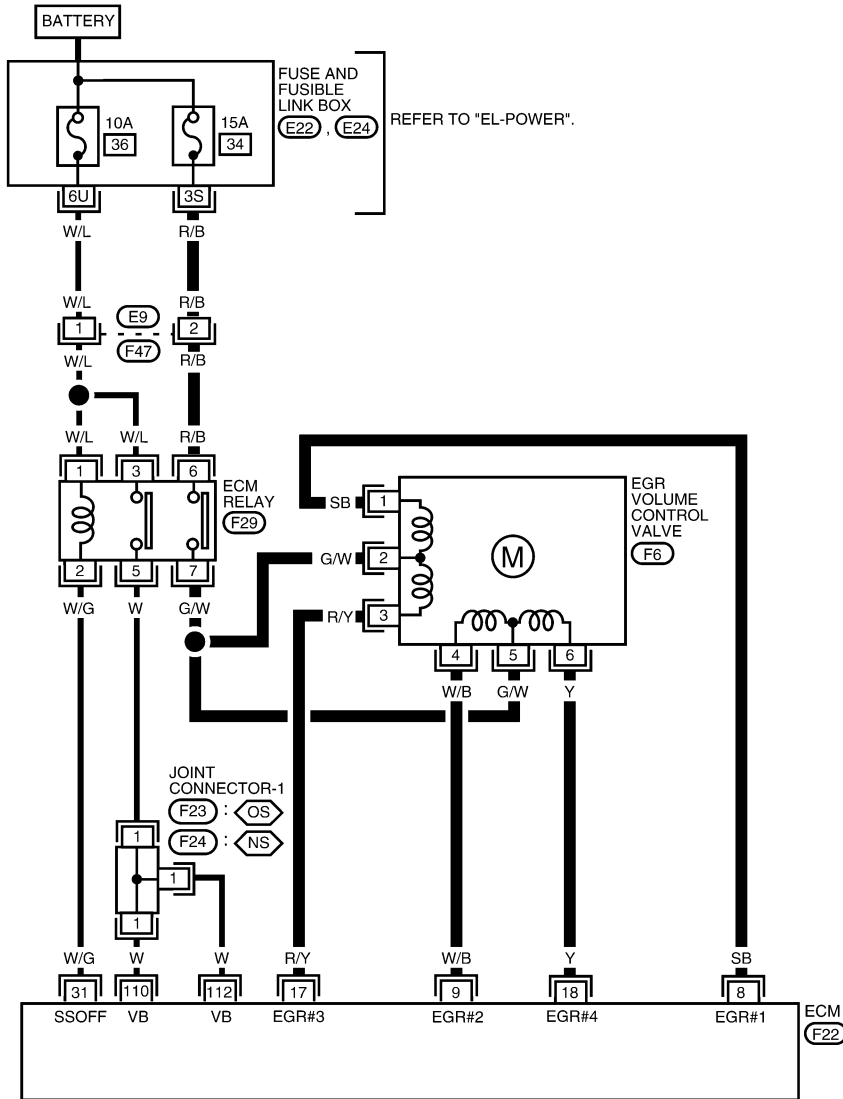
DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

SR20DE

Wiring Diagram

Wiring Diagram

-NIEC0952



EC-EGVC/V-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- NS** : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- OS** : WITH OLD STYLE JOINT CONNECTOR LAYOUT

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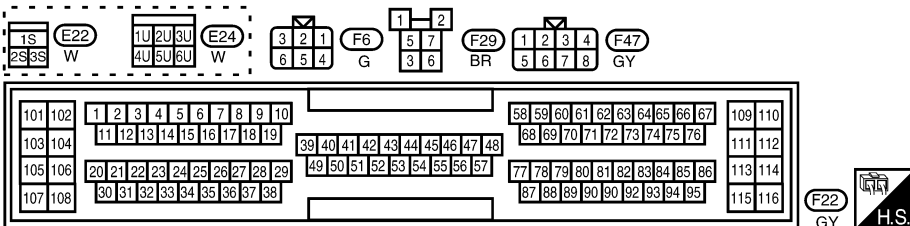
BT

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IDX



REFER TO THE FOLLOWING.
(F24) - JOINT CONNECTOR

WEC954

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

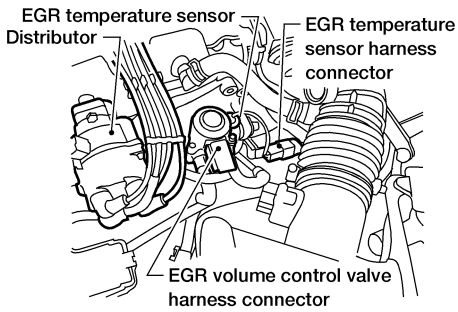
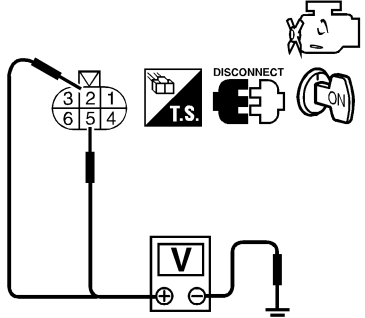
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

SEF575Y

Diagnostic Procedure

NIEC0953

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC285</p> <p>2. Turn ignition switch "ON".</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="margin-left: 100px;">Voltage: Battery voltage</p> </div> <p style="text-align: right;">SEF327X</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 2.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness connectors.</td> </tr> </table>		OK	▶	GO TO 2.	NG	▶	Repair open circuit or short to ground or short to power in harness connectors.
OK	▶	GO TO 2.					
NG	▶	Repair open circuit or short to ground or short to power in harness connectors.					

2	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-1691.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0389</p> <p style="color: blue; margin-left: 20px;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6	OK	▶	GO TO 3.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	EGR volume control valve																
8	1																
9	4																
17	3																
18	6																
OK	▶	GO TO 3.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

DTC P0403 EGR VOLUME CONTROL VALVE (CIRCUIT)

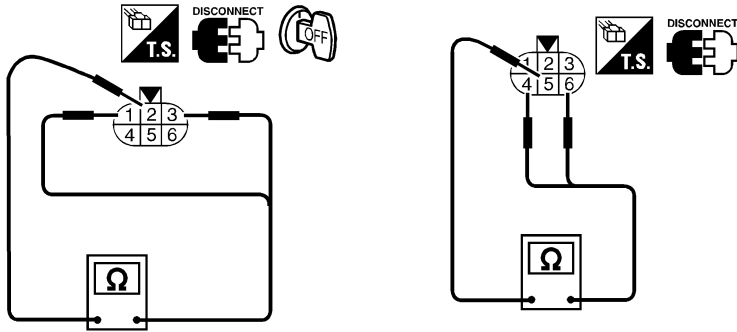
SR20DE

Diagnostic Procedure (Cont'd)

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3 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

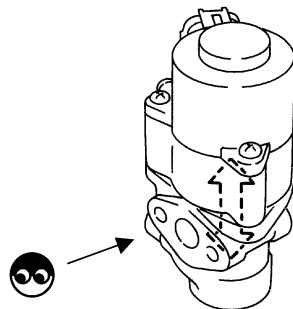
OK (With CONSULT-II)	▶	GO TO 4.
OK (Without CONSULT-II)	▶	GO TO 5.
NG	▶	Replace EGR volume control valve.

4 CHECK EGR VOLUME CONTROL VALVE-II

With CONSULT-II

1. Remove EGR volume control valve.
2. Reconnect ECM harness connector and EGR volume control valve harness connector.
3. Turn ignition switch "ON".
4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.

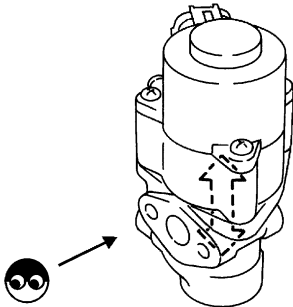
ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
ENG SPEED	XXX rpm



SEF067Y

OK or NG

OK	▶	GO TO 6.
NG	▶	Replace EGR volume control valve.

5	CHECK EGR VOLUME CONTROL VALVE-II
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON" and "OFF". 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 	
	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Replace EGR volume control valve.

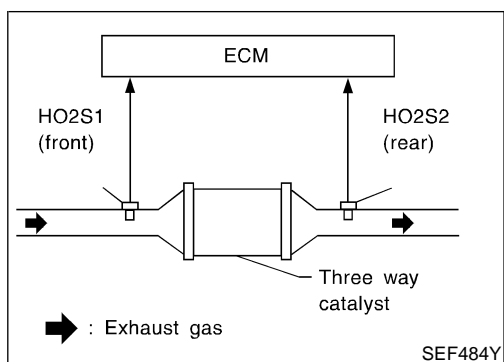
SEF560W

6	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

DTC P0420 THREE WAY CATALYST FUNCTION

SR20DE

On Board Diagnosis Logic



On Board Diagnosis Logic

NIEC0954

The ECM monitors the switching frequency ratio of heated oxygen sensor 1 (front) and 2 (rear).

A three way catalyst with high oxygen storage capacity will indicate a low switching frequency of rear heated oxygen sensor. As oxygen storage capacity decreases, the rear heated oxygen sensor switching frequency will increase.

When the frequency ratio of front and rear heated oxygen sensors approaches a specified limit value, the three way catalyst malfunction is diagnosed.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0420	<ul style="list-style-type: none"> Three way catalyst does not operate properly. Three way catalyst does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> Three way catalyst Exhaust tube Intake air leaks Injectors Injector leaks Spark plug Improper ignition timing

SRT WORK SUPPORT	
CATALYST	INCMP
EVAP SYSTEM	INCMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF671Y

SRT WORK SUPPORT	
CATALYST	CMPLT
EVAP SYSTEM	INCMP
O2 SEN HEATER	CMPLT
O2 SENSOR	INCMP
EGR SYSTEM	INCMP
MONITOR	
ENG SPEED	XXX rpm
MAS A/F SE B1	XXX V
B/FUEL SCHDL	XXX msec
A/F ALPHA-B1	XXX V
COOLAN TEMP/S	XX °C
HO2S1 (B1)	XXX V

SEF672Y

SELF DIAG RESULTS	
DTC RESULTS	TIME
NO DTC IS DETECTED. FURTHER TESTING MAY BE REQUIRED.	

SEF560X

DTC Confirmation Procedure

NIEC0955

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

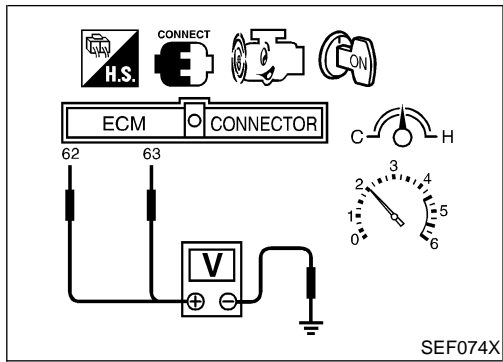
WITH CONSULT-II

NIEC0955S01

TESTING CONDITION:

- Open engine hood before conducting the following procedure.
- Do not hold engine speed for more than the specified minutes below.
 - Turn ignition switch "ON".
 - Select "DTC & SRT CONFIRMATION" then "SRT WORK SUPPORT" mode with CONSULT-II.
 - Start engine.
 - Rev engine up to 3,000±500 rpm and hold it for 3 consecutive minutes then release the accelerator pedal completely.
 - Wait 5 seconds at idle.
 - Rev engine up to 2,500±500 rpm and maintain it until "INCMP" of CATALYST changes to "CMPLT" (It will take approximately 5 minutes).
If not "CMPLT", stop engine and cool it down to less than 70°C (158°F) and then retest from step 1.
 - Select "SELF-DIAG RESULTS" mode with CONSULT-II.
 - Confirm that the 1st trip DTC is not detected.
If the 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1696.

Overall Function Check



Overall Function Check

NIEC0956

Use this procedure to check the overall function of the three way catalyst. During this check, a 1st trip DTC might not be confirmed.

With GST

- 1) Start engine and drive vehicle at a speed of more than 70 km/h (43 MPH) for 2 consecutive minutes.
- 2) Stop vehicle with engine running.
- 3) Set voltmeters probes between ECM terminals 62 [Heated oxygen sensor 1 (front) signal], 63 [Heated oxygen sensor 2 (rear) signal] and engine ground.
- 4) Keep engine speed at 2,000 rpm constant under no load.
- 5) Make sure that the voltage switching frequency (high & low) between ECM terminal 63 and engine ground is much less than that of ECM terminal 62 and engine ground.

Switching frequency ratio = A/B

A: Heated oxygen sensor 2 (rear) voltage switching frequency

B: Heated oxygen sensor 1 (front) voltage switching frequency

This ratio should be less than 0.75.

If the ratio is greater than above, it means three way catalyst does not operate properly.

NOTE:

If the voltage at terminal 62 does not switch periodically more than 5 times within 10 seconds at step 4, perform trouble diagnosis for DTC P0133 first. (See EC-1564.)

Diagnostic Procedure

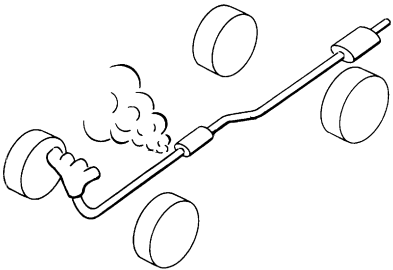
NIEC0957

1	CHECK EXHAUST SYSTEM	
Visually check exhaust tubes and muffler for dents.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair or replace.

DTC P0420 THREE WAY CATALYST FUNCTION

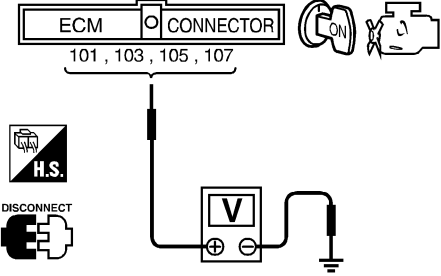
SR20DE

Diagnostic Procedure (Cont'd)

2	CHECK EXHAUST AIR LEAK	
<p>1. Start engine and run it at idle. 2. Listen for an exhaust air leak before the three way catalyst.</p>		
		
SEF099P		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair or replace.

3	CHECK INTAKE AIR LEAK	
Listen for an intake air leak after the mass air flow sensor.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace.

4	CHECK IGNITION TIMING	
Check for ignition timing. Refer to "BASIC INSPECTION", EC-1461.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Adjust ignition timing.

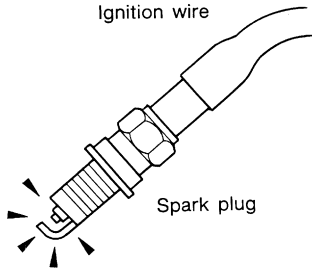
5	CHECK INJECTORS	
<p>1. Refer to Wiring Diagram for Injectors, EC-1906. 2. Stop engine and then turn ignition switch "ON". 3. Check voltage between ECM terminals 101, 103, 105 and 107 and ground with CONSULT-II or tester.</p>		
		
SEF075X		
OK or NG		
Battery voltage should exist.		
OK	▶	GO TO 6.
NG	▶	Perform "Diagnostic Procedure" INJECTOR, EC-1907.

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DTC P0420 THREE WAY CATALYST FUNCTION

SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK IGNITION SPARK
<ol style="list-style-type: none">1. Disconnect ignition wire from spark plug.2. Connect a known good spark plug to the ignition wire.3. Place end of spark plug against a suitable ground and crank engine.4. Check for spark.	
	
SEF282G	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	CHECK IGNITION WIRES
Refer to "Component Inspection", EC-1662.	
OK or NG	
OK	▶ Check ignition coil, power transistor and their circuits. Refer to EC-1899.
NG	▶ Replace.

8	CHECK INJECTOR
<ol style="list-style-type: none">1. Turn ignition switch "OFF".2. Remove injector assembly. Refer to EC-1404. Keep fuel hose and all injectors connected to injector gallery.3. Disconnect distributor harness connector.4. Turn ignition switch "ON". Make sure fuel does not drip from injector.	
OK or NG	
OK (Does not drip)	▶ GO TO 9.
NG (Drips)	▶ Replace the injector(s) from which fuel is dripping.

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
Trouble is fixed	▶ INSPECTION END
Trouble is not fixed	▶ Replace three way catalyst.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC0958

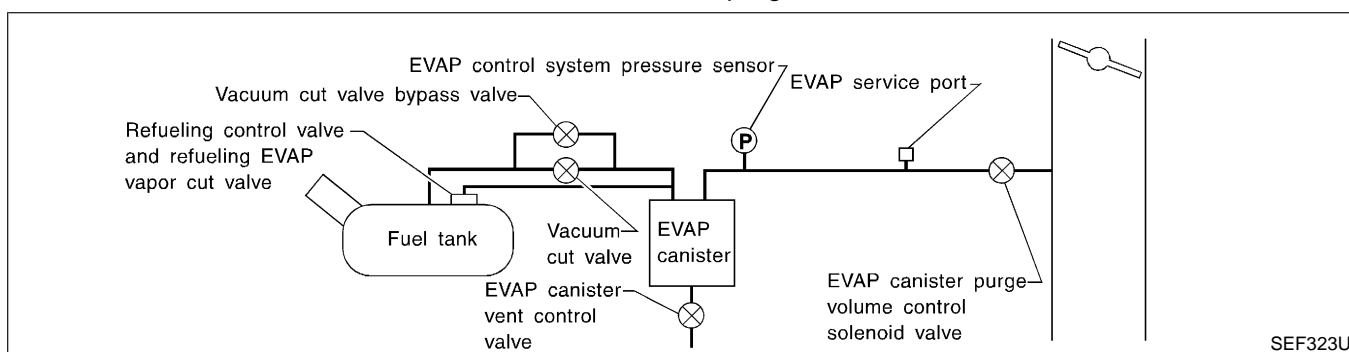
NOTE:

If DTC P0440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1861.)

This diagnosis detects leaks in the EVAP purge line using engine intake manifold vacuum.

If pressure does not increase, the ECM will check for leaks in the line between the fuel tank and EVAP canister purge volume control solenoid valve, under the following "Vacuum test" conditions.

The vacuum cut valve bypass valve is opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control solenoid valve is opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge volume control solenoid valve will be closed.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC0959

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close.
- Foreign matter caught in fuel filler cap.
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve.
- Foreign matter caught in EVAP canister vent control valve.
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent.
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged.
- Water separator
- EVAP canister is saturated with water.
- EVAP control system pressure sensor
- Fuel level sensor and the circuit
- Refueling control valve
- ORVR system leaks

5	EVAP SML LEAK P0440/P1440
<p>1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS. -FUEL LEVEL: 1/4-3/4 -AMBIENT TEMP: 0-30 C(32-86F) -OPEN ENGINE HOOD. 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC.THEN RESTART. 3)TOUCH START.</p>	
SEF565X	

5	EVAP SML LEAK P0440/P1440
<p>WAIT 2 TO 10 MINUTES. KEEP ENGINE RUNNING AT IDLE SPEED.</p>	
SEF566X	

5	EVAP SML LEAK P0440/P1440
OK	
SELF-DIAG RESULTS	
<p>NO DTC DETECTED. FURTHER TESTING MAY BE REQUIRED.</p>	
SEF567X	

DTC Confirmation Procedure

NIEC0960

CAUTION:

Never remove fuel filler cap during the DTC confirmation procedure.

NOTE:

- If DTC P0440 or P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1861.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Always perform test at a temperature of 0 to 30°C (32 to 86°F).

WITH CONSULT-II

NIEC0960S01

- 1) Turn ignition switch “ON”.
- 2) Turn ignition switch “OFF” and wait at least 10 seconds.
- 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 4) Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 30°C (32 - 86°F)
- 5) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
 Follow the instruction displayed.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

DTC Confirmation Procedure (Cont'd)

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to "Basic Inspection", EC-1461.

- 6) Make sure that "OK" is displayed.
If "NG" is displayed, refer to "Diagnostic Procedure", EC-1701.

WITH GST

NIEC0960S02

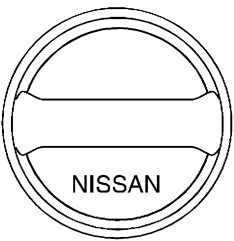
NOTE:

Be sure to read the explanation of "Driving Pattern" on EC-1428 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to "Driving Pattern", EC-1428.
- 3) Stop vehicle.
- 4) Select "MODE 1" with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds.
- 6) Start engine.
It is not necessary to cool engine down before driving.
- 7) Drive vehicle again according to the "Driving Pattern", EC-1428.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", EC-1701.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-1852.
 - If P0440, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

Diagnostic Procedure

NIEC0961

1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.		
		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

SEF915U

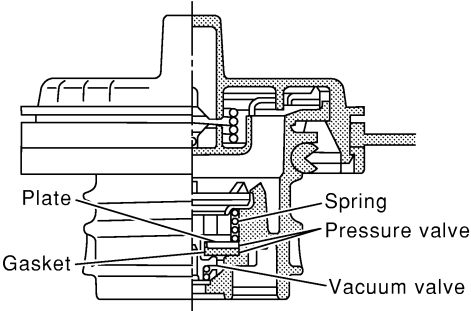
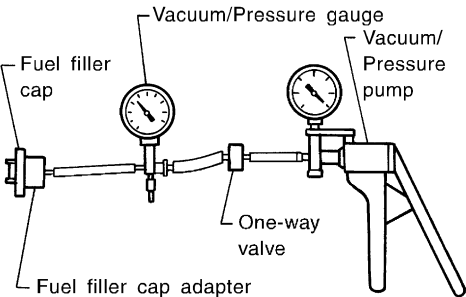
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
<ol style="list-style-type: none"> 1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum. 		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.50 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

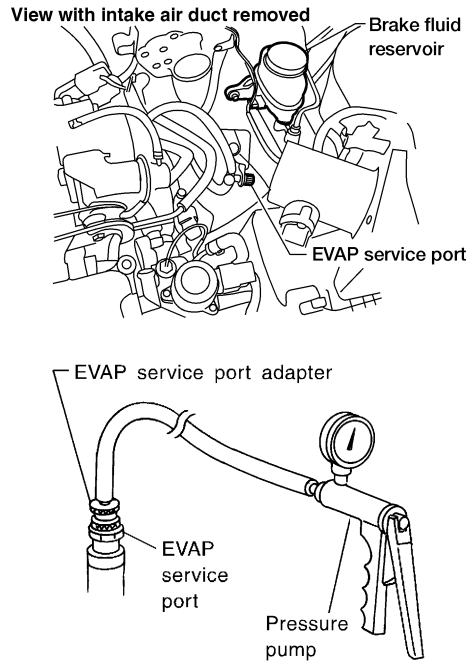
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

5 INSTALL THE PRESSURE PUMP

To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.



LEC288

SEF916U

NOTE:

Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.

Models with CONSULT-II	▶	GO TO 6.
Models without CON- SULT-II	▶	GO TO 7.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

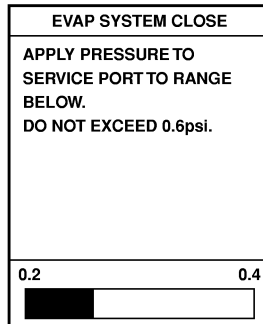
6 CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

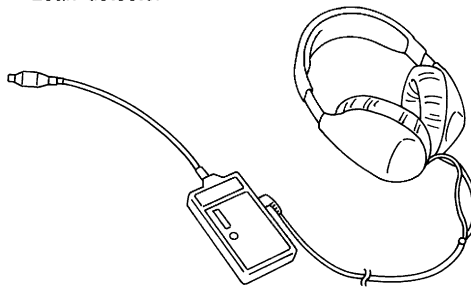
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.

Leak detector



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

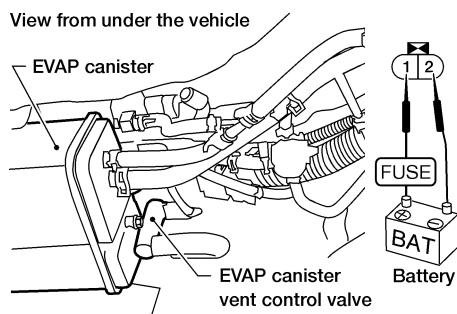
SR20DE

Diagnostic Procedure (Cont'd)

7 CHECK FOR EVAP LEAK

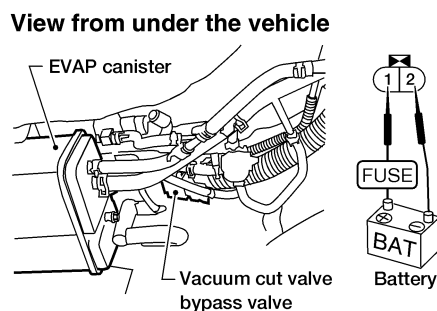
⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



WEC292

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



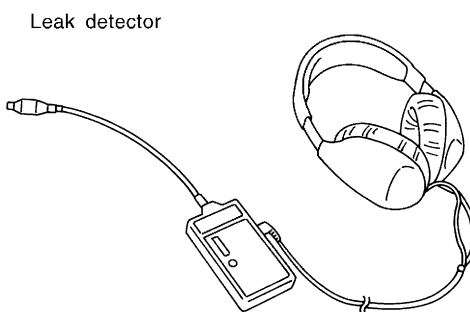
WEC293

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.



SEF200U

OK or NG

OK	▶	GO TO 8.
NG	▶	Repair or replace.

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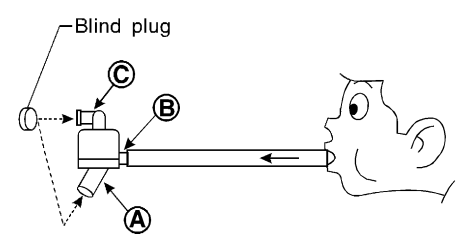
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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

8	RELEASE EVAP LINE PRESSURE
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine and warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine and warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 	
▶ GO TO 9.	

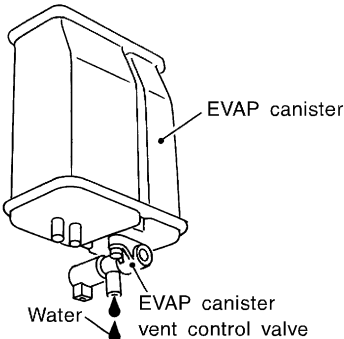
9	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 	
 <p style="text-align: center;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>	
SEF829T	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. 	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace water separator.

10	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT
Refer to "DTC Confirmation Procedure", EC-1715.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

11	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Does water drain from the EVAP canister?</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 12.
No (With CONSULT-II)	▶	GO TO 14.
No (Without CONSULT-II)	▶	GO TO 15.

12	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 14.
OK (Without CONSULT-II)	▶	GO TO 15.
NG	▶	GO TO 13.

13	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
	▶	Repair hose or replace EVAP canister.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

14	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
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HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
Vacuum should exist.																						
SEF595Y																						
OK or NG																						
OK	▶	GO TO 17.																				
NG	▶	GO TO 16.																				

15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue; margin-left: 20px;">Vacuum should exist.</p>		
OK or NG		
OK	▶	GO TO 19.
NG	▶	GO TO 16.

16	CHECK VACUUM HOSE	
<p>Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-1379.</p>		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 17.
OK (Without CONSULT-II)	▶	GO TO 18.
NG	▶	Repair or reconnect the hose.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

17	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓟ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
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HO2S1 MNTR (B1)	LEAN																					
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OK	▶	GO TO 19.																				
NG	▶	GO TO 18.																				

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

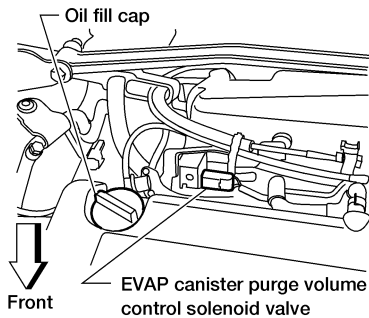
SR20DE

Diagnostic Procedure (Cont'd)

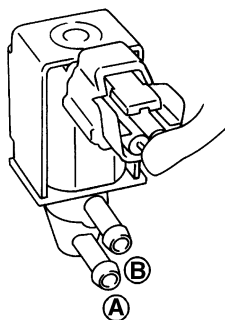
18 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273

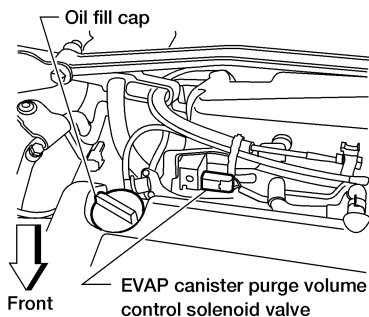


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

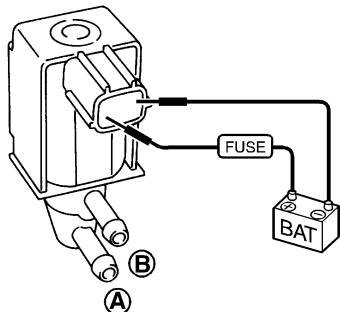
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 19.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

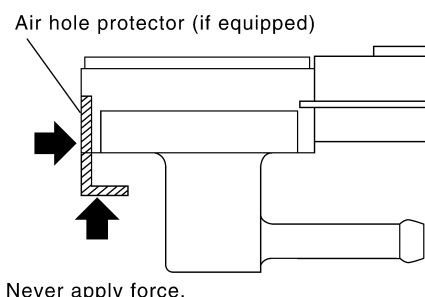
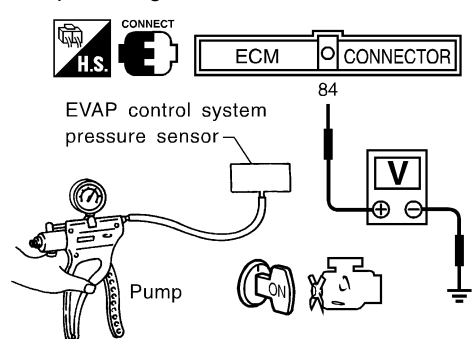
DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

19	CHECK FUEL TANK TEMPERATURE SENSOR	
1. Remove fuel level sensor unit and fuel pump. 2. Check fuel tank temperature sensor. Refer to EC-1637, "Component Inspection".		
OK or NG		
OK	▶	GO TO 20.
NG	▶	Replace fuel level sensor unit.

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20	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR	
1. Remove EVAP control system pressure sensor with its harness connector connected. CAUTION: ● Never apply force to the air hole protector of the sensor if equipped.		
		
SEF799W		
2. Remove hose from EVAP control system pressure sensor. 3. Turn ignition switch "ON". 4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure. CAUTION: ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.		
5. Check input voltage between ECM terminal 84 and ground.		
		
SEF342X		
CAUTION: ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.		
OK or NG		
OK	▶	GO TO 21.
NG	▶	Replace EVAP control system pressure sensor.

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DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

21	CHECK EVAP PURGE LINE
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks or improper connection. Refer to "Evaporative Emission System", EC-1385.	
OK or NG	
OK	▶ GO TO 22.
NG	▶ Repair or reconnect the hose.

22	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 23.

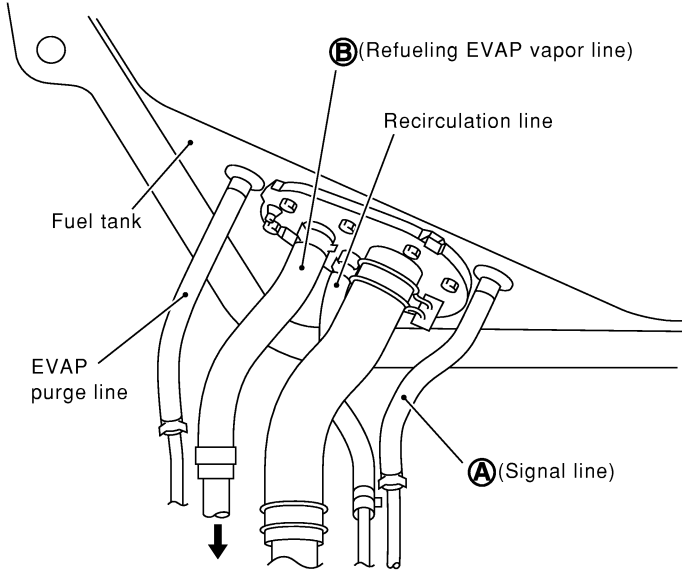
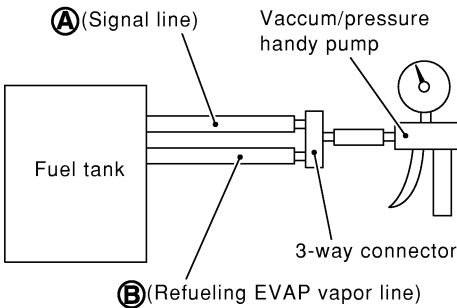
23	CHECK REFUELING EVAP VAPOR LINE
Check refueling EVAP vapor line between EVAP canister and fuel tank for clogging, kink, looseness and improper connection. For location, refer to "ON BOARD REFUELING VAPOR RECOVERY (ORVR)", EC-1391.	
OK or NG	
OK	▶ GO TO 24.
NG	▶ Repair or replace hoses and tubes.

24	CHECK SIGNAL LINE AND RECIRCULATION LINE
Check signal line and recirculation line between filler neck tube and fuel tank for clogging, kink, cracks, looseness and improper connection.	
OK or NG	
OK	▶ GO TO 25.
NG	▶ Repair or replace hoses, tubes or filler neck tube.

DTC P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)

SR20DE

Diagnostic Procedure (Cont'd)

25	CHECK REFUELING CONTROL VALVE	
<ol style="list-style-type: none"> 1. Remove fuel filler cap. 2. Check air continuity between hose ends A and B. Blow air into the hose end B. Air should flow freely into the fuel tank. 3. Blow air into hose end A and check there is no leakage. 4. Apply pressure to both hose ends A and B [20 kPa (150 mmHg, 5.91 inHg)] using a pressure pump and a suitable 3-way connector. Check that there is no leakage. 		
 		
OK or NG		
OK	▶	GO TO 26.
NG	▶	Replace refueling control valve with fuel tank.

26	CHECK FUEL LEVEL SENSOR	
Refer to <i>EL-102</i> , "Fuel Level Sensor Unit Check".		
OK or NG		
OK	▶	GO TO 27.
NG	▶	Replace fuel level sensor unit.

27	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

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DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

SR20DE

Description

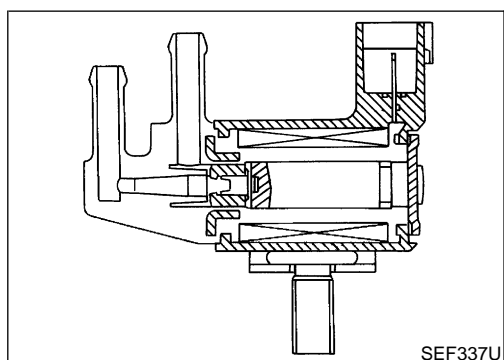
Description SYSTEM DESCRIPTION

NIEC0962

NIEC0962S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Throttle position switch	Closed throttle position		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor bypass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



COMPONENT DESCRIPTION

NIEC0962S02

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

CONSULT-II Reference Value in Data Monitor Mode

NIEC0963

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load 	Idle (Vehicle stopped)	0%
		2,000 rpm	—

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through the valve. NIEC0964

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Possible Cause

- Harness or connectors
(The valve circuit is open or shorted.)
- EVAP canister purge volume control solenoid valve

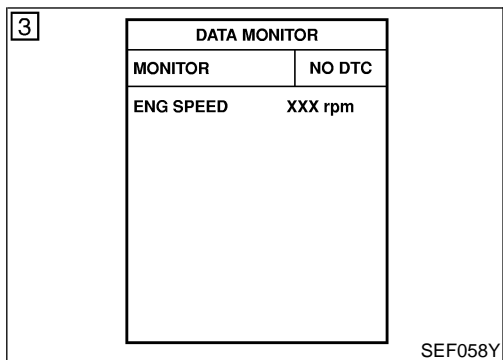
NIEC0965

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DTC Confirmation Procedure

NIEC0966

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

WITH CONSULT-II

NIEC0966S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 13 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1717.

AT

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WITH GST

NIEC0966S02

Follow the procedure "WITH CONSULT-II" above.

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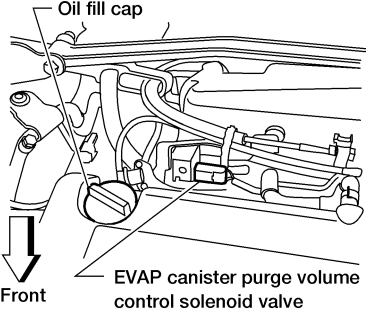
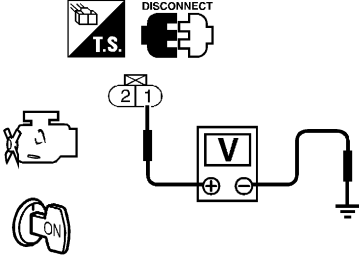
DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0968

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	GI MA EM LC EC FE CL MT AT AX SU BR
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  <p>Oil fill cap</p> <p>Front</p> <p>EVAP canister purge volume control solenoid valve</p> </div> <p style="text-align: right;">LEC273</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: center;">OK or NG</p> <p style="text-align: right;">SEF206W</p> </div>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	ST RS BT HA SC EL IDX
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors F63, M101 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-1716.</p> <p style="padding-left: 20px;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 5.
OK (Without CONSULT-II) ▶		GO TO 6.
NG ▶		GO TO 4.

4	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F101, F63 ● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM 		
▶		Repair open circuit or short to ground and short to power in harness or connectors.

5	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p> With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
OK or NG																						
OK ▶		GO TO 7.																				
NG ▶		GO TO 6.																				

SEF801Y

DTC P0443 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE (CIRCUIT)

SR20DE

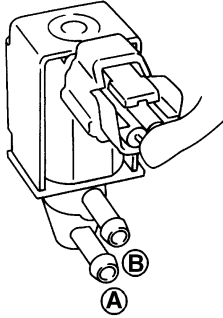
Diagnostic Procedure (Cont'd)

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6 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.

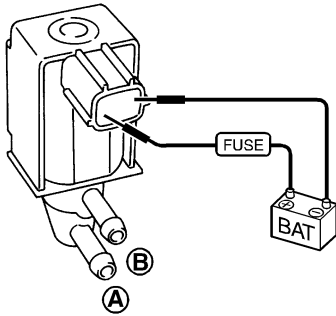


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 7.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

7 CHECK INTERMITTENT INCIDENT

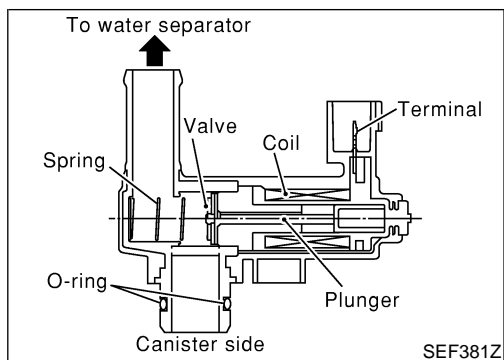
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.

▶ INSPECTION END

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

Component Description



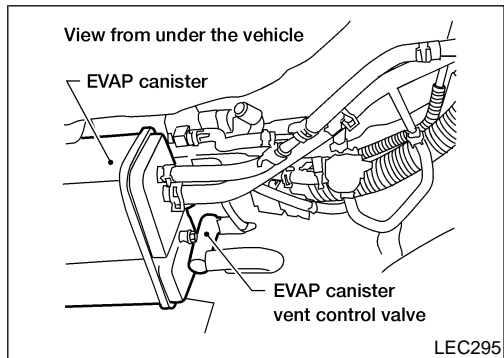
Component Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent. NIEC0969

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.



CONSULT-II Reference Value in Data Monitor Mode

NIEC0970

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through EVAP canister vent control valve. NIEC0971

Possible Cause

- Harness or connectors (The valve circuit is open or shorted.)
- EVAP canister vent control valve

NIEC0972

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC0973

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm battery voltage is more than 11V at idle.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC0973S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 8 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1723.

WITH GST

NIEC0973S02

Follow the procedure "WITH CONSULT-II" above.

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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

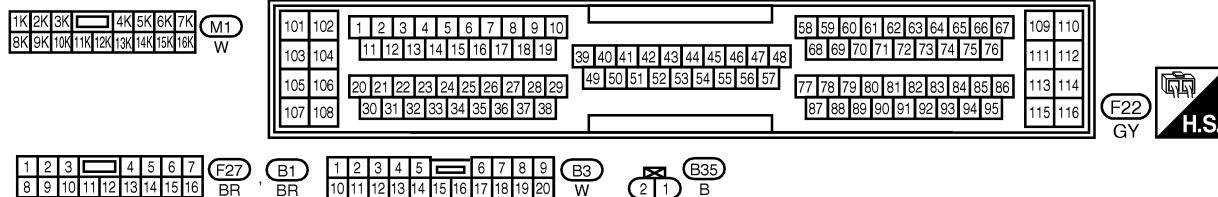
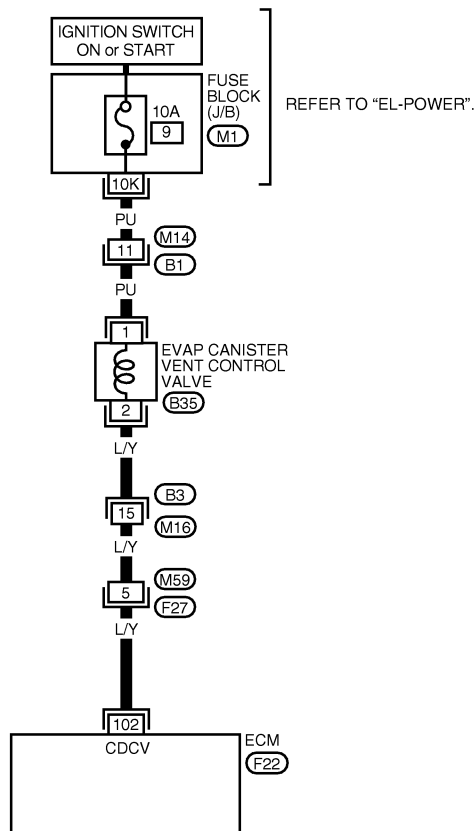
Wiring Diagram

Wiring Diagram

NIEC0974

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF577Y

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC0975

1	INSPECTION START	
1. Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

GI
MA
EM

2	CHECK EVAP CANISTER VENT CONTROL VALVE CIRCUIT																					
<p> With CONSULT-II</p> <p>1. Turn ignition switch "OFF" and then turn "ON".</p> <p>2. Select "VENT CONTROL/V" in "ACTIVE TEST" mode with CONSULT-II.</p> <p>3. Touch "ON/OFF" on CONSULT-II screen.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>VENT CONTROL/V</td><td>OFF</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 (B1)</td><td>XXX V</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VENT CONTROL/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 (B1)	XXX V																					
THRTL POS SEN	XXX V																					
<p>4. Check for operating sound of the valve. Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

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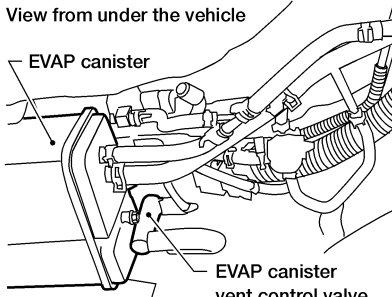
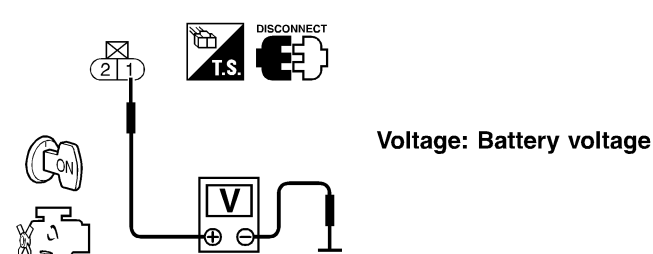
HA
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IDX

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK EVAP CANISTER VENT CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister vent control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC295</p> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister vent control valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">SEF336X</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>		OK	▶	GO TO 5.	NG	▶	GO TO 4.
OK	▶	GO TO 5.					
NG	▶	GO TO 4.					

4	DETECT MALFUNCTIONING PART			
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between EVAP canister vent control valve and fuse <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;"></td> <td style="width: 5%; text-align: center;">▶</td> <td>Repair harness or connectors.</td> </tr> </table>			▶	Repair harness or connectors.
	▶	Repair harness or connectors.		

5	CHECK EVAP CANISTER VENT CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT						
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 102 and EVAP canister vent control valve terminal 2. Refer to "Wiring Diagram", EC-1722. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 6.</td> </tr> </table>		OK	▶	GO TO 7.	NG	▶	GO TO 6.
OK	▶	GO TO 7.					
NG	▶	GO TO 6.					

DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure (Cont'd)

6	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness connectors M59, F27 ● Harness for open or short between EVAP canister vent control valve and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK RUBBER TUBE FOR CLOGGING
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Clean the rubber tube using an air blower.

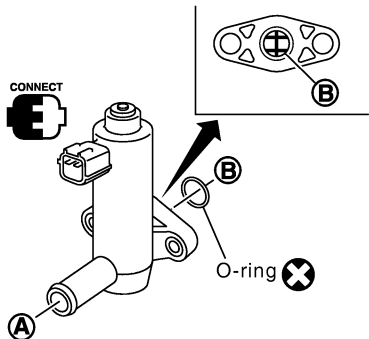
8	CHECK EVAP CANISTER VENT CONTROL VALVE-I
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.	
<p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 9.
NG	▶ Replace EVAP canister vent control valve.

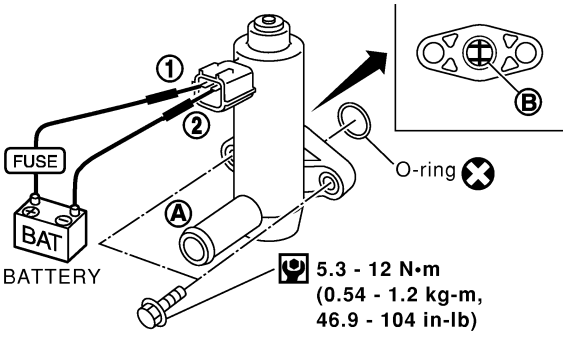
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DTC P0446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CIRCUIT)

SR20DE

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CANISTER VENT CONTROL VALVE-II																											
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																												
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VENT CONTROL/V</th> <th>OFF</th> </tr> </thead> <tbody> <tr> <td colspan="2">MONITOR</td> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p> </div> </div>			ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition	Air passage continuity between A and B	ON	No	OFF	Yes
ACTIVE TEST																												
VENT CONTROL/V	OFF																											
MONITOR																												
ENG SPEED	XXX rpm																											
A/F ALPHA-B1	XXX %																											
HO2S1 (B1)	XXX V																											
THRTL POS SEN	XXX V																											
Condition	Air passage continuity between A and B																											
ON	No																											
OFF	Yes																											
SEF925Z																												

<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>								
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  <p style="margin-top: 10px;">5.3 - 12 N·m (0.54 - 1.2 kg·m, 46.9 - 104 in·lb)</p> </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p> </div> </div>			Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B							
12V direct current supply between terminals 1 and 2	No							
OFF	Yes							
SEF378Z								
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 11.						
NG	▶	GO TO 10.						

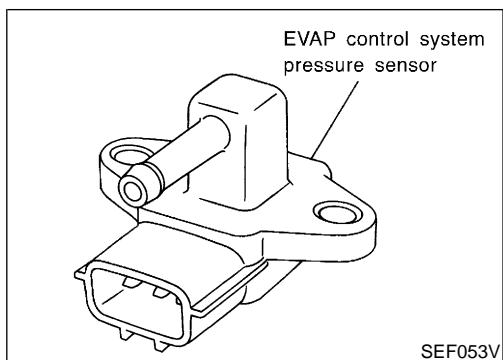
10	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 9 again. 		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Replace EVAP canister vent control valve.

11	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

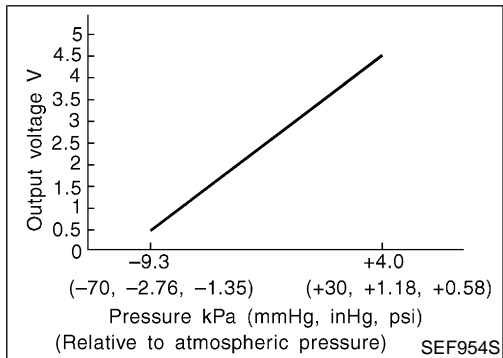
Component Description



Component Description

The EVAP control system pressure sensor detects pressure in the purge line. The sensor output voltage to the ECM increases as pressure increases. The EVAP control system pressure sensor is not used to control the engine system. It is used only for on board diagnosis.

NIEC0976



CONSULT-II Reference Value in Data Monitor Mode

NIEC0977

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
EVAP SYS PRES	● Ignition switch: ON	Approx. 3.4V

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal from EVAP control system pressure sensor is sent to ECM.

NIEC0978

Possible Cause

NIEC0979

- Harness or connectors
(The EVAP control system pressure sensor circuit is open or shorted.)
- Rubber hose to EVAP control system pressure sensor is clogged, vent, kinked, disconnected or improper connection.
- EVAP control system pressure sensor
- EVAP canister vent control valve
- EVAP canister purge volume control solenoid valve
- EVAP canister

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

DTC Confirmation Procedure

- Rubber hose from EVAP canister vent control valve to water separator

DTC Confirmation Procedure

NIEC0980

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

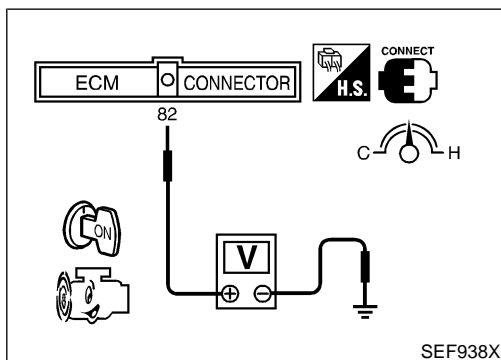
6	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	FUEL T/TMP SE	XXX °C

SEF194Y

WITH CONSULT-II

NIEC0980S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT-II.
- 5) Make sure that "FUEL T/TEMP SE" is more than 0°C (32°F).
- 6) Start engine and wait at least 20 seconds.
- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1730.



WITH GST

NIEC0980S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check that voltage between ECM terminal 82 (Fuel tank temperature sensor signal) and ground is less than 4.2V.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and wait at least 20 seconds.
- 5) Select "MODE 7" with GST.
- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1730.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

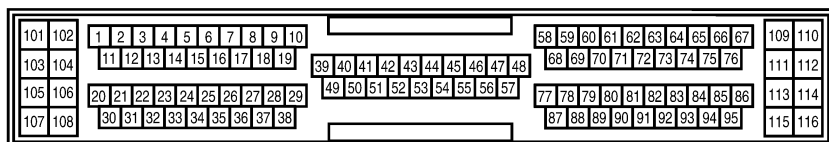
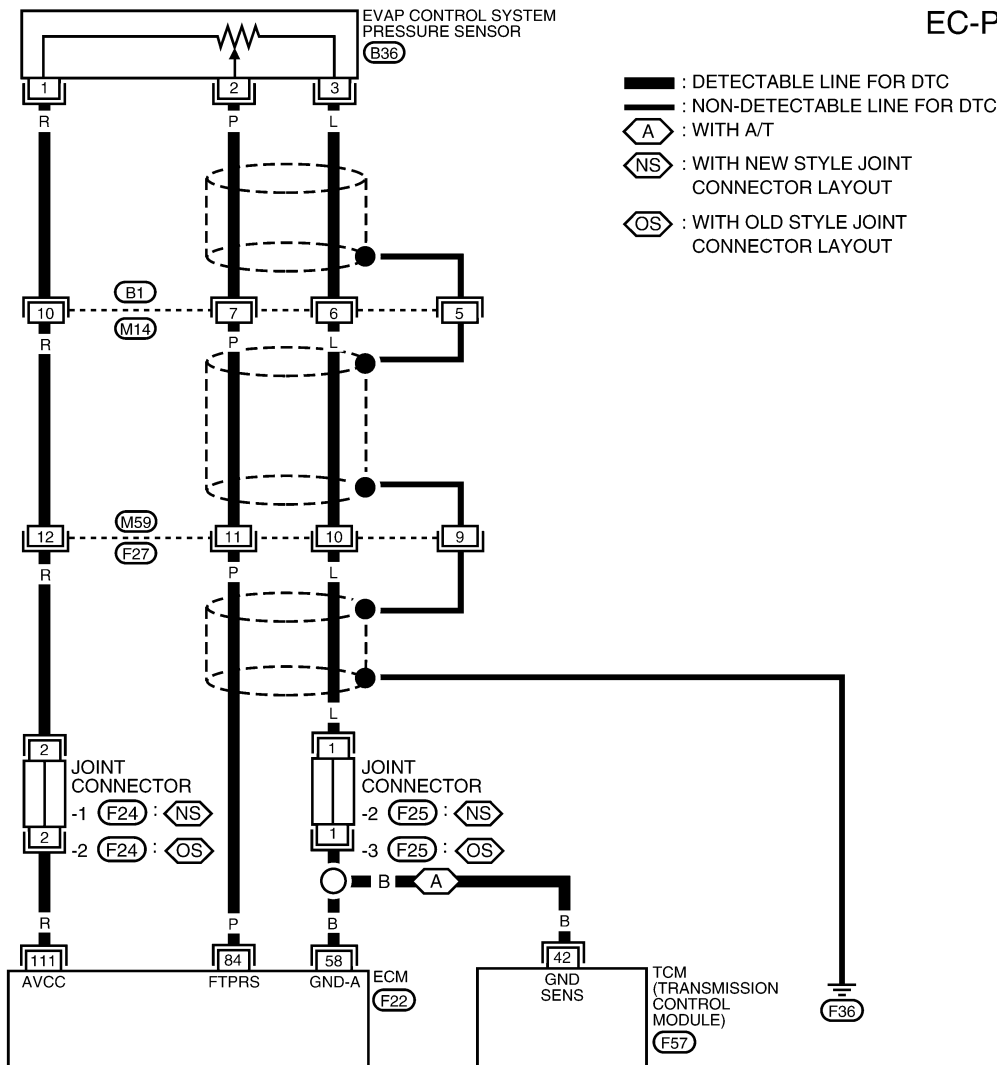
SR20DE

Wiring Diagram

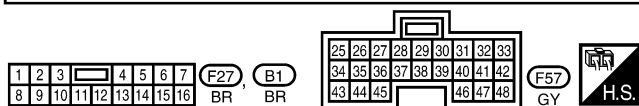
Wiring Diagram

NIEC0981

EC-PRE/SE-01



REFER TO THE FOLLOWING.
(F24), (F25) - JOINT CONNECTOR



WEC955

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
84	P	EVAP CONTROL SYSTEM PRESSURE SENSOR	IGN ON	APPROX. 3.4V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

SEF578Y

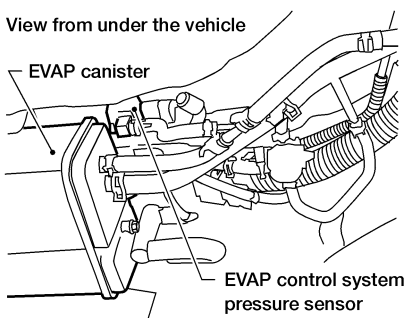
DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

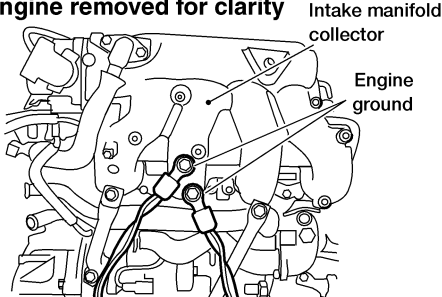
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Diagnostic Procedure

Diagnostic Procedure

NIEC0982

1	CHECK RUBBER TUBE	
<p>1. Turn ignition switch "OFF". 2. Check rubber tube connected to the EVAP control system pressure sensor for clogging, vent, kink, disconnection or improper connection.</p>		
<p>View from under the vehicle</p>  <p style="text-align: right;">LEC294</p>		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Reconnect, repair or replace.

2	RETIGHTEN GROUND SCREWS	
<p>Loosen and retighten engine ground screws.</p>		
<p>Engine removed for clarity</p>  <p style="text-align: right;">LEC302</p>		
▶ GO TO 3.		

3	CHECK CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector. 2. Check sensor harness connector for water. Water should not exist.</p>		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair or replace harness connector.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

4	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "ON". 2. Check voltage between EVAP control system pressure sensor terminal 1 and ground with CONSULT-II or tester.</p>		
SEF341X		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

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5	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-2 ● Harness for open or short between EVAP control system pressure sensor and ECM 		
▶ Repair harness or connectors.		

MT

AT

AX

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Check harness continuity between EVAP control system pressure sensor terminal 3 and engine ground. Refer to "Wiring Diagram", EC-1729. Continuity should exist. 3. Also check harness for short to power.</p>		
OK or NG		
OK	▶	GO TO 8.
NG	▶	GO TO 7.

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7	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Joint connector-3 ● Harness for open or short between EVAP control system pressure sensor and ECM ● Harness for open or short between EVAP control system pressure sensor and TCM (Transmission Control Module) 		
▶ Repair open circuit or short to power in harness or connectors.		

BT

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 84 and EVAP control system pressure sensor terminal 2. Refer to "Wiring Diagram", EC-1729. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK (With CONSULT-II) ▶		GO TO 10.
OK (Without CONSULT-II) ▶		GO TO 11.
NG ▶		GO TO 9.

9	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Harness for open or short between ECM and EVAP control system pressure sensor 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

10	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																					
<p>Ⓜ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
OK or NG																						
OK ▶		GO TO 12.																				
NG ▶		GO TO 11.																				

SEF801Y

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

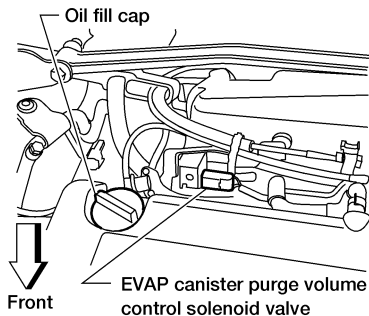
Diagnostic Procedure (Cont'd)

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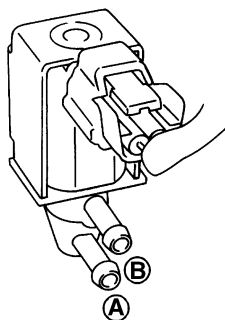
11 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273

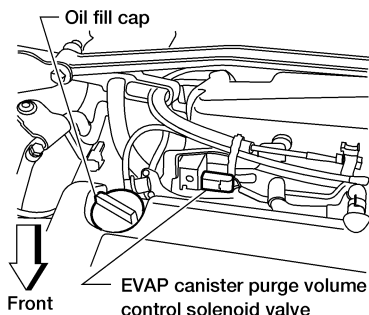


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

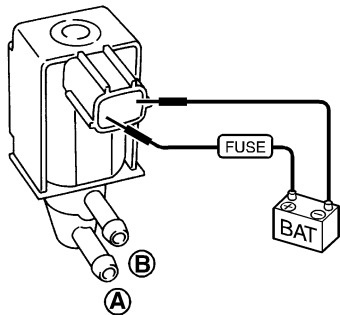
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

12	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Clean the rubber tube using an air blower.

13	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

SEF376Z

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

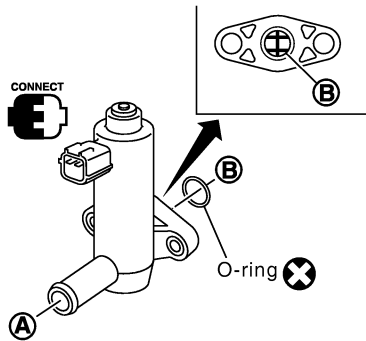
SR20DE

Diagnostic Procedure (Cont'd)

14 CHECK EVAP CANISTER VENT CONTROL VALVE

With CONSULT-II

1. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

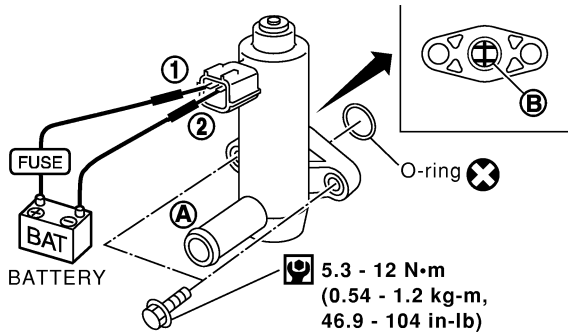
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF925Z

Without CONSULT-II

- Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 16.
NG	▶	GO TO 15.

15 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 14 again.

OK or NG

OK	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

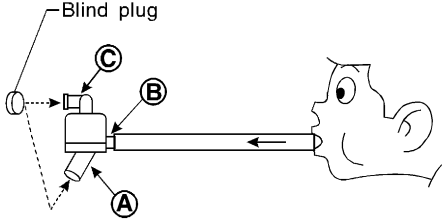
16	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP control system pressure sensor.

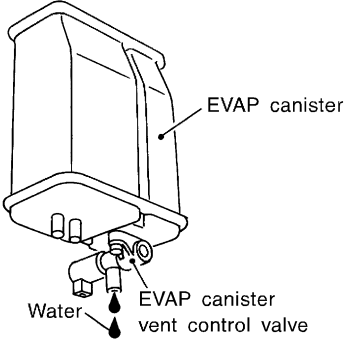
17	CHECK RUBBER TUBE
<p>Check obstructed rubber tube connected to EVAP canister vent control valve.</p>	
OK or NG	
OK	▶ GO TO 18.
NG	▶ Clean rubber tube using an air blower, repair or replace rubber tube.

DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

18	CHECK WATER SEPARATOR	<p>1. Check visually for insect nests in the water separator air inlet.</p> <p>2. Check visually for cracks or flaws in the appearance.</p> <p>3. Check visually for cracks or flaws in the hose.</p> <p>4. Check that A and C are not clogged by blowing air into B with A, and then C plugged.</p> <div style="text-align: center;">  <p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right;">SEF829T</p> <p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> Do not disassemble water separator. <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 19.	
NG	▶	Replace water separator.	

19	CHECK IF EVAP CANISTER SATURATED WITH WATER	<p>1. Remove EVAP canister with EVAP canister vent control valve attached.</p> <p>2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF596U</p> </div> <p style="text-align: center;">Yes or No</p>	
Yes	▶	GO TO 20.	
No	▶	GO TO 22.	

20	CHECK EVAP CANISTER	<p>Weigh the EVAP canister with the EVAP canister vent control valve attached.</p> <p>The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 18.	
NG	▶	GO TO 17.	

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DTC P0450 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

21	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● EVAP canister for damage● EVAP hose between EVAP canister and water separator for clogging or poor connection	
	▶ Repair hose or replace EVAP canister.

22	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR SHIELD CIRCUIT FOR OPEN AND SHORT
1. Reconnect harness connectors disconnected. 2. Disconnect harness connectors B1, M14 3. Check harness continuity between harness connector M14 terminal 5 and engine ground. Refer to "Wiring Diagram", EC-1729. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 24.
NG	▶ GO TO 23.

23	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors M59, F27● Harness for open or short between harness connector M14 and engine ground	
	▶ Repair open circuit or short to power in harness or connectors.

24	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

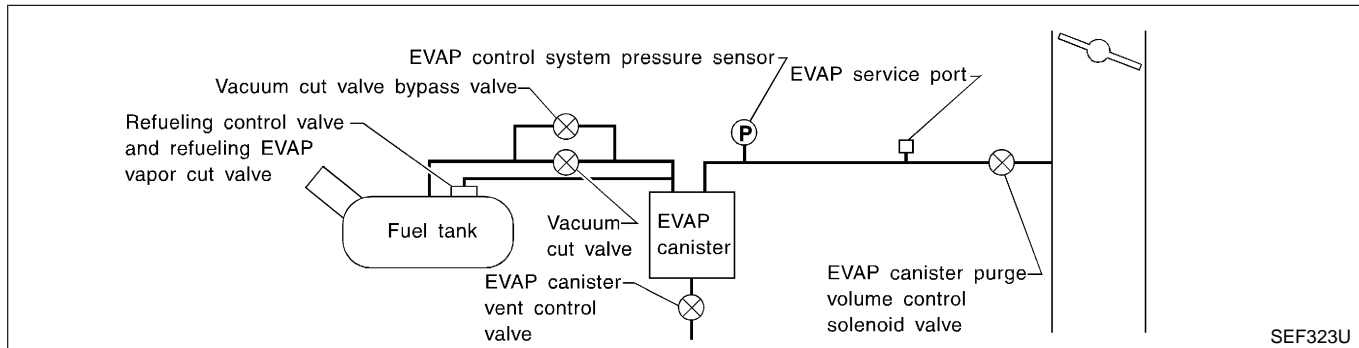
On Board Diagnosis Logic

NIEC0983

NOTE:

If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1861.)

This diagnosis detects a very large leak (fuel filler cap fell off etc.) in the EVAP system between the fuel tank and the EVAP canister purge volume control solenoid valve.



Malfunction is detected when EVAP control system has very large leaks such as when fuel filler cap has fallen off, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC0984

- Fuel filler cap remains open or fails to close
- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Foreign matter caught in fuel filler cap
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve
- Foreign matter caught in EVAP canister vent control valve
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks
- EVAP purge line rubber tube bent
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve and the circuit
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged
- EVAP control system pressure sensor

6
SEF565X

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
 -FUEL LEVEL: 1/4-3/4
 -AMBIENT TEMP: 0-30 C(32-86F)
 -OPEN ENGINE HOOD.
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
 3)TOUCH START.

6
SEF566X


EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING AT IDLE SPEED.

6
SEF874X

EVAP SML LEAK P0440/P1440

MAINTAIN
1600 - 2100 RPM UNTIL FINAL RESULT APPEARS.
(APPROX. 3 MINUTES)



6
SEF567X

EVAP SML LEAK P0440/P1440

OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

DTC Confirmation Procedure

NIEC0985

CAUTION:

Never remove fuel filler cap during the DTC Confirmation Procedure.

NOTE:

- If DTC P0455 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1861.)
- Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
- Open engine hood before conducting the following procedure.

WITH CONSULT-II

NIEC0985S01

- 1) Tighten fuel filler cap securely until ratcheting sound is heard.
- 2) Turn ignition switch “ON”.
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
- 5) Make sure that the following conditions are met.
COOLAN TEMP/S: 0 - 70°C (32 - 158°F)
INT/A TEMP SE: 0 - 60°C (32 - 140°F)
- 6) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
 Follow the instruction displayed.

NOTE:

If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-1461.

- 7) Make sure that “OK” is displayed.
 If “NG” is displayed, select “SELF-DIAG RESULTS” mode with CONSULT-II and make sure that “EVAP GROSS LEAK [P0455]” is displayed. If it is displayed, refer to “Diagnostic Procedure”, EC-1741.
 If P0440 is displayed, perform “Diagnostic Procedure” for DTC P0440.

WITH GST

NIEC0985S02

NOTE:

Be sure to read the explanation of “Driving Pattern” on EC-1428 before driving vehicle.

- 1) Start engine.
- 2) Drive vehicle according to “Driving Pattern”, EC-1428.
- 3) Stop vehicle.
- 4) Select “MODE 1” with GST.
 - If SRT of EVAP system is not set yet, go to the following step.
 - If SRT of EVAP system is set, the result will be OK.
- 5) Turn ignition switch “OFF” and wait at least 10 seconds.
- 6) Start engine.

It is not necessary to cool engine down before driving.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

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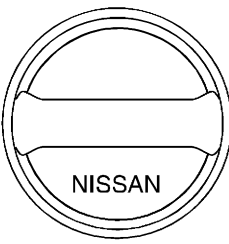
DTC Confirmation Procedure (Cont'd)

- 7) Drive vehicle again according to the "Driving Pattern", EC-1428.
- 8) Stop vehicle.
- 9) Select "MODE 3" with GST.
 - If P0455 is displayed on the screen, go to "Diagnostic Procedure", EC-1741.
 - If P0440 or P1440 is displayed on the screen, go to "Diagnostic Procedure", for DTC P0440, EC-1701.
 - If P1447 is displayed on the screen, go to "Diagnostic Procedure" for DTC P1447, EC-1852.
 - If P0440, P0455, P1440 and P1447 are not displayed on the screen, go to the following step.
- 10) Select "MODE 1" with GST.
 - If SRT of EVAP system is set, the result will be OK.
 - If SRT of EVAP system is not set, go to step 6.

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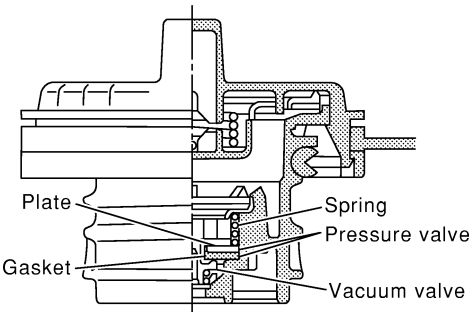
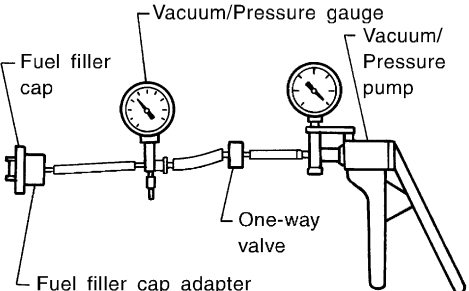
Diagnostic Procedure

NIEC0986

1	CHECK FUEL FILLER CAP DESIGN	
1. Turn ignition switch "OFF". 2. Check for genuine NISSAN fuel filler cap design.		
		
SEF915U		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Replace with genuine NISSAN fuel filler cap.

2	CHECK FUEL FILLER CAP INSTALLATION	
Check that the cap is tightened properly by rotating the cap clockwise.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	<ul style="list-style-type: none"> ● Open fuel filler cap, then clean cap and fuel filler neck threads using air blower. ● Retighten until ratcheting sound is heard.

3	CHECK FUEL FILLER CAP FUNCTION	
Check for air releasing sound while opening the fuel filler cap.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

4	CHECK FUEL TANK VACUUM RELIEF VALVE	
1. Wipe clean valve housing. 2. Check valve opening pressure and vacuum.		
		
SEF445Y		
		
SEF943S		
<p>Pressure: 15.3 - 20.0 kPa (0.156 - 0.204 kg/cm², 2.22 - 2.90 psi)</p> <p>Vacuum: -6.0 to -3.4 kPa (-0.061 to -0.035 kg/cm², -0.87 to -0.50 psi)</p> <p>CAUTION: Use only a genuine fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.</p>		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace fuel filler cap with a genuine one.

5	CHECK EVAP PURGE LINE	
Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks, improper connection or disconnection. Refer to "Evaporative Emission System", EC-1385.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Repair or reconnect the hose.

6	CLEAN EVAP PURGE LINE	
Clean EVAP purge line (pipe and rubber tube) using air blower.		
	▶	GO TO 7.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

SR20DE

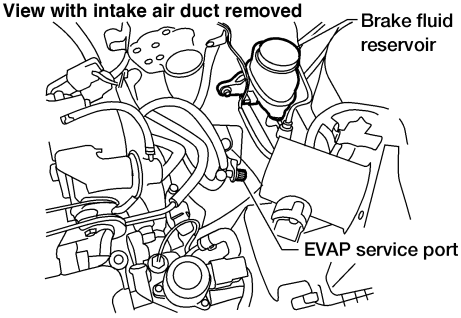
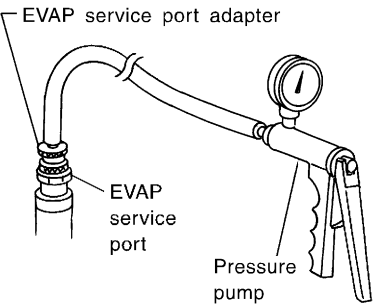
Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER VENT CONTROL VALVE, O-RING AND CIRCUIT	
Refer to "DTC Confirmation Procedure", EC-1721.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace EVAP canister vent control valve and O-ring or harness/connector.

GI

MA

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8	INSTALL THE PRESSURE PUMP	
To locate the EVAP leak, install EVAP service port adapter and pressure pump to EVAP service port securely.		
<p>View with intake air duct removed</p> 		
LEC288		
		
SEF916U		
NOTE:		
Improper installation of the EVAP service port adapter to the EVAP service port may cause leaking.		
Models with CONSULT-II	▶	GO TO 9.
Models without CON- SULT-II	▶	GO TO 10.

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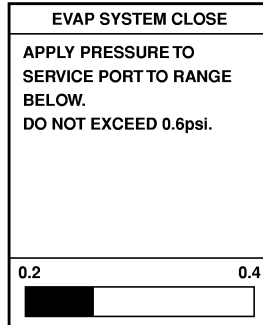
9 CHECK FOR EVAP LEAK

With CONSULT-II

1. Turn ignition switch "ON".
2. Select "EVAP SYSTEM CLOSE" of "WORK SUPPORT" mode with CONSULT-II.
3. Touch "START" and apply pressure into the EVAP line until the pressure indicator reaches the middle of the bar graph.

NOTE:

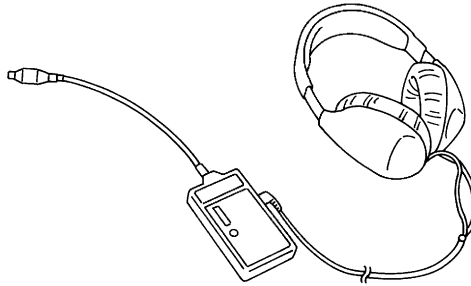
- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.



PEF917U

4. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.

Leak detector



SEF200U

OK or NG

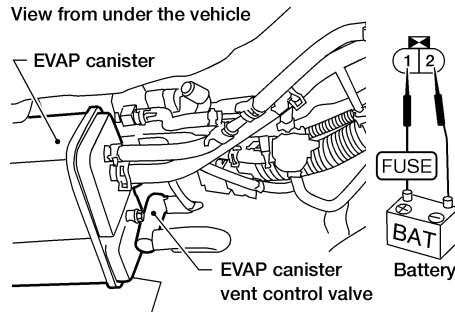
OK	▶	GO TO 11.
NG	▶	Repair or replace.

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10 CHECK FOR EVAP LEAK

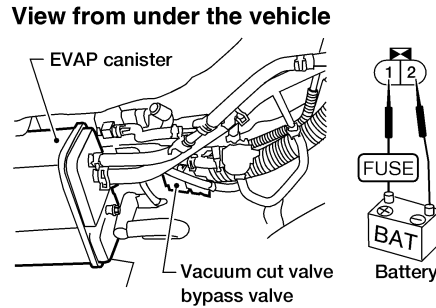
⊗ Without CONSULT-II

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12 volts until the end of test.)



WEC292

3. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)



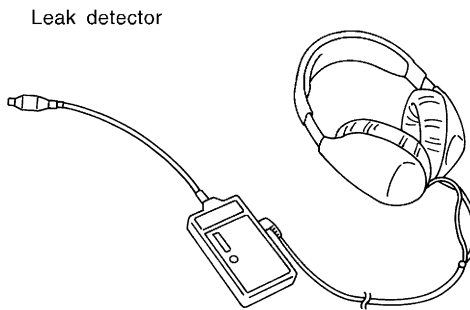
WEC293

4. Pressurize the EVAP line using pressure pump with 1.3 to 2.7 kPa (10 to 20 mmHg, 0.39 to 0.79 inHg), then remove pump and EVAP service port adapter.

NOTE:

- Never use compressed air or a high pressure pump.
- Do not exceed 4.12 kPa (0.042 kg/cm², 0.6 psi) of pressure in the system.

5. Using EVAP leak detector, locate the EVAP leak. For the leak detector, refer to the instruction manual for more details. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.



SEF200U

OK or NG

OK	▶	GO TO 11.
NG	▶	Repair or replace.

11	RELEASE EVAP LINE PRESSURE	
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Touch "BACK" on CONSULT-II screen. 2. Start engine and warm it up to normal operating temperature. 3. Turn ignition switch "OFF" and wait at least 10 seconds. 4. Start engine and let it idle for 90 seconds. 5. Keep engine speed at about 2,000 rpm for 30 seconds. 6. Turn ignition switch "OFF". 		
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Stop applying 12 volts DC to EVAP canister vent control valve and vacuum cut valve bypass valve. 2. Reconnect harness connectors to EVAP canister vent control valve and vacuum cut valve bypass valve. 3. Start engine and warm it up to normal operating temperature. 4. Turn ignition switch "OFF" and wait at least 10 seconds. 5. Start engine and let it idle for 90 seconds. 6. Keep engine speed at about 2,000 rpm for 30 seconds. 7. Turn ignition switch "OFF". 		
Models with CONSULT-II ▶		GO TO 12.
Models without CONSULT-II ▶		GO TO 13.

12	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION																					
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 2. Start engine. 3. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode. 4. Touch "Qu" on CONSULT-II screen to increase "PURG VOL CONT/V" opening to 100.0%. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																						
PURG VOL CONT/V	XXX %																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	LEAN																					
THRTL POS SEN	XXX V																					
Vacuum should exist.																						
OK or NG																						
OK ▶		GO TO 15.																				
NG ▶		GO TO 14.																				

SEF595Y

13	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OPERATION	
<p>ⓧ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose to EVAP canister purge volume control solenoid valve at EVAP service port. 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum hose for vacuum when revving engine up to 2,000 rpm. <p style="color: blue; text-align: center;">Vacuum should exist.</p>		
OK or NG		
OK ▶		GO TO 16.
NG ▶		GO TO 14.

DTC P0455 EVAP CONTROL SYSTEM (GROSS LEAK)

SR20DE

Diagnostic Procedure (Cont'd)

14	CHECK VACUUM HOSE	
Check vacuum hoses for clogging or disconnection. Refer to "Vacuum Hose Drawing", EC-1379.		
OK or NG		
OK (With CONSULT-II)	▶▶	GO TO 15.
OK (Without CONSULT-II)	▶▶	GO TO 16.
NG	▶▶	Repair or reconnect the hose.

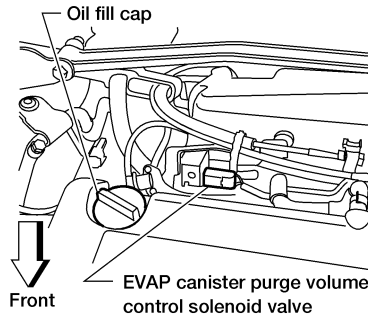
15	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																											
<p>Ⓜ With CONSULT-II</p> <p>1. Start engine.</p> <p>2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.</p>																												
<table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>PURG VOL CONT/V</th> <th>XXX %</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> <tr> <th>A/F ALPHA-B1</th> <th>XXX %</th> </tr> <tr> <th>HO2S1 MNTR (B1)</th> <th>LEAN</th> </tr> <tr> <th>THRTL POS SEN</th> <th>XXX V</th> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V												
ACTIVE TEST																												
PURG VOL CONT/V	XXX %																											
MONITOR																												
ENG SPEED	XXX rpm																											
A/F ALPHA-B1	XXX %																											
HO2S1 MNTR (B1)	LEAN																											
THRTL POS SEN	XXX V																											
SEF801Y																												
OK or NG																												
OK	▶▶	GO TO 17.																										
NG	▶▶	GO TO 16.																										

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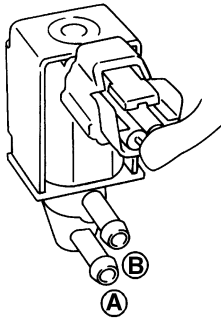
16 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273

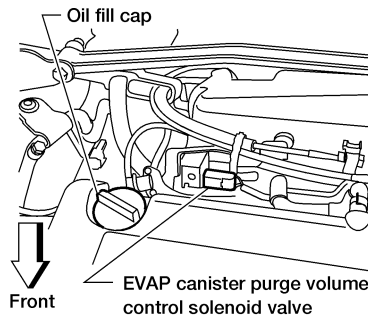


Condition PURG VOL CONT/V value	Air passage continuity between A and B
100.0%	Yes
0.0%	No

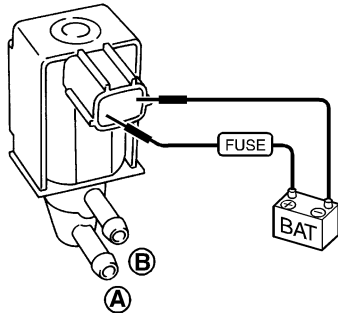
SEF334X

Without CONSULT-II

Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.



LEC273



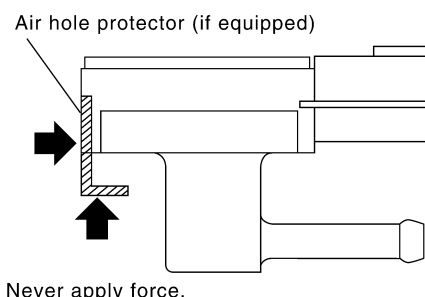
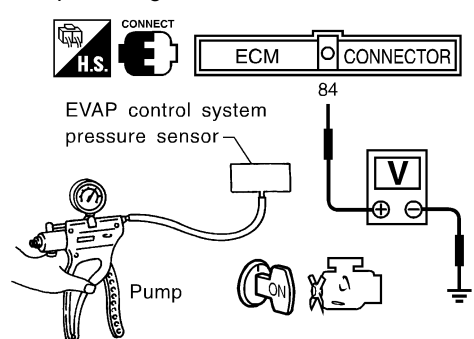
Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

SEF335X

OK or NG

OK	▶	GO TO 17.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

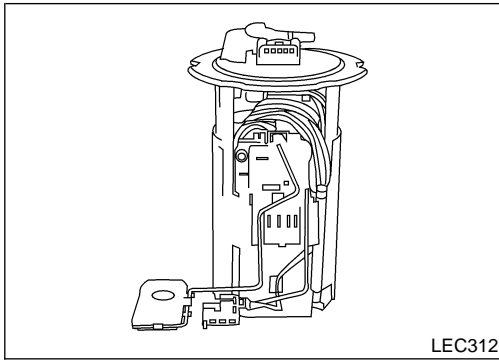
17	CHECK FUEL TANK TEMPERATURE SENSOR
1. Remove fuel level sensor unit and fuel pump. 2. Check fuel tank temperature sensor. Refer to EC-1637, "Component Inspection".	
OK or NG	
OK	▶ GO TO 18.
NG	▶ Replace fuel level sensor unit.

18	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
1. Remove EVAP control system pressure sensor with its harness connector connected. CAUTION: <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
	
SEF799W	
2. Remove hose from EVAP control system pressure sensor. 3. Turn ignition switch "ON". 4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure. CAUTION: <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. 5. Check input voltage between ECM terminal 84 and ground.	
	
SEF342X	
CAUTION: <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace EVAP control system pressure sensor.

19	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶ INSPECTION END	

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Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0987} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

When the vehicle is parked, naturally the fuel level in the fuel tank is stable. It means that output signal of the fuel level sensor does not change. If ECM senses sloshing signal from the sensor, fuel level sensor malfunction is detected. ^{NIEC0988}

Malfunction is detected when even though the vehicle is parked, a signal being varied is sent from the fuel level sensor to ECM.

Possible Cause

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.)
- Fuel level sensor

^{NIEC0989}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC0990}

Ⓜ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC0990S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait maximum of 2 consecutive minutes.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1752.

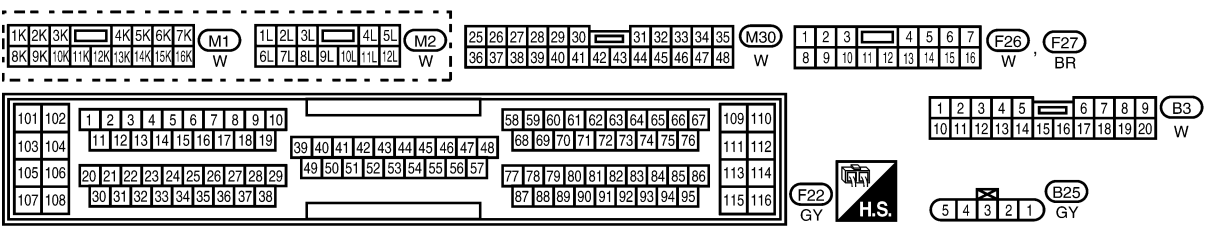
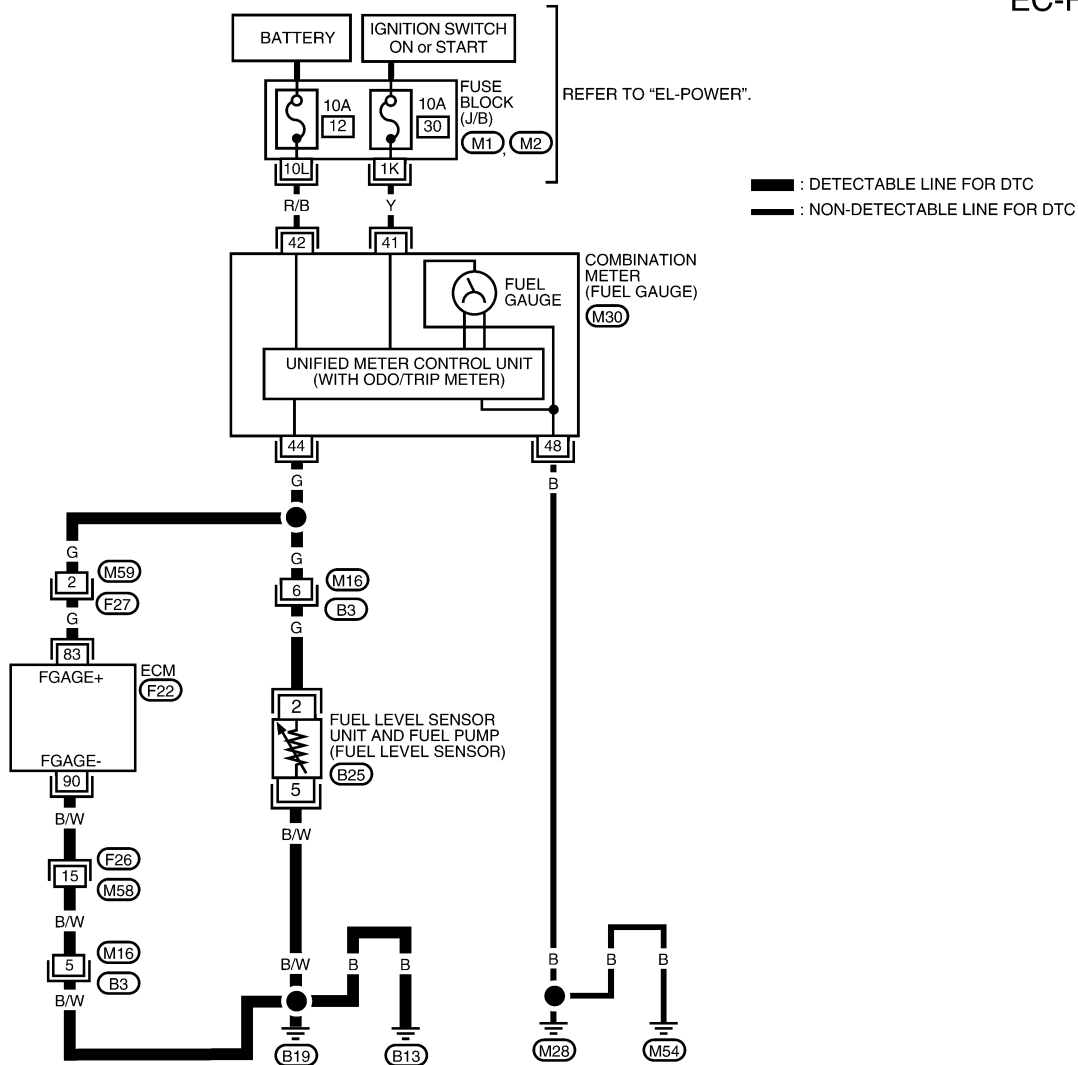
Ⓜ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC0990S02}

Wiring Diagram

NIEC0991

EC-FLS1-01



WEC146A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

Diagnostic Procedure

=NIEC0992

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit and fuel pump harness connector terminal 2 and ground with CONSULT-II or a tester.		
Voltage: Battery voltage		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

SEF524Z

2	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness for open or short between combination meter and fuel level sensor unit and fuel pump 		
▶		Repair or replace harness or connectors.

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit and fuel pump harness connector terminal 5 and body ground. Refer to "Wiring Diagram", EC-1751. Continuity should exist. 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit and fuel pump harness connector terminal 2, ECM terminal 90 and fuel level sensor unit and fuel pump harness connector terminal 5. Refer to Wiring Diagram. Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P0460 FUEL LEVEL SENSOR FUNCTION (SLOSH)

SR20DE

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors B3, M16● Harness connectors M59, F27● Harness connectors F26, M58● Harness for open or short between ECM and fuel level sensor	
▶	Repair open circuit or short to ground or short to power in harness or connectors.
6	CHECK FUEL LEVEL SENSOR
Refer to <i>EL-102</i> , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.
7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

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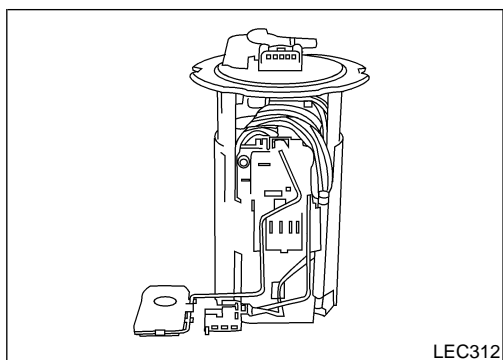
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Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0993} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

Driving long distances naturally affect fuel gauge level. ^{NIEC0994}

This diagnosis detects the fuel gauge malfunction of the gauge not moving even after a long distance has been driven.

Malfunction is detected when the output signal of the fuel level sensor does not change within the specified range even though the vehicle has been driven a long distance.

Possible Cause

- Harness or connectors
(The level sensor circuit is open or shorted.)
- Fuel level sensor

^{NIEC0995}

Overall Function Check

Use this procedure to check the overall function of the fuel level sensor function. During this check, a 1st trip DTC might not be confirmed. ^{NIEC0996}

WARNING:

When performing following procedure, be sure to observe the handling of the fuel. Refer to *FE-5*, "FUEL SYSTEM".

TESTING CONDITION:

Before starting overall function check, preparation of draining fuel and refilling fuel is required.

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓜ WITH CONSULT-II

NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

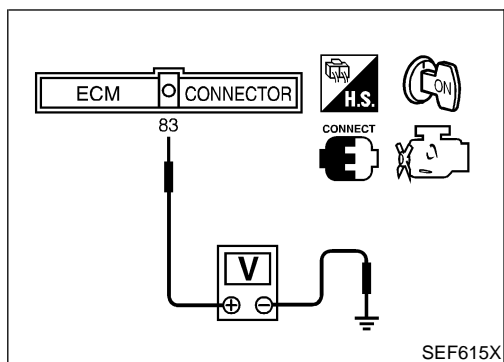
- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-1403.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.

^{NIEC0996S01}

- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Select "FUEL LEVEL SE" in "DATA MONITOR" mode with CONSULT-II.
- 7) Check "FUEL LEVEL SE" output voltage and note it.
- 8) Select "FUEL PUMP" in "ACTIVE TEST" mode with CONSULT-II.
- 9) Touch "ON" and drain fuel approximately 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) and stop it.
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Check "FUEL LEVEL SE" output voltage and note it.
- 12) Check "FUEL LEVEL SE" output voltage and confirm whether the voltage changes more than 0.03V during step 7 to 11. If NG, check the fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK".

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WITH GST

NIEC0996S02

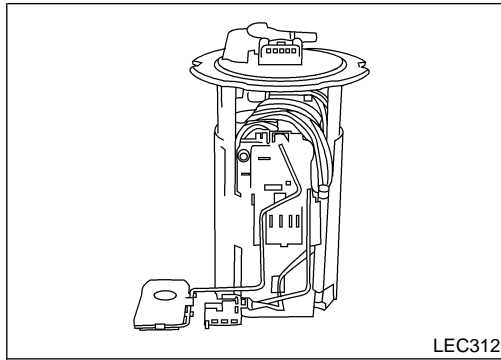
NOTE:

Start from step 11, if it is possible to confirm that the fuel cannot be drained by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) in advance.

- 1) Prepare a fuel container and a spare hose.
- 2) Release fuel pressure from fuel line, refer to "Fuel Pressure Release", EC-1403.
- 3) Remove the fuel feed hose on the fuel level sensor unit.
- 4) Connect a spare fuel hose where the fuel feed hose was removed.
- 5) Turn ignition switch "OFF".
- 6) Set voltmeter's probe between ECM terminal 83 (fuel level sensor signal) and ground.
- 7) Turn ignition switch "ON".
- 8) Check voltage between ECM terminal 83 and ground and note it.
- 9) Drain fuel by 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal) from the fuel tank using proper equipment.
- 10) Fill fuel into the fuel tank for 30 ℓ (7-7/8 US gal, 6-5/8 Imp gal).
- 11) Confirm that the voltage between ECM terminal 83 and ground changes more than 0.03V during step 8 - 10. If NG, check component of fuel level sensor, refer to **EL-102**, "FUEL LEVEL SENSOR UNIT CHECK".

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Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC0997} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor circuit. ^{NIEC0998} One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the former, to detect open or short circuit malfunction.

Malfunction is detected when an excessively low or high voltage is sent from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit (The fuel level sensor circuit is open or shorted.)
 - Fuel level sensor
- ^{NIEC0999}

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at ignition switch "ON".

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓟ WITH CONSULT-II

- 1) Turn ignition switch "ON".
 - 2) Select "DATA MONITOR" mode with CONSULT-II.
 - 3) Wait at least 5 seconds.
 - 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1758.
- ^{NIEC1000S01}

Ⓢ WITH GST

Follow the procedure "WITH CONSULT-II" above.

^{NIEC1000S02}

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

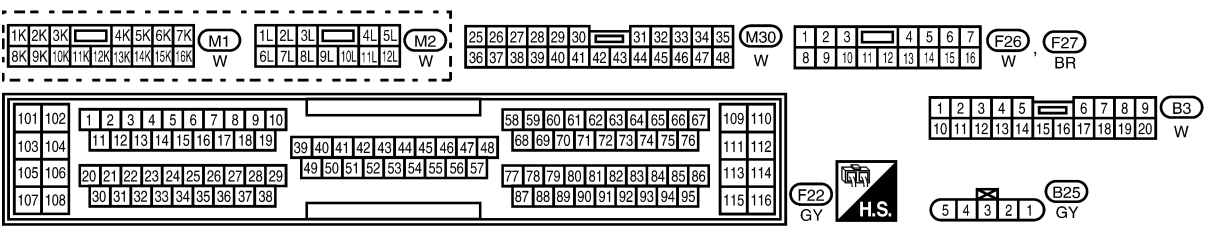
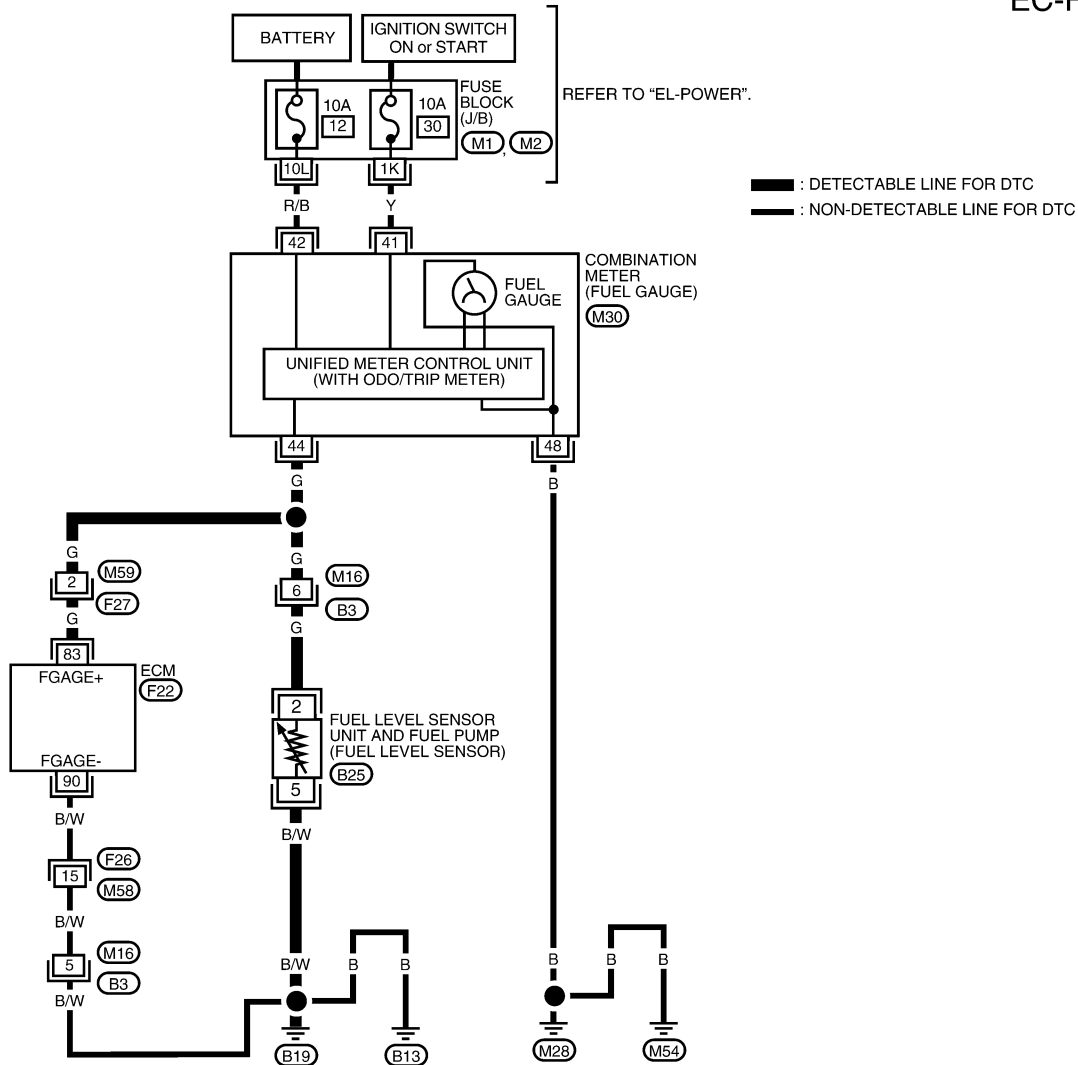
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1001

EC-FLS2-01



WEC147A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

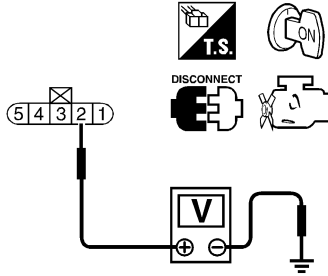
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF579Y

Diagnostic Procedure

=NIEC1002

1	CHECK FUEL LEVEL SENSOR POWER SUPPLY CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector. 3. Turn ignition switch "ON". 4. Check voltage between fuel level sensor unit and fuel pump harness connector terminal 2 and ground with CONSULT-II or tester.		
		
Voltage: Battery voltage		
SEF524Z		
OK or NG		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors B3, M16 ● Harness for open or short between combination meter and fuel level sensor unit and fuel pump 		
▶ Repair or replace harness or connectors.		

3	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch "OFF". 2. Check harness continuity between fuel level sensor unit and fuel pump harness connector terminal 5 and body ground. Refer to "Wiring Diagram", EC-1757. Continuity should exist. 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to power in harness or connectors.

4	CHECK FUEL LEVEL SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 83 and fuel level sensor unit and fuel pump harness connector terminal 2. Refer to "Wiring Diagram", EC-1757. Continuity should exist. 3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P0464 FUEL LEVEL SENSOR CIRCUIT

SR20DE

Diagnostic Procedure (Cont'd)

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors B3, M16● Harness connectors M58, F26● Harness connectors M59, F27● Harness for open or short between ECM and fuel level sensor	
	▶ Repair open circuit or short to ground or short to power in harness on connectors.

GI
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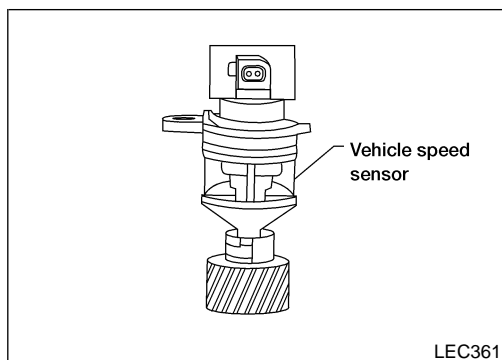
6	CHECK FUEL LEVEL SENSOR
Refer to <i>EL-102</i> , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace fuel level sensor unit.

LC
EC

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

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Component Description



Component Description

The vehicle speed sensor is installed in the transaxle. It contains a pulse generator which provides a vehicle speed signal to the speedometer. The speedometer then sends a signal to the ECM. NIEC1003

On Board Diagnosis Logic

NIEC1004

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0500	<ul style="list-style-type: none"> The almost 0 km/h (0 MPH) signal from vehicle speed sensor is sent to ECM even when vehicle is being driven. 	<ul style="list-style-type: none"> Harness or connector (The vehicle speed sensor circuit is open or shorted.) Vehicle speed sensor

DTC Confirmation Procedure

NIEC1005

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

With CONSULT-II

- Start engine
- Read "VHCL SPEED SE" in "DATA MONITOR" mode with CONSULT-II. The vehicle speed on CONSULT-II should exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- If NG, go to "Diagnostic Procedure", EC-1763. If OK, go to following step.
- Select "DATA MONITOR" mode with CONSULT-II.
- Warm engine up to normal operating temperature.
- Maintain the following conditions for at least 10 consecutive seconds.

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
B/FUEL SCHDL	XXX msec
PW/ST SIGNAL	OFF
VHCL SPEED SE	XXX km/h

SEF196Y

ENG SPEED	1,650 - 3,000 rpm (A/T) 1,950 - 4,000 rpm (M/T)
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	4.8 - 12.0 msec (A/T) 4.5 - 10.5 msec (M/T)
Selector lever	Suitable position
PW/ST SIGNAL	OFF

- 7) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1763.

GI

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Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a 1st trip DTC might not be confirmed.

NIEC1006

EC

With GST

- 1) Lift up drive wheels.
- 2) Start engine.
- 3) Read vehicle speed sensor signal in “MODE 1” with GST.
The vehicle speed sensor on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.
- 4) If NG, go to “Diagnostic Procedure”, EC-1763.

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DTC P0500 VEHICLE SPEED SENSOR (VSS)

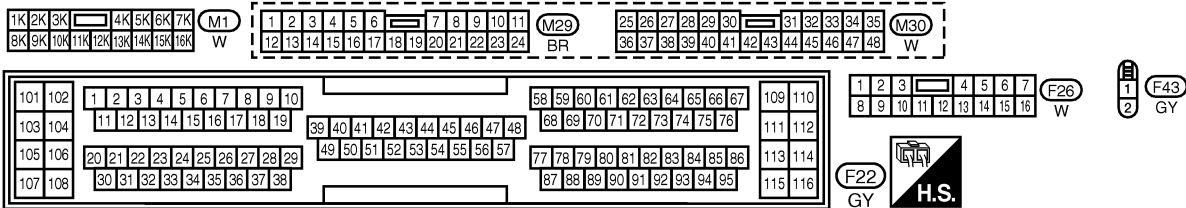
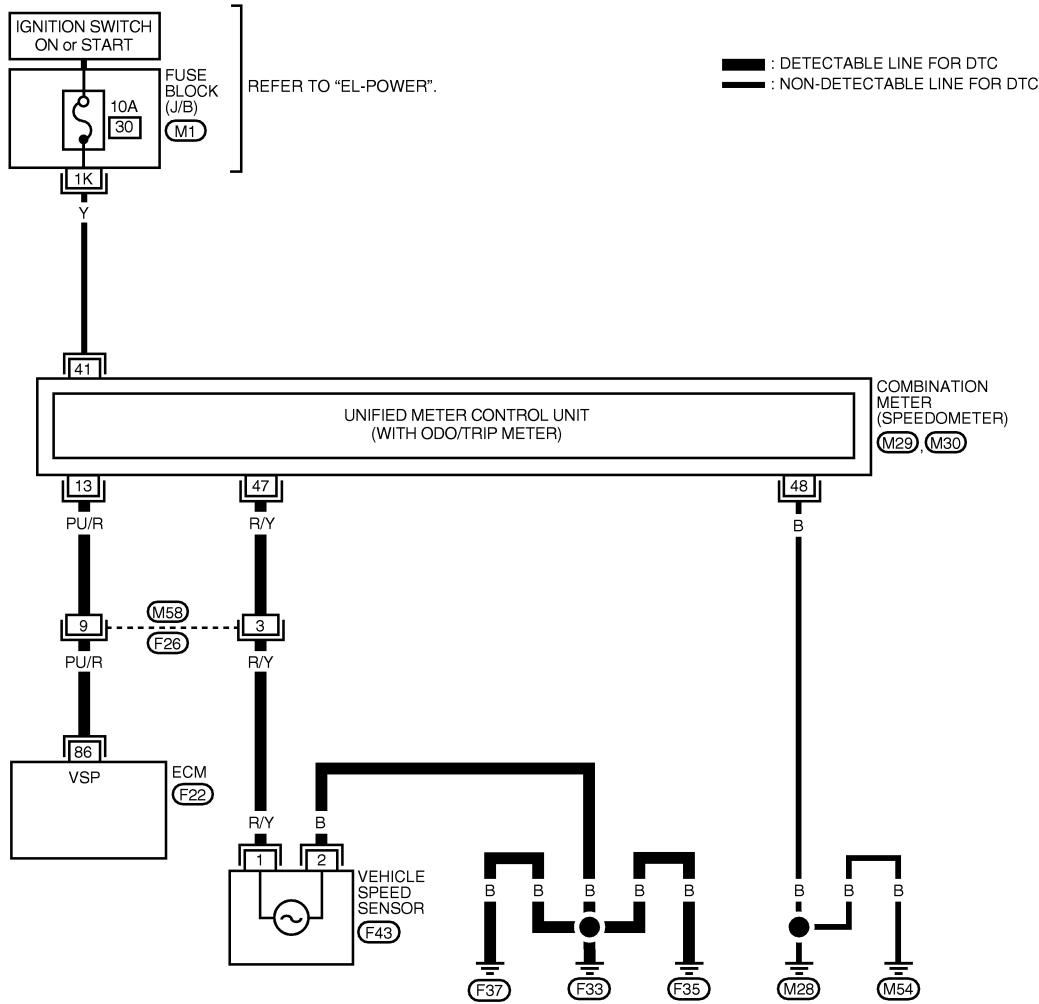
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1007

EC-VSS-01



LEC204

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
86	PU/R	VEHICLE SPEED SENSOR	VEHICLE DRIVING AT 40 KM/H (25 MPH) IN 2ND GEAR POSITION UNDER LIFTED UP CONDITION	0 - APPROX. 4.2V (V) 50 ms

SEF580Y

Diagnostic Procedure

NIEC1008

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector and combination meter harness connector.</p> <p>3. Check harness continuity between ECM terminal 86 and combination meter terminal 13. Refer to "Wiring Diagram", EC-1762.</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between ECM and combination meter 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

EC
FE
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3	CHECK SPEEDOMETER FUNCTION	
<p>Make sure that speedometer functions properly.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

MT
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4	CHECK SPEEDOMETER CIRCUIT FOR OPEN AND SHORT	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness for open or short between combination meter and vehicle speed sensor <p style="text-align: center;">OK or NG</p>		
OK	▶	Check combination meter and vehicle speed sensor. Refer to EL-85 , "METERS AND GAUGES".
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

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5	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>		
▶		INSPECTION END

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DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

Description

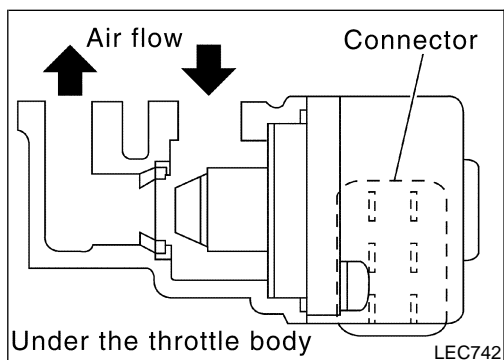
Description SYSTEM DESCRIPTION

NIEC1009

NIEC1009S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	Idle air control	IACV-AAC valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Park/neutral position (PNP) switch	Park/neutral position		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Battery	Battery voltage		
Vehicle speed sensor	Vehicle speed		
Intake air temperature sensor	Intake air temperature		

This system automatically controls engine idle speed to a specified level. Idle speed is controlled through fine adjustment of the amount of air which bypasses the throttle valve via IACV-AAC valve. The IACV-AAC valve changes the opening of the air bypass passage to control the amount of auxiliary air. This valve is actuated by a step motor built into the valve, which moves the valve in the axial direction in steps corresponding to the ECM output signals. One step of IACV-AAC valve movement causes the respective opening of the air bypass passage. (i.e., when the step advances, the opening is enlarged.) The opening of the valve is varied to allow for optimum control of the engine idling speed. The camshaft position sensor detects the actual engine speed and sends a signal to the ECM. The ECM then controls the step position of the IACV-AAC valve so that engine speed coincides with the target value memorized in ECM. The target engine speed is the lowest speed at which the engine can operate steadily. The optimum value stored in the ECM is determined by taking into consideration various engine conditions, such as during warm up, deceleration, and engine load (air conditioner, power steering and cooling fan operation).



COMPONENT DESCRIPTION

NIEC1009S02

IACV-AAC Valve

NIEC1009S0201

The IACV-AAC valve is operated by a step motor for centralized control of auxiliary air supply. This motor has four winding phases and is actuated by the output signals of ECM which turns ON and OFF two windings each in sequence. Each time the IACV-AAC valve opens or closes to change the auxiliary air quantity, the ECM sends a pulse signal to the step motor. When no change in the auxiliary air quantity is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC1010

MONITOR ITEM	CONDITION		SPECIFICATION
IACV-AAC/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	5 - 20 steps
		2,000 rpm	—

On Board Diagnosis Logic

NIEC1011

DTC No.	Malfunction is detected when ...		Check Items (Possible Cause)
P0505	A)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is open.) ● IACV-AAC valve
	B)	The IACV-AAC valve does not operate properly.	<ul style="list-style-type: none"> ● Harness or connectors (The IACV-AAC valve circuit is shorted.) ● Air control valve (Power steering) ● IACV-AAC valve

DTC Confirmation Procedure

NIEC1012

NOTE:

- If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.
- Perform "Procedure for Malfunction A" first. If 1st trip DTC cannot be confirmed, perform "Procedure for Malfunction B".
- If the target idle speed is out of the specified value, perform "Idle Air Volume Learning", EC-1419, before conducting "DTC Confirmation Procedure". For the target idle speed, refer to the "Service Data and Specifications (SDS)", EC-1943.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

PROCEDURE FOR MALFUNCTION A

NIEC1012S01

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 10.5V with ignition switch "ON".

④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for three seconds, then let it idle for three seconds.
- 5) Perform step 4 once more.

EC-1765

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

DTC Confirmation Procedure (Cont'd)

- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1768.



With GST

Follow the procedure “With CONSULT-II” above.

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION B TESTING CONDITION:

NIEC1012S02

- Before performing the following procedure, make sure battery voltage is more than 11V at idle.
- Always perform the test at a temperature above -10°C (14°F).



With CONSULT-II

- 1) Open engine hood.
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch “OFF” and wait at least 10 seconds.
- 4) Turn ignition switch “ON” again and select “DATA MONITOR” mode with CONSULT-II.
- 5) Start engine and run it for at least 1 minute at idle speed.
- 6) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1768.



With GST

Follow the procedure “With CONSULT-II” above.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

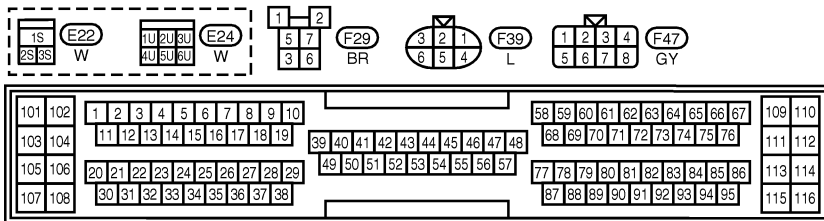
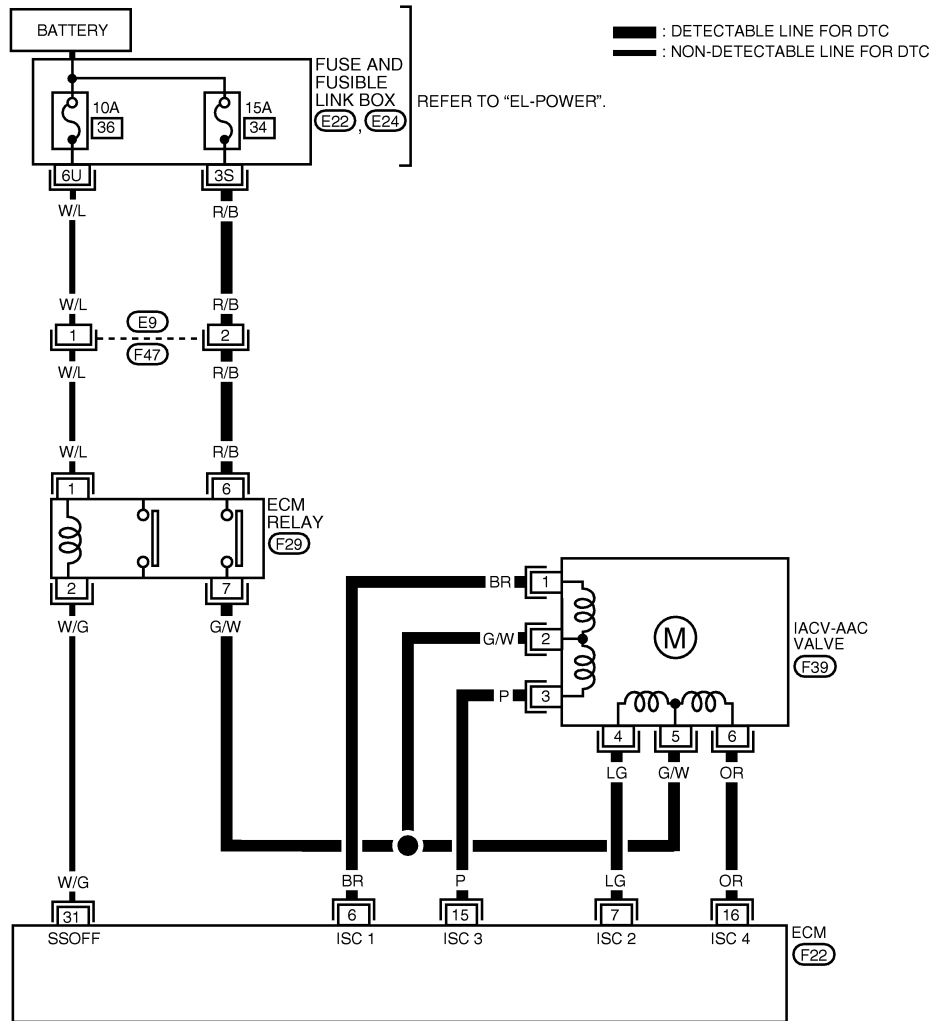
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1013

EC-AAC/V-01



LEC208

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
6	BR	IACV-AAC VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
7	LG			
15	P			
16	OR			

SEF581Y

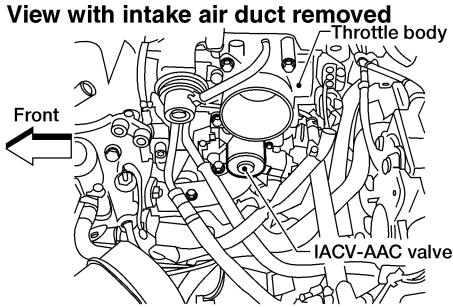
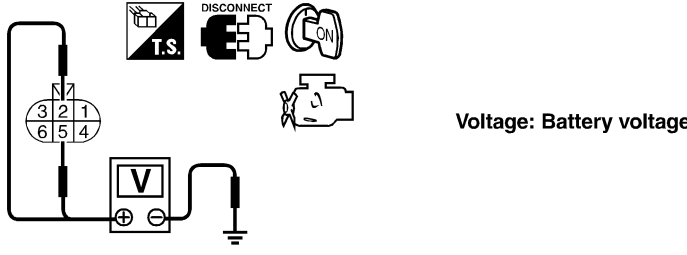
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

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Diagnostic Procedure

Diagnostic Procedure

NIEC1014

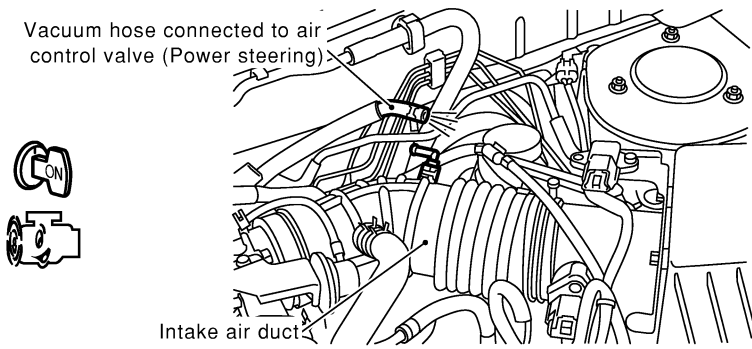
1	CHECK IACV-AAC VALVE POWER SUPPLY CIRCUIT						
<p>1. Stop engine. 2. Disconnect IACV-AAC valve harness connector.</p> <div style="text-align: center;"> <p>View with intake air duct removed</p>  </div> <p style="text-align: right;">LEC287</p> <p>3. Turn ignition switch "ON". 4. Check voltage between IACV-AAC valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: right;">SEF343X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 2.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		OK	▶	GO TO 2.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
OK	▶	GO TO 2.					
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.					

2	CHECK IACV-AAC VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminals and IACV-AAC valve terminals as follows. Refer to "Wiring Diagram", EC-1767.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">IACV-AAC valve terminal</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">6</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">7</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">15</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">16</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0390</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 10%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	IACV-AAC valve terminal	6	1	7	4	15	3	16	6	OK	▶	GO TO 3.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	IACV-AAC valve terminal																
6	1																
7	4																
15	3																
16	6																
OK	▶	GO TO 3.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

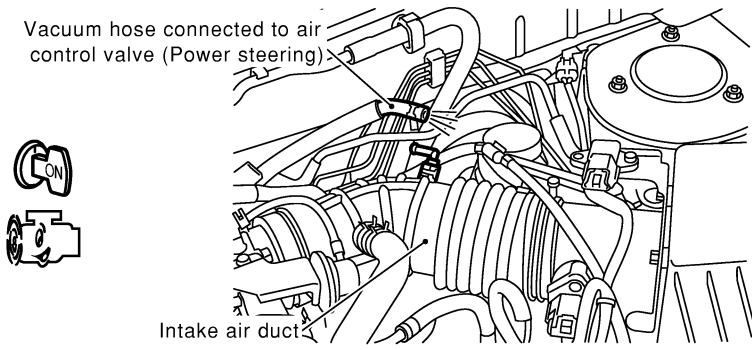
DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-I	
<p>1. Reconnect ECM harness connector and IACV-AAC valve harness connector. 2. Disconnect vacuum hose connected to air control valve (Power steering) at intake air duct. 3. Start engine and let it idle. 4. Check vacuum hose for vacuum existence.</p>		
		
<p>Vacuum slightly exist or does not exist.</p> <p>OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Replace air control valve (Power steering).

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4	CHECK AIR CONTROL VALVE (POWER STEERING) OPERATION-II	
<p>Check vacuum hose for vacuum existence when steering wheel is turned.</p>		
		
<p>Vacuum should exist.</p> <p>OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	GO TO 5.

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

Diagnostic Procedure (Cont'd)

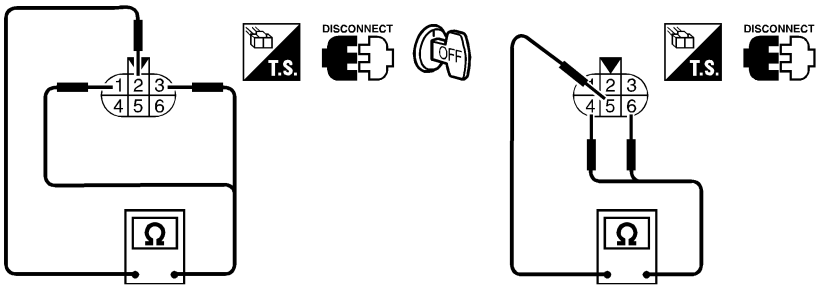
5	CHECK VACUUM PORT	<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect vacuum hose connected to air control valve (Power steering) at the vacuum port. 3. Blow air into vacuum port. 4. Check that air flows freely. 	
LEC338			
OK or NG			
OK	▶	GO TO 6.	
NG	▶	Repair or clean vacuum port.	

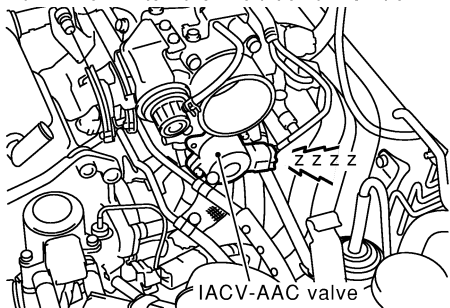
6	CHECK VACUUM HOSES AND TUBES	<ol style="list-style-type: none"> 1. Disconnect vacuum hoses between air control valve (Power steering) and vacuum port, air control valve (Power steering) and intake air duct. 2. Check the hoses and tubes for cracks, clogging, improper connection or disconnection. 	
SEF109L			
OK or NG			
OK	▶	GO TO 7.	
NG	▶	Repair hoses or tubes.	

DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK IACV-AAC VALVE-I	<p>1. Disconnect IACV-AAC valve harness connector.</p> <p>2. Check resistance between IACV-AAC valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.</p>	
		<p>Resistance: 20 - 24 Ω [at 20°C (68°F)]</p>	SEF214Z
OK or NG			
OK	▶	GO TO 8.	
NG	▶	GO TO 9.	

8	CHECK IACV-AAC VALVE-II	<p>1. Reconnect IACV-AAC valve harness connector and ECM harness connector.</p> <p>2. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve makes operating sound according to the ignition switch position.</p>	
<p>View with intake air duct removed</p> 		SEF853X	
OK or NG			
OK	▶	GO TO 10.	
NG	▶	GO TO 9.	

9	REPLACE IACV-AAC VALVE	<p>1. Replace IACV-AAC valve assembly.</p> <p>2. Perform "Idle Air Volume Learning", EC-1419. Is the result CMPLT or INCMP?</p>	
CMPLT or INCMP			
CMPLT	▶	INSPECTION END	
INCMP	▶	Follow the instruction of "Idle Air Volume Learning".	

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DTC P0505 IDLE AIR CONTROL VALVE (IACV) — AUXILIARY AIR CONTROL (AAC) VALVE

SR20DE

Diagnostic Procedure (Cont'd)

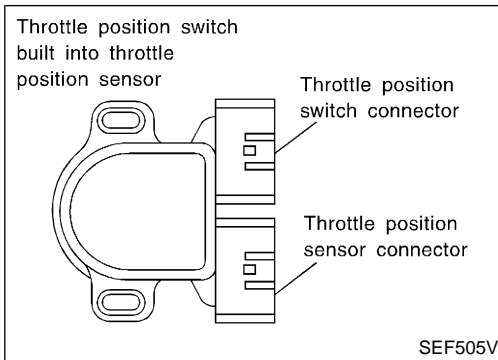
10	CHECK TARGET IDLE SPEED	
<p>1. Turn ignition switch "OFF".</p> <p>2. Reconnect all harness connectors and vacuum hoses.</p> <p>3. Start engine and warm it up to normal operating temperature.</p> <p>4. Also warm up transmission to normal operating temperature.</p> <ul style="list-style-type: none"> ● For A/T models with CONSULT-II, drive vehicle until "FLUID TEMP SE" in "DATA MONITOR" mode of "A/T" system indicates less than 0.9V. ● For A/T models without CONSULT-II and M/T models, drive vehicle for 10 minutes. <p>5. Stop vehicle with engine running.</p> <p>6. Check target idle speed.</p> <p style="margin-left: 20px;">M/T: 800±50 rpm</p> <p style="margin-left: 20px;">A/T: 800±50 rpm (in "P" or "N" position)</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Perform idle air volume learning. Refer to "Idle Air Volume Learning" EC-1419.

11	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END

DTC P0510 CLOSED THROTTLE POSITION SWITCH

SR20DE

Component Description



Component Description

A closed throttle position switch and wide open throttle position switch are built into the throttle position sensor unit. The wide open throttle position switch is used only for A/T control.

When the throttle valve is in the closed position, the closed throttle position switch sends a voltage signal to the ECM. The ECM only uses this signal to open or close the EVAP canister purge volume control solenoid valve when the throttle position sensor is malfunctioning.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
CLSD THL/P SW	● Engine: After warming up ● Ignition switch: ON ● Vacuum is applied using a vacuum pump	Throttle valve: Idle position ON
		Throttle valve: Slightly open OFF

On Board Diagnosis Logic

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0510	● Battery voltage from the closed throttle position switch is sent to ECM with the throttle valve opened.	● Harness or connectors (The closed throttle position switch circuit is shorted.) ● Closed throttle position switch ● Throttle position sensor

4

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
CLSD THL/P SW	ON

SEF197Y

6

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V

SEF198Y

DTC Confirmation Procedure

CAUTION:
Always drive vehicle at a safe speed.

NOTE:
If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF", wait at least 10 seconds and then start engine.
- 3) Select "CLSD THL/P SW" in "DATA MONITOR" mode.
- 4) Check the signal under the following conditions.

Condition	Signal indication
Throttle valve: Idle position	ON
Throttle valve: Slightly open	OFF

If the result is NG, go to "Diagnostic Procedure", EC-1776.
If OK, go to following step.

- 5) Select "DATA MONITOR" mode with CONSULT-II.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

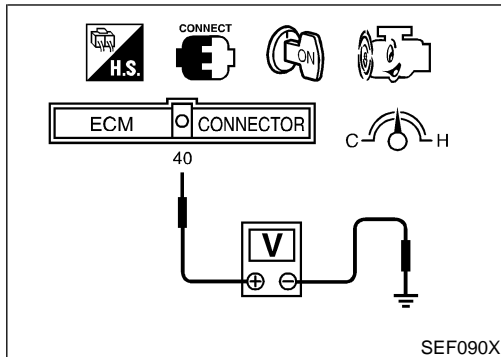
SR20DE

DTC Confirmation Procedure (Cont'd)

- 6) Drive the vehicle for at least 5 consecutive seconds under the following condition.

THRTL POS SEN	More than 2.3V
VHCL SPEED SE	More than 4 km/h (2 MPH)
Selector lever	Suitable position
Driving location	Driving vehicle uphill (Increased engine load) will help maintain the driving conditions required for this test.

- 7) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1776.



Overall Function Check

Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a 1st trip DTC might not be confirmed.

NIEC1019

⊗ Without CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Check the voltage between ECM terminal 40 (Closed throttle position switch signal) and ground under the following conditions.

Condition	Voltage
At idle	Battery voltage
At 2,000 rpm	Approximately 0V

- 3) If NG, go to "Diagnostic Procedure", EC-1776.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

SR20DE

Wiring Diagram

Wiring Diagram

NIEC1020

EC-TP/SW-01

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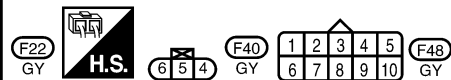
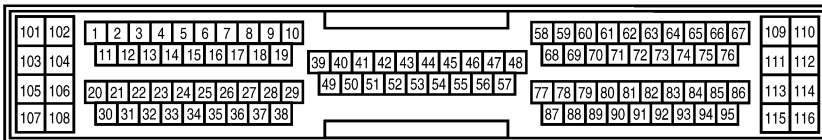
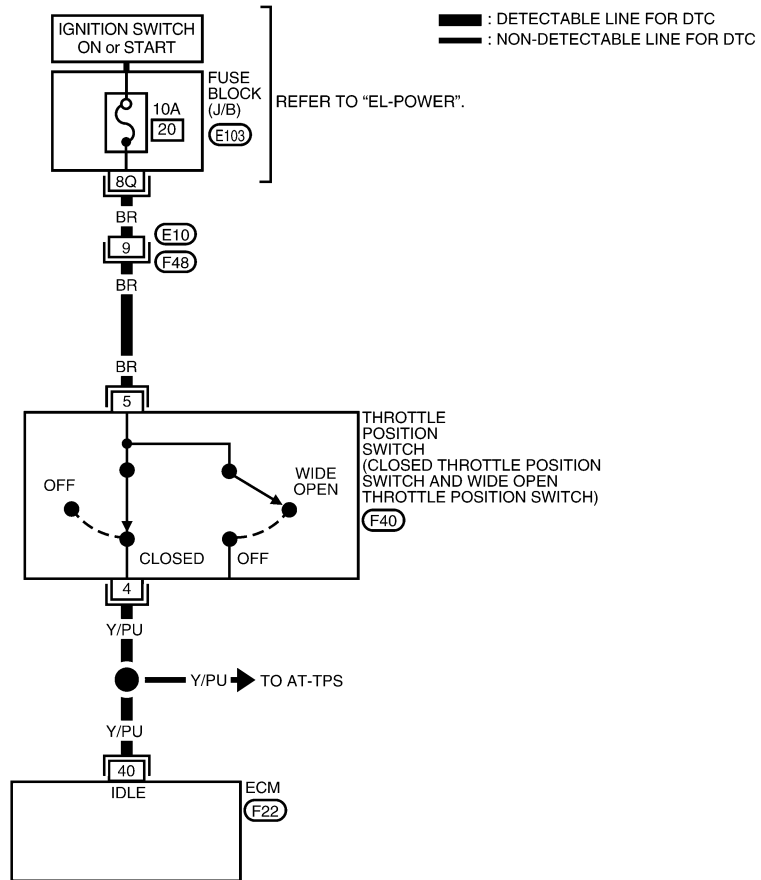
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WEC594

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

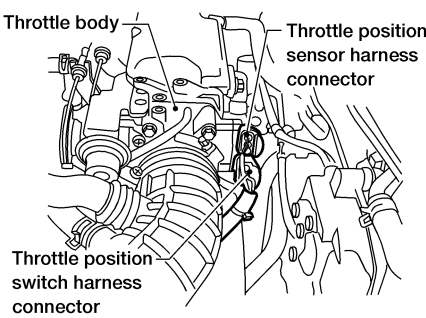
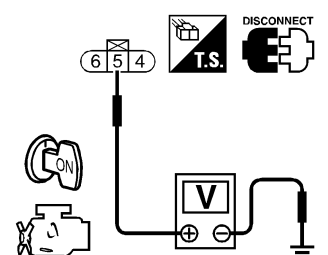
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
40	Y/PU	THROTTLE POSITION SWITCH (CLOSED POSITION)	ENGINE RUNNING WITH ACCELERATOR PEDAL FULLY RELEASED UNDER WARM-UP CONDITION	BATTERY VOLTAGE
			IGN ON WITH ACCELERATOR PEDAL DEPRESSED	APPROX. 0V

SEF582Y

Diagnostic Procedure

NIEC1021

1	CHECK CLOSED THROTTLE POSITION SWITCH POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect throttle position switch harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><small>LEC279</small></p> <p>3. Turn ignition switch "ON". 4. Check voltage between throttle position switch terminal 5 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  </div> <p style="text-align: right;"><small>SEF346X</small></p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● 10A fuse ● Harness for open or short between throttle position switch and fuse 		
▶		Repair harness or connectors.

3	CHECK CLOSED THROTTLE POSITION SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 40 and throttle position switch terminal 4. Refer to "Wiring Diagram", EC-1775. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

SR20DE

Diagnostic Procedure (Cont'd)

4 CHECK IGNITION TIMING AND ENGINE IDLE SPEED	
Check the following items. Refer to "Basic Inspection", EC-1461.	
Items	Specifications
Ignition timing	15° ± 2° BTDC
Idle speed	M/T: 800 ± 50 rpm A/T: 800 ± 50 rpm (in "P" or "N" position)
MTBL0391	
Models with CONSULT-II ▶	GO TO 5.
Models without CON- SULT-II ▶	GO TO 6.

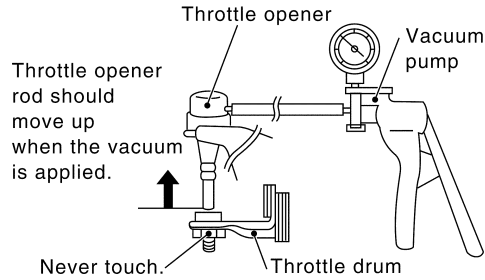
5 CHECK THROTTLE POSITION SWITCH	
<p>📄 With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Turn ignition switch "OFF". Remove vacuum hose connected to throttle opener. Connect suitable vacuum hose to vacuum pump and the throttle opener. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 	
<p>Throttle opener rod should move up when the vacuum is applied.</p> <p>Never touch.</p>	
SEF793W	
<ol style="list-style-type: none"> Turn ignition switch "ON". Select "DATA MONITOR" mode with CONSULT-II. Check indication of "CLSD THL/P SW" under the following conditions. Measurement must be made with throttle position switch installed in vehicle. 	
Throttle valve conditions	CLSD THL/P SW
Completely closed	ON
Partially open or completely open	OFF
MTBL0355	
OK or NG	
OK (With CONSULT-II) ▶	GO TO 8.
OK (Without CONSULT-II) ▶	GO TO 9.
NG ▶	GO TO 7.

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6 CHECK THROTTLE POSITION SWITCH

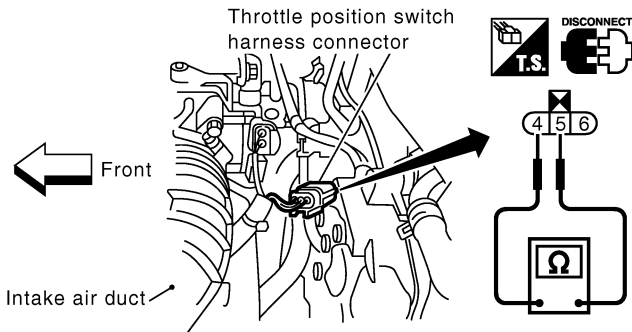
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Turn ignition switch "OFF".
3. Remove vacuum hose connected to throttle opener.
4. Connect suitable vacuum hose to vacuum pump and the throttle opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Disconnect closed throttle position switch harness connector.
7. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve condition	Continuity
Completely closed	Yes
Partially open	No
Completely open	No

SEF911Z

OK or NG

OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	GO TO 7.

DTC P0510 CLOSED THROTTLE POSITION SWITCH

SR20DE

Diagnostic Procedure (Cont'd)

7	ADJUST THROTTLE POSITION SWITCH									
Check the following items. Refer to "Basic Inspection", EC-1461.										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Items</th> <th style="width: 60%;">Specifications</th> </tr> </thead> <tbody> <tr> <td>Ignition timing</td> <td>15°±2° BTDC</td> </tr> <tr> <td>Closed throttle position switch idle position adjustment</td> <td>Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF</td> </tr> <tr> <td>Target idle speed</td> <td>M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)</td> </tr> </tbody> </table>			Items	Specifications	Ignition timing	15°±2° BTDC	Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF	Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)
Items	Specifications									
Ignition timing	15°±2° BTDC									
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF									
Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)									
MTBL0450										
Is it possible to adjust closed throttle position switch?										
Yes or No										
Yes (With CONSULT-II) ▶	GO TO 8.									
Yes (Without CONSULT-II) ▶	GO TO 9.									
No ▶	Replace throttle position switch.									

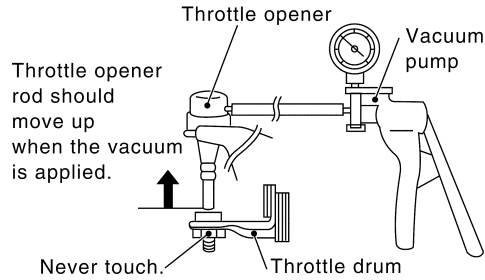
8	CHECK THROTTLE POSITION SENSOR									
<p>With CONSULT-II</p> <ol style="list-style-type: none"> Start engine and warm it up to normal operating temperature. Stop engine (ignition switch OFF). Remove the vacuum hose connected to the throttle opener. Connect suitable vacuum hose to the vacuum pump and the opener. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener. 										
SEF793W										
<ol style="list-style-type: none"> Turn ignition switch ON. Select "DATA MONITOR" mode with CONSULT-II. Check voltage of "THRTL POS SEN" under the following conditions. <p>Voltage measurement must be made with throttle position sensor installed in vehicle.</p>										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">Throttle valve conditions</th> <th style="width: 50%;">THRTL POS SEN</th> </tr> </thead> <tbody> <tr> <td>Completely closed (a)</td> <td>0.15 - 0.85V</td> </tr> <tr> <td>Partially open</td> <td>Between (a) and (b)</td> </tr> <tr> <td>Completely open (b)</td> <td>3.5 - 4.7V</td> </tr> </tbody> </table>			Throttle valve conditions	THRTL POS SEN	Completely closed (a)	0.15 - 0.85V	Partially open	Between (a) and (b)	Completely open (b)	3.5 - 4.7V
Throttle valve conditions	THRTL POS SEN									
Completely closed (a)	0.15 - 0.85V									
Partially open	Between (a) and (b)									
Completely open (b)	3.5 - 4.7V									
MTBL0230										
OK or NG										
OK ▶	GO TO 10.									
NG ▶	Replace throttle position sensor.									

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9 CHECK THROTTLE POSITION SENSOR

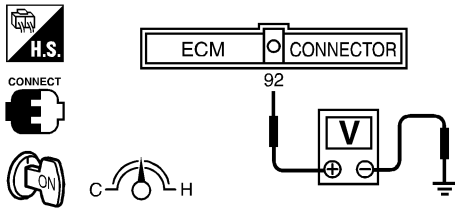
⊗ Without CONSULT-II

1. Start engine and warm it up to normal operating temperature.
2. Stop engine (ignition switch OFF).
3. Remove the vacuum hose connected to the throttle opener.
4. Connect suitable vacuum hose to the vacuum pump and the opener.
5. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

6. Turn ignition switch ON.
7. Check voltage between ECM terminal 92 (Throttle position sensor signal) and ground.
Voltage measurement must be made with throttle position sensor installed in vehicle.



Throttle valve conditions	Voltage
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

SEF526Z

OK or NG

- | | | |
|----|---|-----------------------------------|
| OK | ▶ | GO TO 10. |
| NG | ▶ | Replace throttle position sensor. |

10 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.

▶ **INSPECTION END**

System Description

NIEC1022

These circuit lines are used to control the smooth shifting up and down of A/T during the hard acceleration/ deceleration. Voltage signals are exchanged between ECM and TCM (Transmission control module).

On Board Diagnosis Logic

NIEC1023

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0600*	<ul style="list-style-type: none"> ECM receives incorrect voltage from TCM (Transmission control module) continuously. 	<ul style="list-style-type: none"> Harness or connectors [The circuit between ECM and TCM (Transmission control module) is open or shorted.]

*: This DTC can be detected only by "DATA MONITOR (AUTO TRIG)" with CONSULT-II.

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm

SEF058Y

DTC Confirmation Procedure

NIEC1024

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

④ With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If DTC is detected, go to "Diagnostic Procedure", EC-1783.

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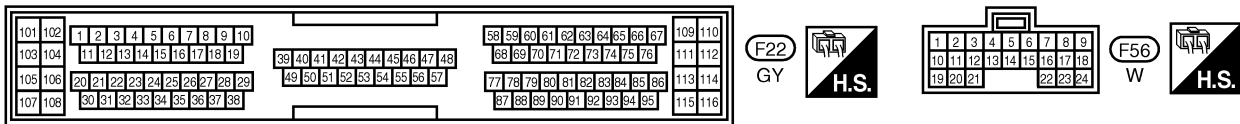
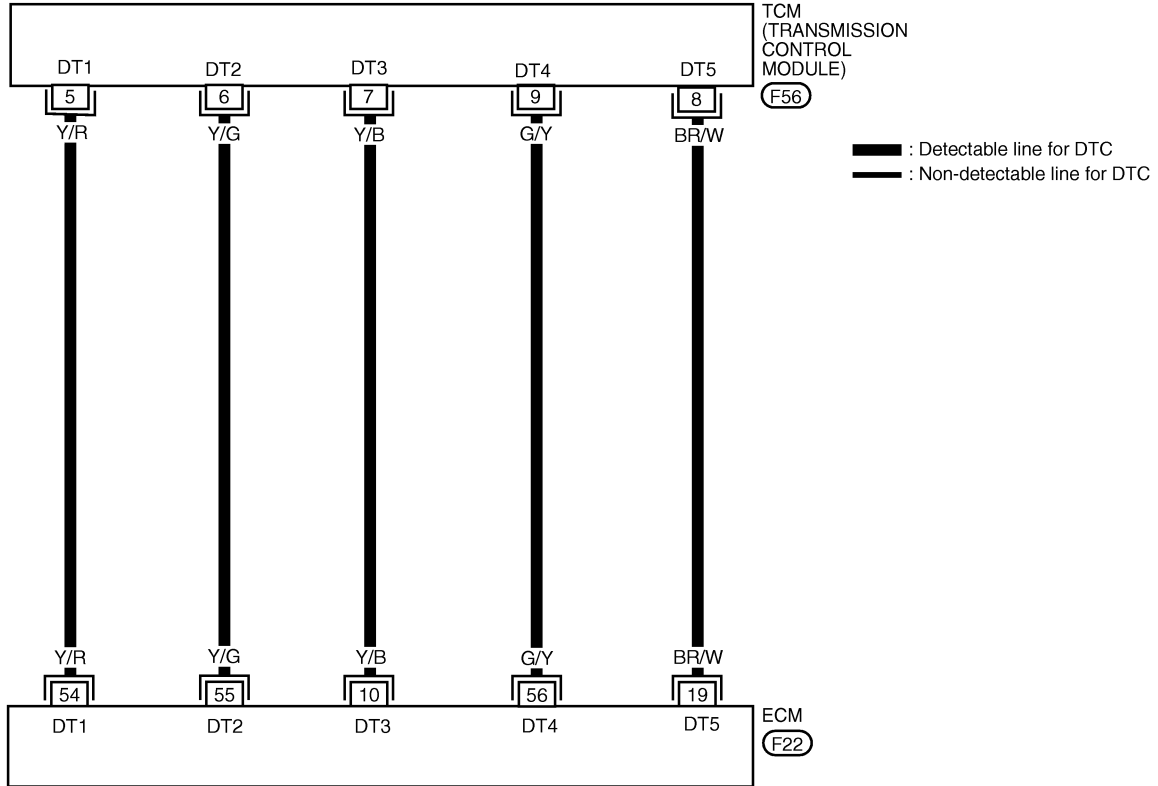
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Wiring Diagram

NIEC1025

EC-AT/C-01



LEC376

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

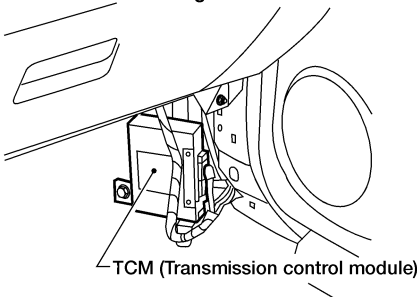
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
10	Y/B	A/T SIGNAL NO. 3	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
19	BR/W	A/T SIGNAL NO. 5	ENGINE RUNNING AT IDLE SPEED	APPROX. 8V
54	Y/R	A/T SIGNAL NO. 1	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
55	Y/G	A/T SIGNAL NO. 2	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V
56	G/Y	A/T SIGNAL NO. 4	ENGINE RUNNING AT IDLE SPEED	APPROX. 0 - 1.0V

SEF583Y

Diagnostic Procedure

NIEC1026

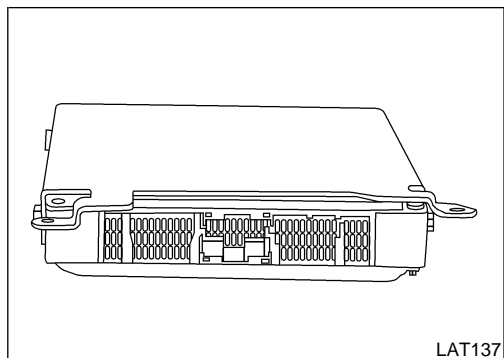
1	CHECK INPUT SIGNAL CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM (Transmission control module) harness connector.		
View with dash side lower garnish RH removed		
		
<small>LEC306</small>		
3. Check harness continuity between ECM terminal 10 and TCM terminal 7, ECM terminal 19 and TCM terminal 8, ECM terminal 54 and terminal 5, ECM terminal 55 and TCM terminal 6, ECM terminal 56 and TCM terminal 9. Refer to "Wiring Diagram", EC-1782. Continuity should exist.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair harness or connectors.

2	CHECK INPUT SIGNAL CIRCUIT	
1. Check harness continuity between ECM terminal 10 and ground, ECM terminal 19 and ground, ECM terminal 54 and ground, ECM terminal 55 and ground, ECM terminal 56 and ground. Refer to "Wiring Diagram", EC-1782. Continuity should not exist.		
2. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair short to ground or short to power in harness.

3	CHECK INTERMITTENT INCIDENT	
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

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Component Description



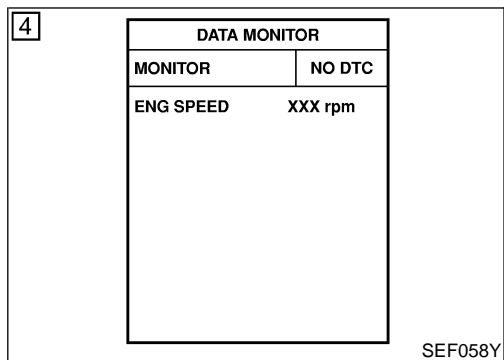
Component Description

The ECM consists of a microcomputer and connector for signal input and output and for power supply. The ECM controls the engine. NIEC1027

On Board Diagnosis Logic

NIEC1028

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0605	<ul style="list-style-type: none"> ECM calculation function is malfunctioning. 	<ul style="list-style-type: none"> ECM



DTC Confirmation Procedure

NIEC1029

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Run engine for at least 30 seconds at idle speed.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1785.

With GST

Follow the procedure "With CONSULT-II" above.

Diagnostic Procedure

NIEC1030

1	INSPECTION START	
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select "SELF DIAG RESULTS" mode with CONSULT-II. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-1784. 5. Is the 1st trip DTC P0605 displayed again? 		
<p> With GST</p> <ol style="list-style-type: none"> 1. Turn ignition switch "ON". 2. Select MODE 4 with GST. 3. Touch "ERASE". 4. Perform "DTC Confirmation Procedure". See EC-1784. 5. Is the 1st trip DTC P0605 displayed again? 		
Yes or No		
Yes	▶	GO TO 2.
No	▶	INSPECTION END

2	REPLACE ECM	
<ol style="list-style-type: none"> 1. Replace ECM. 2. Perform initialization of NVIS (NATS) system and registration of all NVIS (NATS) ignition key IDs. Refer to "NVIS (NISSAN VEHICLE IMMOBILIZER SYSTEM — NATS)", EC-1435. 3. Perform "Idle Air Volume Learning", EC-1419, Is the result CMPLT or INCMP? 		
CMPLT or INCMP		
CMPLT	▶	INSPECTION END
INCMP	▶	Follow the instruction of "Idle Air Volume Learning".

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On Board Diagnosis Logic

Engine coolant temperature has not risen enough to open the thermostat even though the engine has run long enough. NIEC1031

This is due to a leak in the seal or the thermostat open stuck. Malfunction is detected when the engine coolant temperature does not reach to specified temperature even though the engine has run long enough.

Possible Cause

- Thermostat function
- Leakage from sealing portion of thermostat
- Engine coolant temperature sensor

NIEC1032

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NIEC1033

TESTING CONDITION:

- For best results, perform at ambient temperature of -10°C (14°F) or higher.
- For best results, perform at engine coolant temperature of -10°C (14°F) to 60°C (140°F).

WITH CONSULT-II

- 1) Replace thermostat with new one. Refer to **LC-31**, "Thermostat". Use only a genuine NISSAN thermostat as a replacement. If an incorrect thermostat is used, the MIL may come on. NIEC1033S01
- 2) Turn ignition switch "ON".
- 3) Select "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT-II.
- 4) Check that the "COOLAN TEMP/S" is above 60°C (140°F).
If it is below 60°C (140°F), go to following step.
If it is above 60°C (140°F), stop engine and cool down the engine to less than 60°C (140°F), then retry from step 1.
- 5) Drive vehicle for 10 consecutive minutes under the following conditions.

VHCL SPEED SE	80 - 120 km/h (50 - 75 MPH)
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If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1787.

WITH GST

- 1) Follow the procedure "WITH CONSULT-II" above. NIEC1033S02

DTC P1126 THERMOSTAT FUNCTION

SR20DE

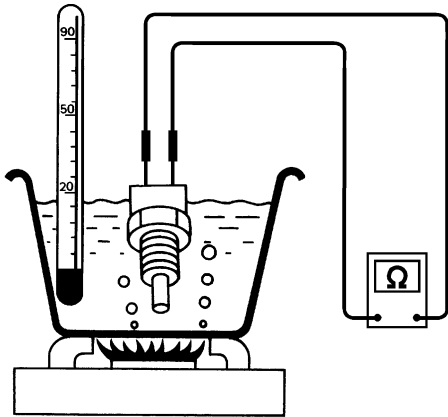
Diagnostic Procedure

Diagnostic Procedure

NIEC1034

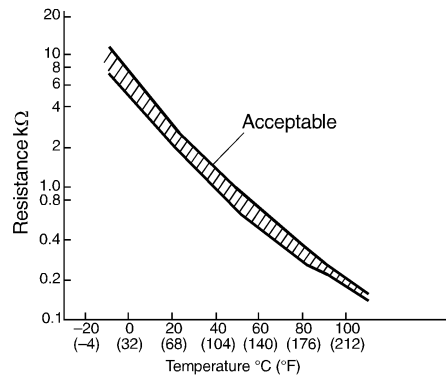
1 CHECK ENGINE COOLANT TEMPERATURE SENSOR

1. Turn ignition switch OFF.
2. Remove engine coolant temperature sensor.
3. Check resistance between engine coolant temperature sensor terminals under the following conditions.



<Reference data>

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260



SEF304X

OK or NG

OK	▶	INSPECTION END
NG	▶	Replace engine coolant temperature sensor.

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On Board Diagnosis Logic

NIEC1035

★ The closed loop control has the one trip detection logic.

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1148	<ul style="list-style-type: none"> The closed loop control function does not operate even when vehicle is driving in the specified condition. 	<ul style="list-style-type: none"> The heated oxygen sensor 1 (front) circuit is open or shorted. Heated oxygen sensor 1 (front) Heated oxygen sensor 1 heater (front)

3

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
B/FUEL SCHDL	XXX msec
COOLAN TEMP/S	XXX °C
HO2S1 (B1)	XXX V
VHCL SPEED SE	XXX km/h

SEF682Y

DTC Confirmation Procedure

NIEC1036

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- **Never raise engine speed above 3,200 rpm during the “DTC Confirmation Procedure”. If the engine speed limit is exceeded, retry the procedure from step 4.**
- **Before performing the following procedure, confirm that battery voltage is more than 11V at idle.**

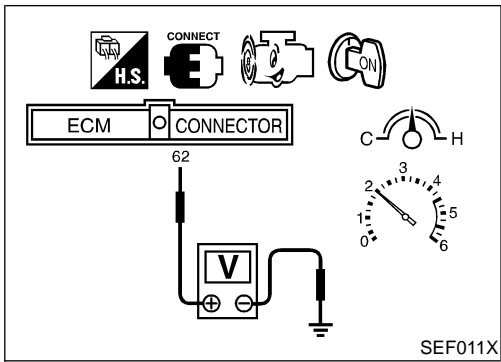
With CONSULT-II

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Hold engine speed at 2,000 rpm and check the following.
 - “HO2S1 (B1)” voltage should go above 0.70V at least once.
 - “HO2S1 (B1)” voltage should go below 0.21V at least once. If the result is NG, perform “Diagnostic Procedure”, EC-1789. If the result is OK, perform the following step.
- 4) Let engine idle at least 4 minutes.
- 5) Maintain the following condition at least 50 consecutive seconds.

B/FUEL SCHDL	More than 2.4 msec
ENG SPEED	More than 1,500 rpm
Selector lever	Suitable position
VHCL SPEED SE	More than 71 km/h (44 MPH)

During this test, P0130 DTC may be displayed on CONSULT-II screen.

- 6) If DTC is detected, go to “Diagnostic Procedure”, EC-1789.



Overall Function Check

Use this procedure to check the overall function of the closed loop control. During this check, a DTC might not be confirmed. NIEC1037

With GST

- 1) Start engine and warm it up to normal operating temperature.
- 2) Set voltmeter probes between ECM terminal 62 [Heated oxygen sensor 1 (front) signal] and engine ground.
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - The voltage should go above 0.70V at least once.
 - The voltage should go below 0.21V at least once.
- 4) If NG, go to "Diagnostic Procedure", EC-1789.

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Diagnostic Procedure

Refer to "Diagnostic Procedure" for DTC P0133, EC-1568. NIEC1038

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System Description

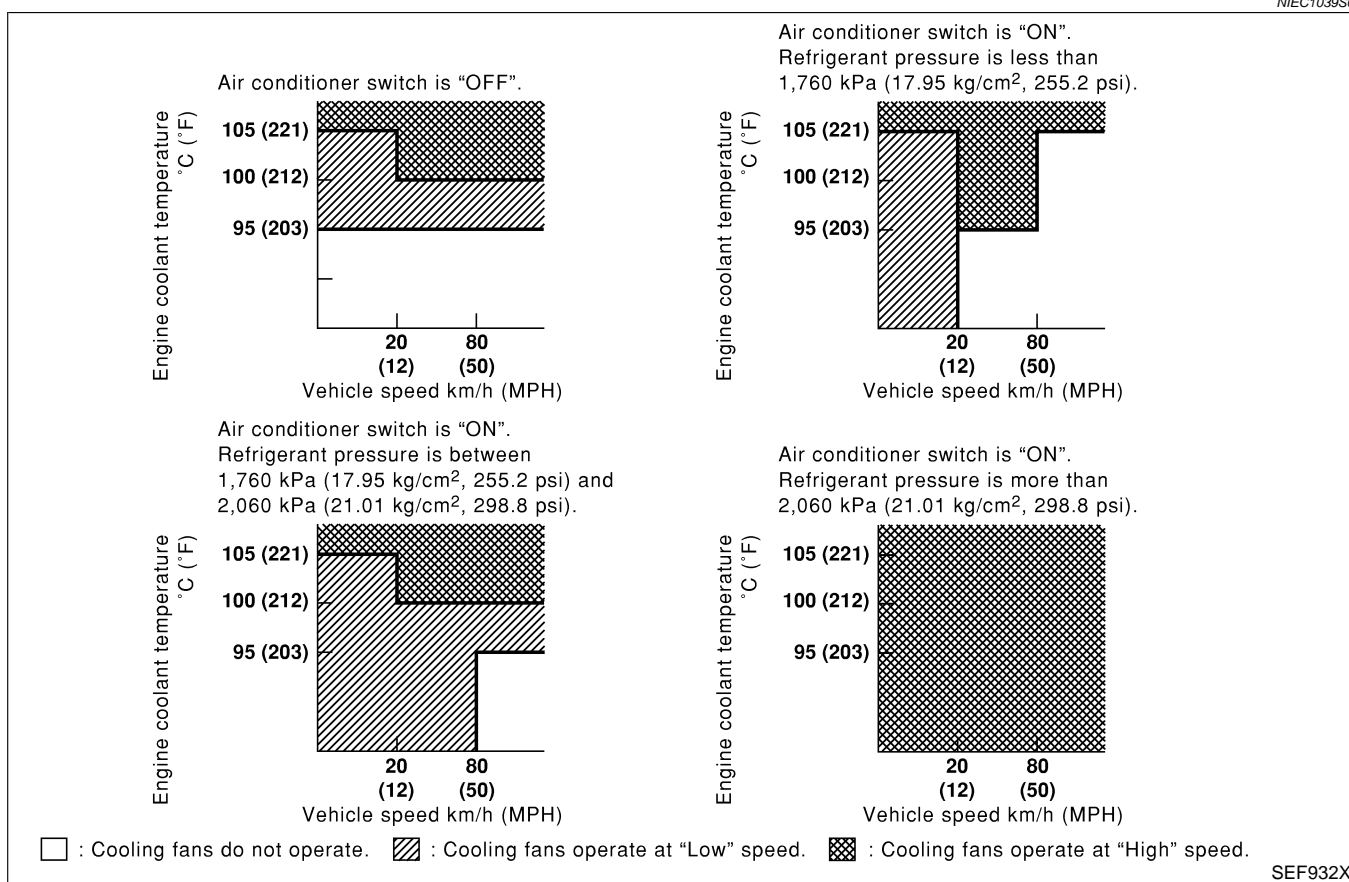
NIEC1039
NIEC1039S01

COOLING FAN CONTROL

Sensor	Input Signal to ECM	ECM function	Actuator
Vehicle speed sensor	Vehicle speed	ECM	Cooling fan relay(s)
Engine coolant temperature sensor	Engine coolant temperature		
Air conditioner switch	Air conditioner "ON" signal		
Ignition switch	Start signal		
Refrigerant pressure sensor	Refrigerant pressure		

The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature, refrigerant pressure, and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

OPERATION

NIEC1039S02

SEF932X

CONSULT-II Reference Value in Data Monitor Mode

NIEC1040

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
AIR COND SIG	● Engine: After warming up, idle the engine	Air conditioner switch: OFF
	Air conditioner switch: ON (Compressor operates)	ON

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

CONSULT-II Reference Value in Data Monitor Mode (Cont'd)

MONITOR ITEM	CONDITION		SPECIFICATION
COOLING FAN	<ul style="list-style-type: none"> After warming up engine, idle the engine. Air conditioner switch: OFF 	Engine coolant temperature is below 95°C (203°F)	OFF
		Engine coolant temperature is between 95°C (203°F) and 105°C (221°F)	LOW
		Engine coolant temperature is above 105°C (221°F)	HIGH

On Board Diagnosis Logic

NIEC1041

If the cooling fan or another component in the cooling system malfunctions, engine coolant temperature will rise.

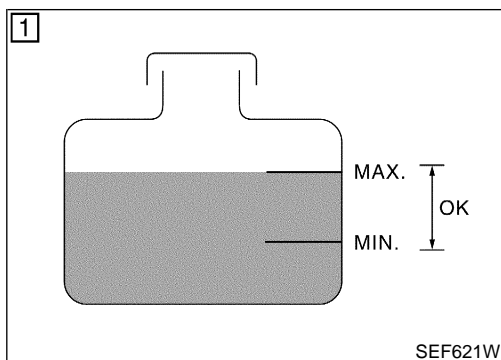
When the engine coolant temperature reaches an abnormally high temperature condition, a malfunction is indicated.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1217	<ul style="list-style-type: none"> Cooling fan does not operate properly (Overheat). Cooling fan system does not operate properly (Overheat). Engine coolant was not added to the system using the proper filling method. 	<ul style="list-style-type: none"> Harness or connectors (The cooling fan circuit is open or shorted.) Cooling fan Radiator hose Radiator Radiator cap Water pump Thermostat <p>For more information, refer to "MAIN 12 CAUSES OF OVERHEATING", EC-1806.</p>

CAUTION:

When a malfunction is indicated, be sure to replace the coolant. Refer to MA-17, "Changing Engine Coolant". Also, replace the engine oil. Refer to MA-20, "Changing Engine Oil".

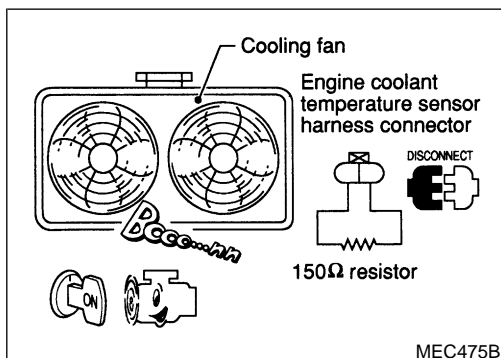
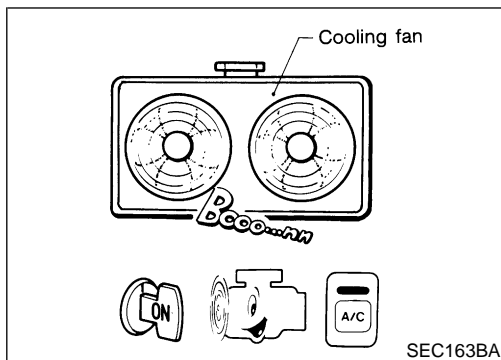
- 1) Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute. Be sure to use coolant with the proper mixture ratio. Refer to MA-15, "Anti-freeze Coolant Mixture Ratio".
- 2) After refilling coolant, run engine to ensure that no water-flow noise is emitted.



4

ACTIVE TEST	
COOLING FAN	OFF
MONITOR	
COOLAN TEMP/S	XXX °C

SEF111X



Overall Function Check

Use this procedure to check the overall function of the cooling fan. ^{NIEC1042}
During this check, a DTC might not be confirmed.

WARNING:

Never remove the radiator cap when the engine is hot. Serious burns could be caused by high pressure fluid escaping from the radiator.

Wrap a thick cloth around cap. Carefully remove the cap by turning it a quarter turn to allow built-up pressure to escape. Then turn the cap all the way off.

With CONSULT-II

- 1) Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-1794.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-1794.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II at idle.
- 5) If the results are NG, go to "Diagnostic Procedure", EC-1794.

With GST

- 1) Check the coolant level in the reservoir tank and radiator.
Allow engine to cool before checking coolant level.
If the coolant level in the reservoir tank and/or radiator is below the proper range, skip the following steps and go to "Diagnostic Procedure", EC-1794.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "Diagnostic Procedure", EC-1794.
- 3) Start engine.
Be careful not to overheat engine.
- 4) Set temperature control lever to full cold position.
- 5) Turn air conditioner switch "ON".
- 6) Turn blower fan switch "ON".
- 7) Run engine at idle for a few minutes with air conditioner operating.
Be careful not to overheat engine.
- 8) Make sure that cooling fan operates at low speed.
If NG, go to "Diagnostic Procedure", EC-1794.
If OK, go to the following step.
- 9) Turn ignition switch "OFF".
- 10) Turn air conditioner switch and blower fan switch "OFF".
- 11) Disconnect engine coolant temperature sensor harness connector.
- 12) Connect 150Ω resistor to engine coolant temperature sensor harness connector.
- 13) Restart engine and make sure that cooling fan operates at higher speed than low speed.
Be careful not to overheat engine.
- 14) If NG, go to "Diagnostic Procedure", EC-1794.

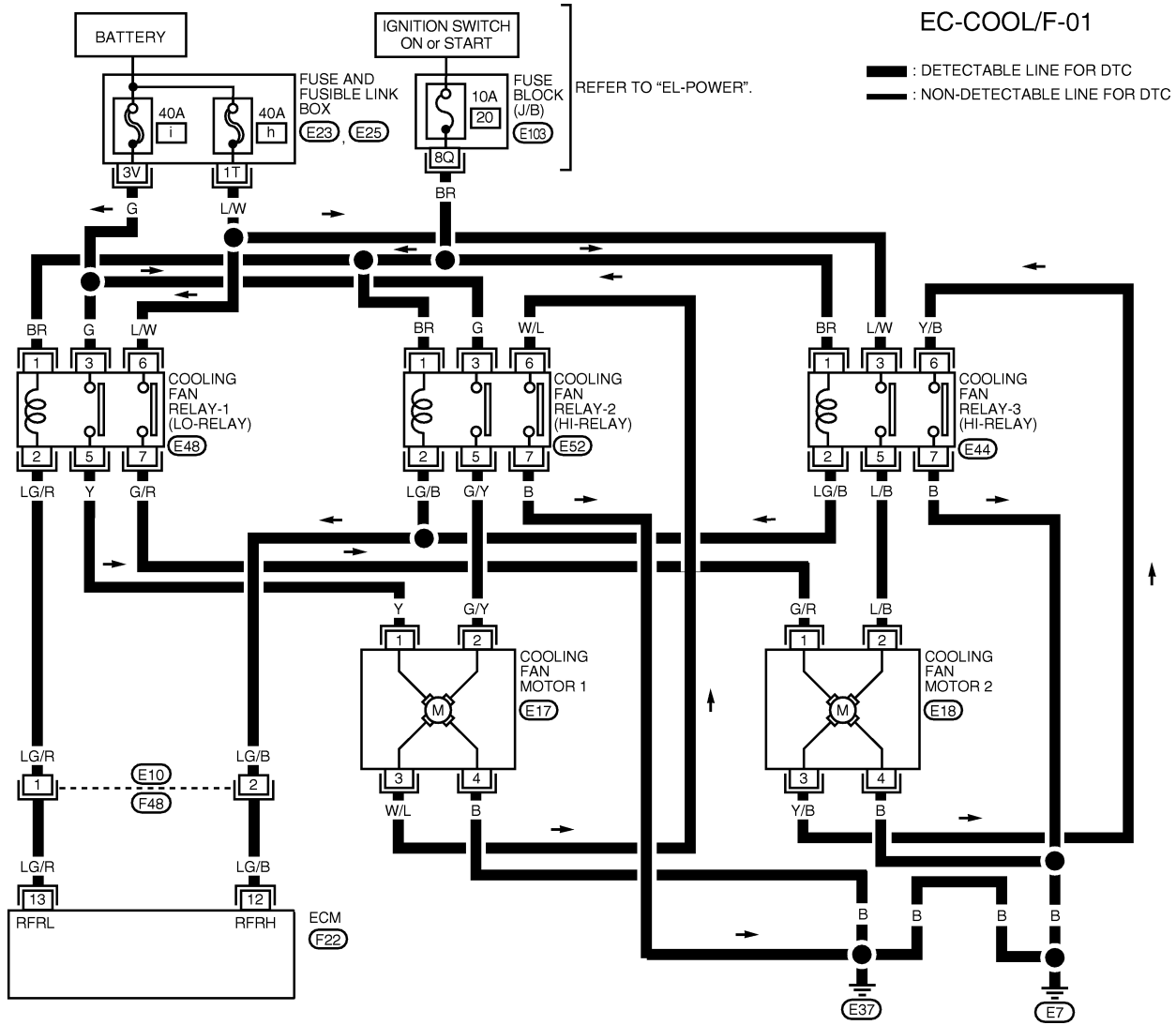
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

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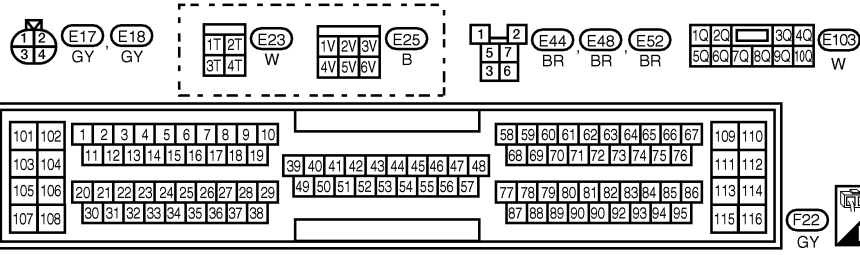
Wiring Diagram

Wiring Diagram

NIEC1043



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ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
12	LG/B	COOLING FAN RELAY (HIGH)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT HIGH SPEED	0 - 0.6V
13	LG/R	COOLING FAN RELAY (LOW)	ENGINE RUNNING WITH COOLING FAN NOT OPERATING	BATTERY VOLTAGE
			ENGINE RUNNING WITH COOLING FAN OPERATING AT LOW SPEED	0 - 0.6V

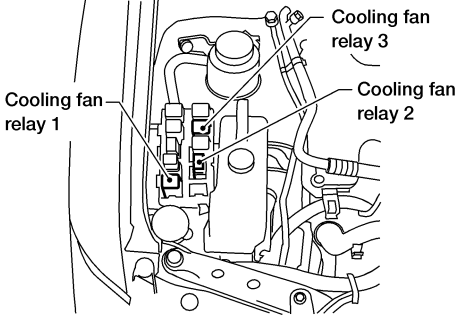
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Diagnostic Procedure

NIEC1044

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 4.

2	CHECK COOLING FAN LOW SPEED OPERATION																									
<p>📖 With CONSULT-II</p> <p>1. Disconnect cooling fan relays-2 and -3.</p>																										
																										
<small>LEC272</small>																										
<p>2. Turn ignition switch "ON".</p> <p>3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II.</p>																										
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>LOW</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>			ACTIVE TEST		COOLING FAN	LOW	MONITOR		COOLAN TEMP/S	XXX °C																
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<p>4. Make sure that cooling fans-1 and -2 operate at low speed.</p> <p style="text-align: center;">OK or NG</p>																										
OK	▶	GO TO 3.																								
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1800.)																								

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

3 CHECK COOLING FAN HIGH SPEED OPERATION																									
<p>Ⓢ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Disconnect cooling fan relay-1. 4. Turn ignition switch "ON". 5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT-II. 																									
<table border="1"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>COOLING FAN</th> <th>HIGH</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>COOLAN TEMP/S</th> <th>XXX °C</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		COOLING FAN	HIGH	MONITOR		COOLAN TEMP/S	XXX °C																
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MONITOR																									
COOLAN TEMP/S	XXX °C																								
<p>6. Make sure that cooling fans-1 and -2 operate at higher speed than low speed.</p> <p style="text-align: right;">SEF785Z</p>																									
OK or NG																									
OK	▶ GO TO 6.																								
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1803.)																								

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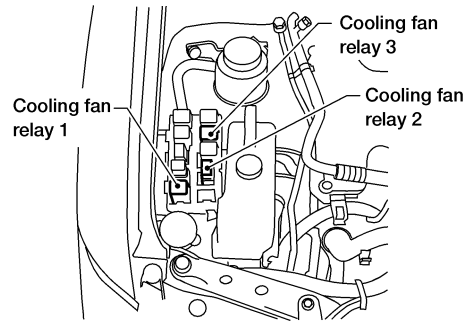
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4 CHECK COOLING FAN LOW SPEED OPERATION

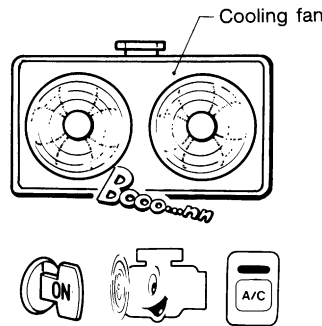
⊗ Without CONSULT-II

1. Disconnect cooling fan relays-2 and -3.



LEC272

2. Start engine and let it idle.
3. Set temperature lever at full cold position.
4. Turn air conditioner switch "ON".
5. Turn blower fan switch "ON".
6. Make sure that cooling fans-1 and -2 operate at low speed.



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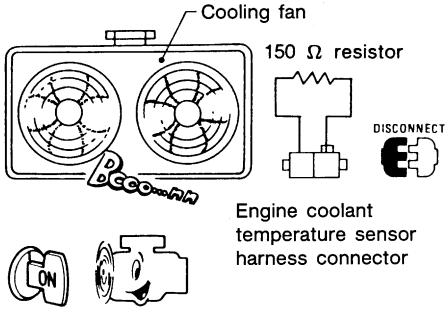
OK or NG

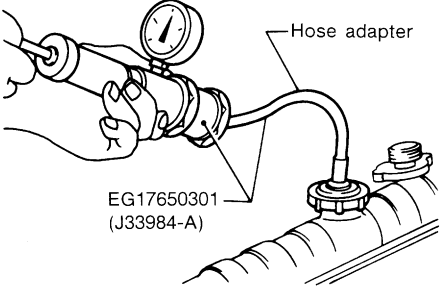
OK	▶	GO TO 5.
NG	▶	Check cooling fan low speed control circuit. (Go to PROCEDURE A, EC-1800.)

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

5	CHECK COOLING FAN HIGH SPEED OPERATION
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect cooling fan relays-2 and -3. 3. Disconnect cooling fan relay-1. 4. Turn air conditioner switch and blower fan switch "OFF". 5. Disconnect engine coolant temperature sensor harness connector. 6. Connect 150Ω resistor to engine coolant temperature sensor harness connector. 7. Restart engine and make sure that cooling fans-1 and -2 operate at higher speed than low speed. 	
 <p style="text-align: right;">MEF613EA</p>	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Check cooling fan high speed control circuit. (Go to PROCEDURE B, EC-1803.)

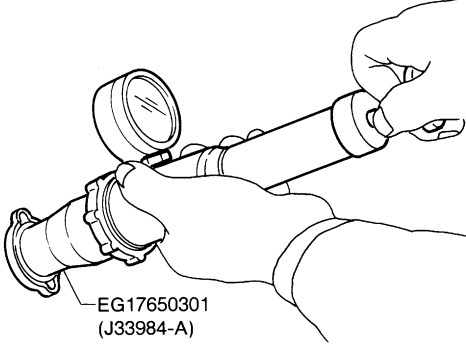
6	CHECK COOLING SYSTEM FOR LEAK
<p>Apply pressure to the cooling system with a tester, and check if the pressure drops.</p> <p style="color: blue;">Testing pressure: 157 kPa (1.6 kg/cm², 23 psi)</p> <p>CAUTION: Higher than the specified pressure may cause radiator damage.</p>	
 <p style="text-align: right;">SLC754A</p>	
Pressure should not drop.	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Check the following for leak <ul style="list-style-type: none"> ● Hose ● Radiator ● Water pump Refer to LC-13 , "Water Pump".

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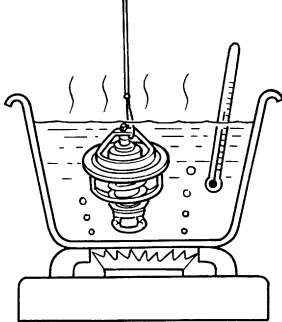
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK RADIATOR CAP
Apply pressure to cap with a tester.	
	
Radiator cap relief pressure: 59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi)	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Replace radiator cap.

SLC755A

8	CHECK THERMOSTAT
1. Check valve seating condition at normal room temperatures. It should seat tightly.	
2. Check valve opening temperature and valve lift.	
	
Valve opening temperature: 76.5°C (170°F) [standard]	
Valve lift: More than 8 mm/90°C (0.31 in/194°F)	
3. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC-31 , "Thermostat".	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace thermostat

SLC343

9	CHECK ENGINE COOLANT TEMPERATURE SENSOR
Refer to "COMPONENT INSPECTION", EC-1544.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace engine coolant temperature sensor.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

10	CHECK MAIN 12 CAUSES
If the cause cannot be isolated, go to "MAIN 12 CAUSES OF OVERHEATING", EC-1806.	
▶	INSPECTION END

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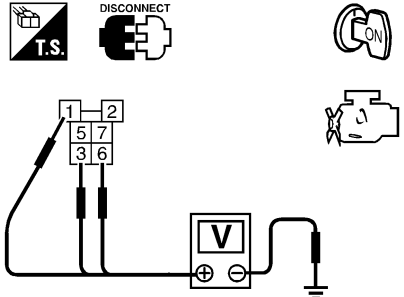
DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

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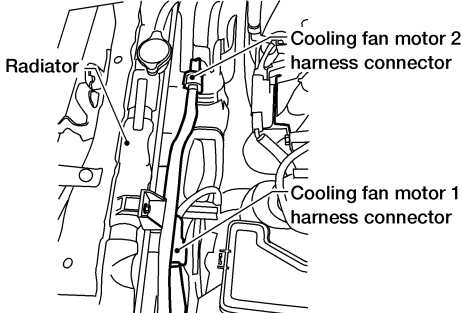
Diagnostic Procedure (Cont'd)

PROCEDURE A

-NIEC1044S01

1	CHECK POWER SUPPLY
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relay-1. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relay-1 terminals 1, 3, 6 and ground with CONSULT-II or tester.</p>	
	
SEF590X	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

2	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none">● 10A fuse● 40A fusible links● Harness for open or short between cooling fan relay-1 and fuse● Harness for open or short between cooling fan relay-1 and battery	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.

3	CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.</p> <div style="text-align: center;">  </div> <p>3. Check harness continuity between cooling fan relay-1 terminal 5 and cooling fan motor-1 terminal 1, cooling fan motor-1 terminal 4 and body ground. Refer to "Wiring Diagram", EC-1793. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p>5. Check harness continuity between cooling fan relay-1 terminal 7 and cooling fan motor-2 terminal 1, cooling fan motor-2 terminal 4 and body ground. Refer to "Wiring Diagram", EC-1793. Continuity should exist.</p> <p>6. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	GI MA EM LC EC FE CL MT AT AX
OK	▶	GO TO 4.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
4	CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Disconnect ECM harness connector.</p> <p>2. Check harness continuity between ECM terminal 13 and cooling fan relay-1 terminal 2. Refer to "Wiring Diagram", EC-1793. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	SU BR ST RS
OK	▶	GO TO 6.	
NG	▶	GO TO 5.	
5	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E10, F48 ● Harness for open or short between cooling fan relay-1 and ECM <p style="text-align: center;">OK or NG</p>	BT HA SC
	▶	Repair open circuit or short to ground or short to power in harness or connectors.	
6	CHECK COOLING FAN RELAY-1	<p>Refer to "Component Inspection", EC-1806.</p> <p style="text-align: center;">OK or NG</p>	EL IDX
OK	▶	GO TO 7.	
NG	▶	Replace cooling fan relay.	

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK COOLING FAN MOTORS-1 AND -2
Refer to "Component Inspection", EC-1807.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Replace cooling fan motors.

8	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Diagnostic Procedure (Cont'd)

PROCEDURE B

-NIEC1044S02

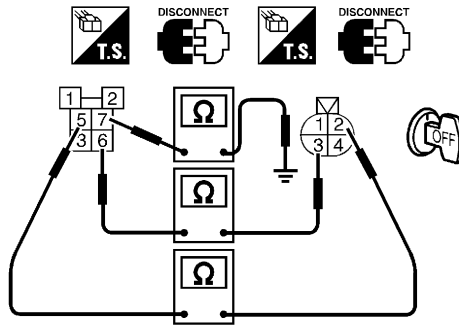
1	CHECK POWER SUPPLY		
<p>1. Turn ignition switch "OFF". 2. Disconnect cooling fan relays-2 and -3. 3. Turn ignition switch "ON". 4. Check voltage between cooling fan relays-2 and -3 terminals 1, 3 and ground with CONSULT-II or tester.</p>			
SEF593X			
OK or NG			
OK	▶	GO TO 3.	
NG	▶	GO TO 2.	

2	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between cooling fan relays-2 and -3 and fuse ● Harness for open or short between cooling fan relays-2 and -3 and fusible link 			
	▶	Repair harness or connectors.	

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3 CHECK COOLING FAN MOTOR CIRCUIT FOR OPEN AND SHORT

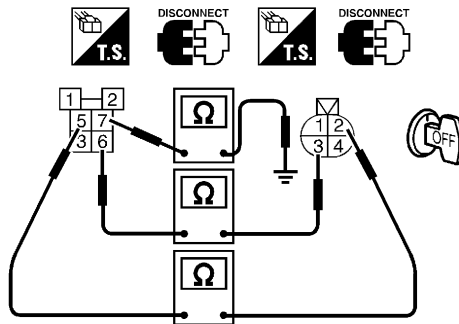
1. Turn ignition switch "OFF".
2. Disconnect cooling fan motor-1 harness connector and cooling fan motor-2 harness connector.
3. Check harness continuity between the following:
 - Cooling fan relay-2 terminal 5 and cooling fan motor-1 terminal 2
 - Cooling fan relay-2 terminal 6 and cooling fan motor-1 terminal 3
 - Cooling fan relay-2 terminal 7 and body ground.



SEF732W

Continuity should exist.

4. Also check harness for short to ground and short to power.
5. Check harness continuity between the following:
 - Cooling fan relay-3 terminal 5 and cooling fan motor-2 terminal 2
 - Cooling fan relay-3 terminal 6 and cooling fan motor-2 terminal 3
 - Cooling fan relay-3 terminal 7 and body ground.



SEF732W

Continuity should exist.

6. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 4.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

4 CHECK COOLING FAN OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal 12 and cooling fan relay-2 terminal 2, cooling fan relay-3 terminal 2. Refer to "Wiring Diagram", EC-1793.

Continuity should exist.

3. Also check harness for short to ground and short to power.

OK or NG

OK	▶	GO TO 6.
NG	▶	GO TO 5.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE*Diagnostic Procedure (Cont'd)*

5	DETECT MALFUNCTIONING PART	
Check the following.		
<ul style="list-style-type: none">● Harness connectors E10, F48● Harness for open or short between cooling fan relays-2 and -3 and ECM		
	▶	Repair open circuit or short to ground or short to power in harness or connectors.
6	CHECK COOLING FAN RELAYS-2 AND -3	
Refer to "Component Inspection", EC-1806.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace cooling fan relays.
7	CHECK COOLING FAN MOTORS-1 AND -2	
Refer to "Component Inspection", EC-1807.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace cooling fan motors.
8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END

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DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Main 12 Causes of Overheating

Main 12 Causes of Overheating

NIEC1045

Engine	Step	Inspection item	Equipment	Standard	Reference page
OFF	1	<ul style="list-style-type: none"> Blocked radiator Blocked condenser Blocked radiator grille Blocked bumper 	<ul style="list-style-type: none"> Visual 	No blocking	—
	2	<ul style="list-style-type: none"> Coolant mixture 	<ul style="list-style-type: none"> Coolant tester 	50 - 50% coolant mixture	See MA-13 , "RECOMMENDED FLUIDS AND LUBRICANTS".
	3	<ul style="list-style-type: none"> Coolant level 	<ul style="list-style-type: none"> Visual 	Coolant up to MAX level in reservoir tank and radiator filler neck	See MA-17 , "Changing Engine Coolant".
	4	<ul style="list-style-type: none"> Radiator cap 	<ul style="list-style-type: none"> Pressure tester 	59 - 98 kPa (0.6 - 1.0 kg/cm ² , 9 - 14 psi) (Limit)	See LC-12 , "System Check".
ON*2	5	<ul style="list-style-type: none"> Coolant leaks 	<ul style="list-style-type: none"> Visual 	No leaks	See LC-12 , "System Check".
ON*2	6	<ul style="list-style-type: none"> Thermostat 	<ul style="list-style-type: none"> Touch the upper and lower radiator hoses 	Both hoses should be hot	See LC-31 , "Thermostat", and LC-33 , "Radiator".
ON*1	7	<ul style="list-style-type: none"> Cooling fan 	<ul style="list-style-type: none"> CONSULT-II 	Operating	See trouble diagnosis for DTC P1217 (EC-1790).
OFF	8	<ul style="list-style-type: none"> Combustion gas leak 	<ul style="list-style-type: none"> Color checker chemical tester 4 Gas analyzer 	Negative	—
ON*3	9	<ul style="list-style-type: none"> Coolant temperature gauge 	<ul style="list-style-type: none"> Visual 	Gauge less than 3/4 when driving	—
		<ul style="list-style-type: none"> Coolant overflow to reservoir tank 	<ul style="list-style-type: none"> Visual 	No overflow during driving and idling	See MA-17 , "Changing Engine Coolant".
OFF*4	10	<ul style="list-style-type: none"> Coolant return from reservoir tank to radiator 	<ul style="list-style-type: none"> Visual 	Should be initial level in reservoir tank	See MA-16 , "ENGINE MAINTENANCE".
OFF	11	<ul style="list-style-type: none"> Cylinder head 	<ul style="list-style-type: none"> Straight gauge feeler gauge 	0.1 mm (0.004 in) Maximum distortion (warping)	See EM-110 , "Inspection".
	12	<ul style="list-style-type: none"> Cylinder block and pistons 	<ul style="list-style-type: none"> Visual 	No scuffing on cylinder walls or piston	See EM-132 , "Inspection".

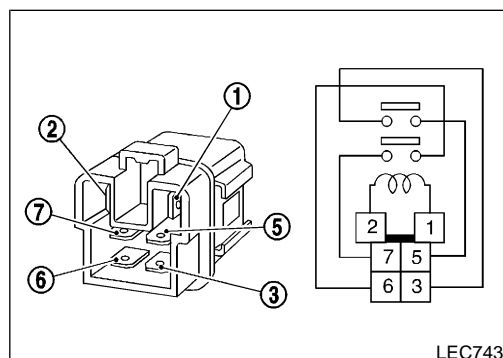
*1: Turn the ignition switch ON.

*2: Engine running at 3,000 rpm for 10 minutes.

*3: Drive at 90 km/h (55 MPH) for 30 minutes and then let idle for 10 minutes.

*4: After 60 minutes of cool down time.

For more information, refer to **LC-19**, "OVERHEATING CAUSE ANALYSIS".



LEC743

Component Inspection

COOLING FAN RELAYS-1, -2 AND -3

NIEC1046

NIEC1046S01

Check continuity between terminals 3 and 5, 6 and 7.

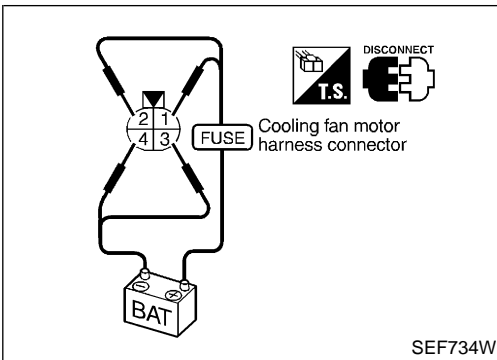
Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.

DTC P1217 ENGINE OVER TEMPERATURE (OVERHEAT)

SR20DE

Component Inspection (Cont'd)



COOLING FAN MOTORS-1 AND -2

NIEC1046S02

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.

	Speed	Terminals	
		(+)	(-)
Cooling fan motor	Low	1	4
	High	1, 2	3, 4

Cooling fan motor should operate.

If NG, replace cooling fan motor.

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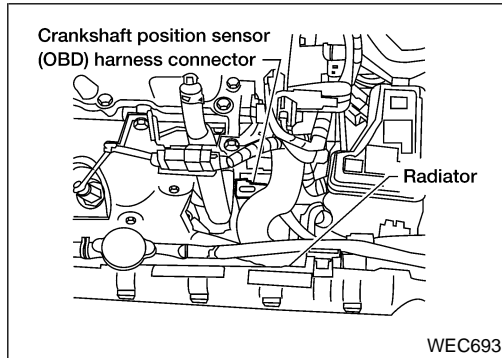
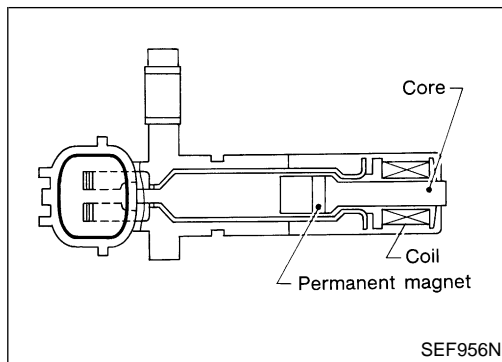
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DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

SR20DE

Component Description



Component Description

NIEC1054

The crankshaft position sensor (OBD) is located on the transmission housing facing the gear teeth (cogs) of the flywheel or drive plate. It detects the fluctuation of the engine revolution.

The sensor consists of a permanent magnet, core and coil.

When the engine is running, the high and low parts of the teeth cause the gap with the sensor to change.

The changing gap causes the magnetic field near the sensor to change.

Due to the changing magnetic field, the voltage from the sensor changes.

The ECM receives the voltage signal and detects the fluctuation of the engine revolution.

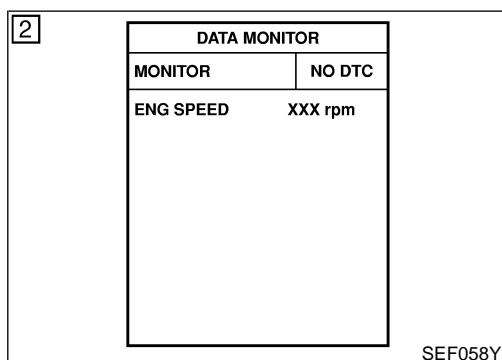
This sensor is not used to control the engine system.

It is used only for the on board diagnosis.

On Board Diagnosis Logic

NIEC1055

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1336	<ul style="list-style-type: none"> A chipping of the flywheel or drive plate gear tooth (cog) is detected by the ECM. 	<ul style="list-style-type: none"> Harness or connectors Crankshaft position sensor (OBD) Drive plate/Flywheel



DTC Confirmation Procedure

NIEC1056

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT-II.
- 2) Start engine and run it for at least 4 minutes at idle speed.
- 3) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1810.

With GST

Follow the procedure "With CONSULT-II" above.






DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

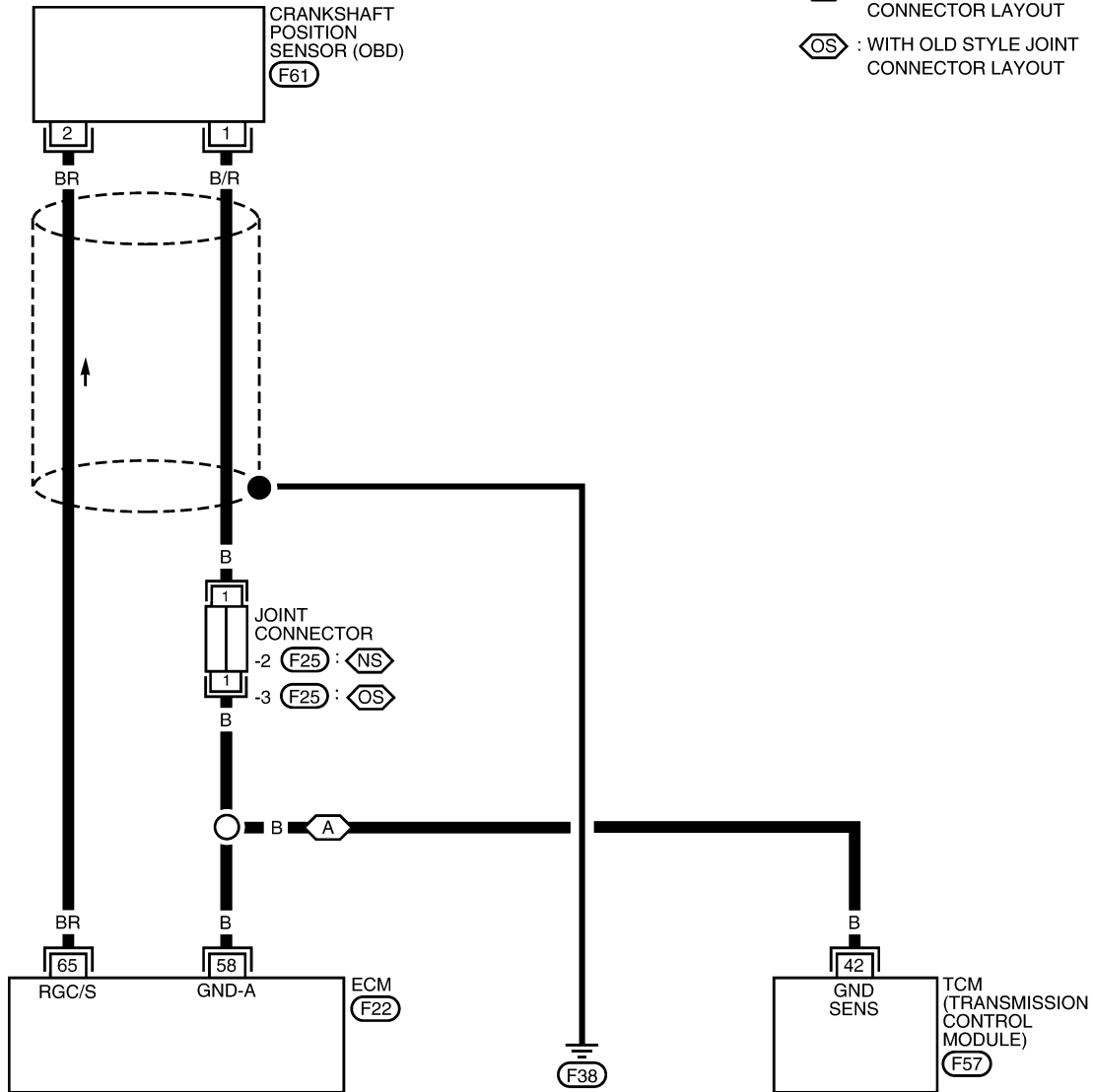
SR20DE
Wiring Diagram

Wiring Diagram

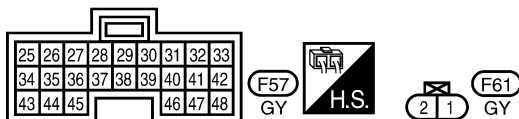
NIEC1057


EC-CKPS-01

-  : DETECTABLE LINE FOR DTC
-  : NON-DETECTABLE LINE FOR DTC
-  : WITH A/T
-  : WITH NEW STYLE JOINT CONNECTOR LAYOUT
-  : WITH OLD STYLE JOINT CONNECTOR LAYOUT



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19			39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29			49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																								115	116



REFER TO THE FOLLOWING.
 - JOINT CONNECTOR

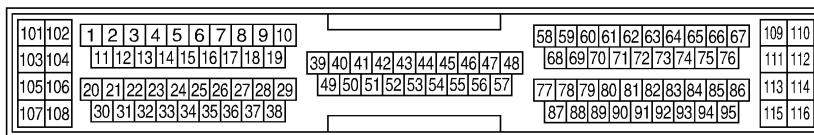


WEC951

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

SR20DE

Wiring Diagram (Cont'd)



SEF970W

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
65	B/R	CRANKSHAFT POSITION SENSOR (OBD)	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	3 - 5V (AC RANGE) (V)
			ENGINE RUNNING AT 2,000 RPM	6 - 9V (AC RANGE) (V)

SEF573Y

Diagnostic Procedure

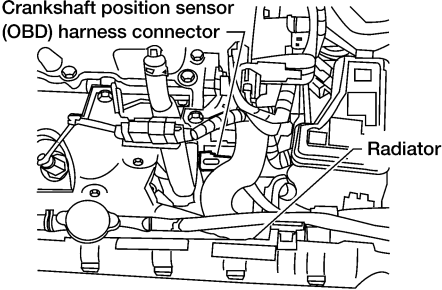
NIEC1058

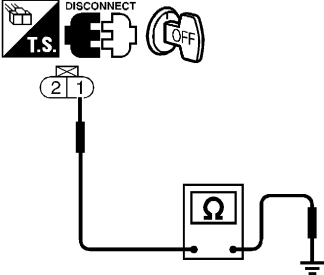
1	RETIGHTEN GROUND SCREWS
1. Turn ignition switch "OFF". 2. Loosen and retighten engine ground screws.	
	GO TO 2.

DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

SR20DE

Diagnostic Procedure (Cont'd)

2	CHECK INPUT SIGNAL CIRCUIT	<p>1. Disconnect crankshaft position sensor (OBD) and ECM harness connectors.</p> <div style="text-align: center;">  <p style="font-size: small;">Crankshaft position sensor (OBD) harness connector</p> <p style="font-size: small;">Radiator</p> </div> <p style="text-align: right; font-size: x-small;">WEC693</p> <p>2. Check continuity between ECM terminal 65 and CKPS terminal 2. Refer to "Wiring Diagram", EC-1809. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 3.	
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.	

3	CHECK GROUND CIRCUIT	<p>1. Reconnect ECM harness connectors.</p> <p>2. Check harness continuity between CKPS terminal 1 and engine ground.</p> <div style="text-align: center;">  <p style="font-size: x-small;">DISCONNECT T.S. OFF</p> </div> <p style="text-align: right; font-size: x-small;">SEF229W</p> <p>Continuity should exist.</p> <p>3. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between crankshaft position sensor (OBD) and ECM ● Harness for open or short between crankshaft position sensor (OBD) and TCM (Transmission control module) <p style="text-align: center;">▶ Repair open circuit or short to power in harness or connectors.</p>	
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5	CHECK IMPROPER INSTALLATION	<p>Loosen and retighten the fixing bolt of the crankshaft position sensor (OBD) Then retest.</p> <p style="text-align: center;">▶ Trouble is not fixed. GO TO 6.</p>	
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DTC P1336 CRANKSHAFT POSITION SENSOR (CKPS) (OBD) (COG)

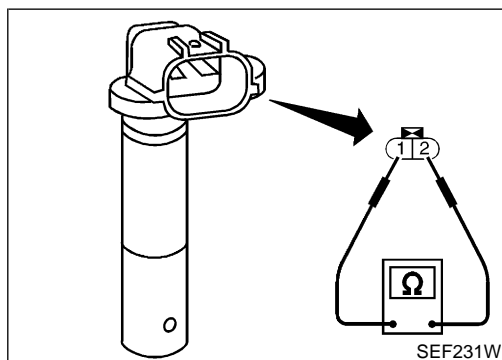
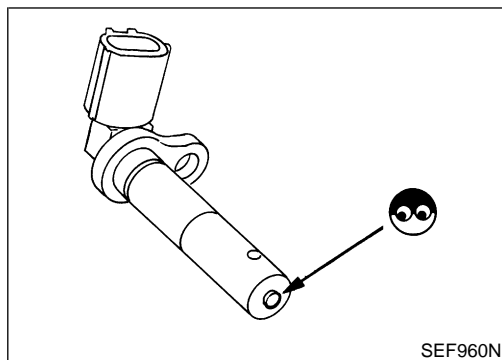
SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK CRANKSHAFT POSITION SENSOR (OBD)	
Refer to "Component Inspection", EC-1812.		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace crankshaft position sensor (OBD).

7	CHECK GEAR TOOTH	
Visually check for chipping flywheel or drive plate gear tooth (cog).		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace the flywheel or drive plate.

8	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END



Component Inspection

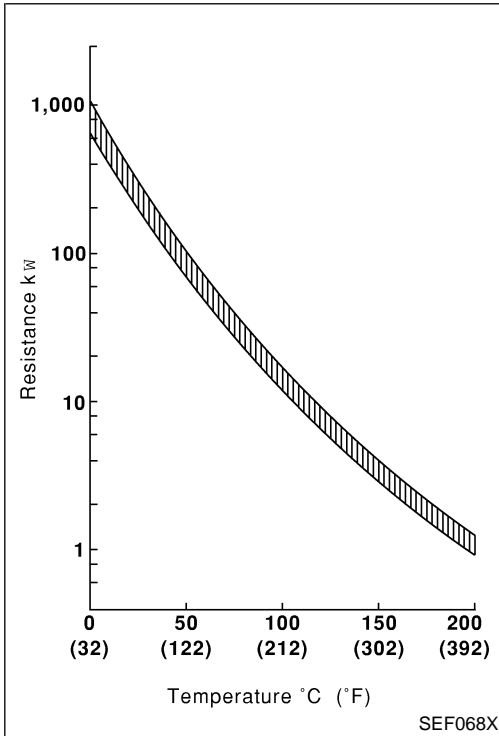
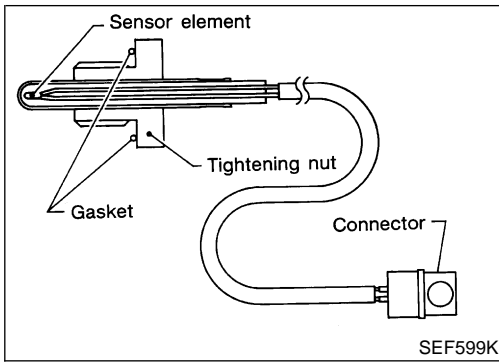
CRANKSHAFT POSITION SENSOR (OBD)

NIEC1059

NIEC1059S01

1. Disconnect crankshaft position sensor (OBD) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.

5. Check resistance as shown in the figure.
Resistance: 166 - 204 Ω [at 20°C (68°F)]
 If NG, replace crankshaft position sensor (OBD).



Component Description

The EGR temperature sensor detects temperature changes in the EGR passageway. When the EGR volume control valve opens, hot exhaust gases flow, and the temperature in the passageway changes. The EGR temperature sensor is a thermistor that modifies a voltage signal sent from the ECM. This modified signal then returns to the ECM as an input signal. As the temperature increases, EGR temperature sensor resistance decreases. This sensor is not directly used to control the engine system. It is used only for the on board diagnosis.

<Reference data>

EGR temperature °C (°F)	Voltage* V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

*: These data are reference values and are measured between ECM terminal 72 (EGR temperature sensor) and ground.

When EGR system is operating.

Voltage: 0 - 1.5V

CAUTION:

Do not use ECM ground terminals when measuring input/output voltage. Doing so may result in damage to the ECM's transistor. Use a ground other than ECM terminals, such as the ground.

On Board Diagnosis Logic

Malfunction is detected when

(Malfunction A) an excessively low voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is low.

(Malfunction B) an excessively high voltage from the EGR temperature sensor is sent to ECM even when engine coolant temperature is high.

Possible Cause

MALFUNCTION A

- Harness or connectors (The EGR temperature sensor circuit is shorted.)
- EGR temperature sensor
- Malfunction of EGR function

MALFUNCTION B

- Harness or connectors (The EGR temperature sensor circuit is open.)
- EGR temperature sensor

- Malfunction of EGR function

DTC Confirmation Procedure

Perform “PROCEDURE FOR MALFUNCTION A” first. If 1st trip DTC cannot be confirmed, perform “PROCEDURE FOR MALFUNCTION B”.

NIEC1063

NOTE:

If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C

SEF174Y

PROCEDURE FOR MALFUNCTION A

NIEC1063S01

With CONSULT-II

NIEC1063S0101

- 1) Turn ignition switch “ON”.
- 2) Select “DATA MONITOR” mode with CONSULT-II.
- 3) Verify that “COOLAN TEMP/S” is less than 50°C (122°F).
If the engine coolant temperature is above the range, cool the engine down.
- 4) Start engine and let it idle for at least 8 seconds.
- 5) If 1st trip DTC is detected, go to “Diagnostic Procedure”, EC-1817.

With GST

NIEC1063S0102

Follow the procedure “With CONSULT-II” above.

ACTIVE TEST	
EGR VOL CONT/V	50 step
MONITOR	
ENG SPEED	XXX rpm
EGR TEMP SEN	XXX V

SEF200Y

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF201Y

PROCEDURE FOR MALFUNCTION B

NIEC1063S02

CAUTION:

Always drive vehicle at a safe speed.

TESTING CONDITION:

Always perform the test at a temperature above -10°C (14°F).

Ⓜ With CONSULT-II

NIEC1063S0201

- 1) Start engine and warm it up to normal operating temperature.
- 2) Select "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
- 3) Hold engine speed at 1,500 rpm.
- 4) Touch "Qu" and set the EGR volume control valve opening to 50 step and check EGR TEMP SEN.
EGR TEMP SEN should decrease to less than 1.0V.
If the check result is NG, go to "Diagnostic Procedure", EC-1817.
If the check result is OK, go to the following step.
- 5) Turn ignition switch "OFF" and wait at least 10 seconds then turn "ON".
- 6) Check the output voltage of "THRTL POS SEN" (at closed throttle position) and note it.
- 7) Start engine and maintain the following conditions for at least 5 consecutive seconds.

ENG SPEED	1,800 - 2,800 rpm
VHCL SPEED SE	10 km/h (6 MPH) or more
B/FUEL SCHDL	5.0 - 8.5 msec
THRTL POS SEN	$(X + 0.05) - (X - 0.87) V$ X = Voltage value measured at step 6
Selector lever	Suitable position

- 8) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1817.

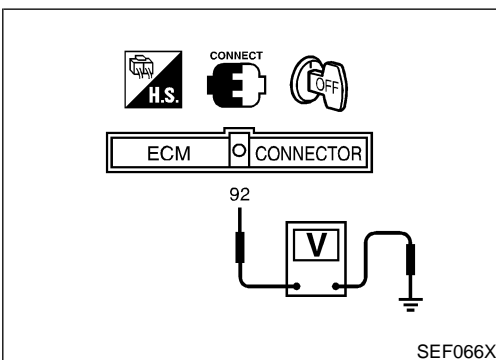
Ⓜ With GST

NIEC1063S0202

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds, then turn "ON".
- 3) Select "MODE 1" with GST and maintain the following conditions for at least 5 consecutive seconds.

Engine speed	1,800 - 2,800 rpm
Vehicle speed	10 km/h (6 MPH) or more
Voltage between ECM terminal 92 and ground	0.86 - 2.0V
Selector lever	Suitable position

- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1817.

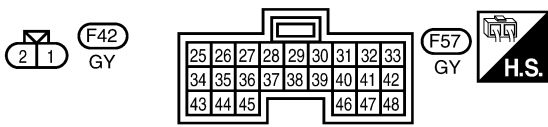
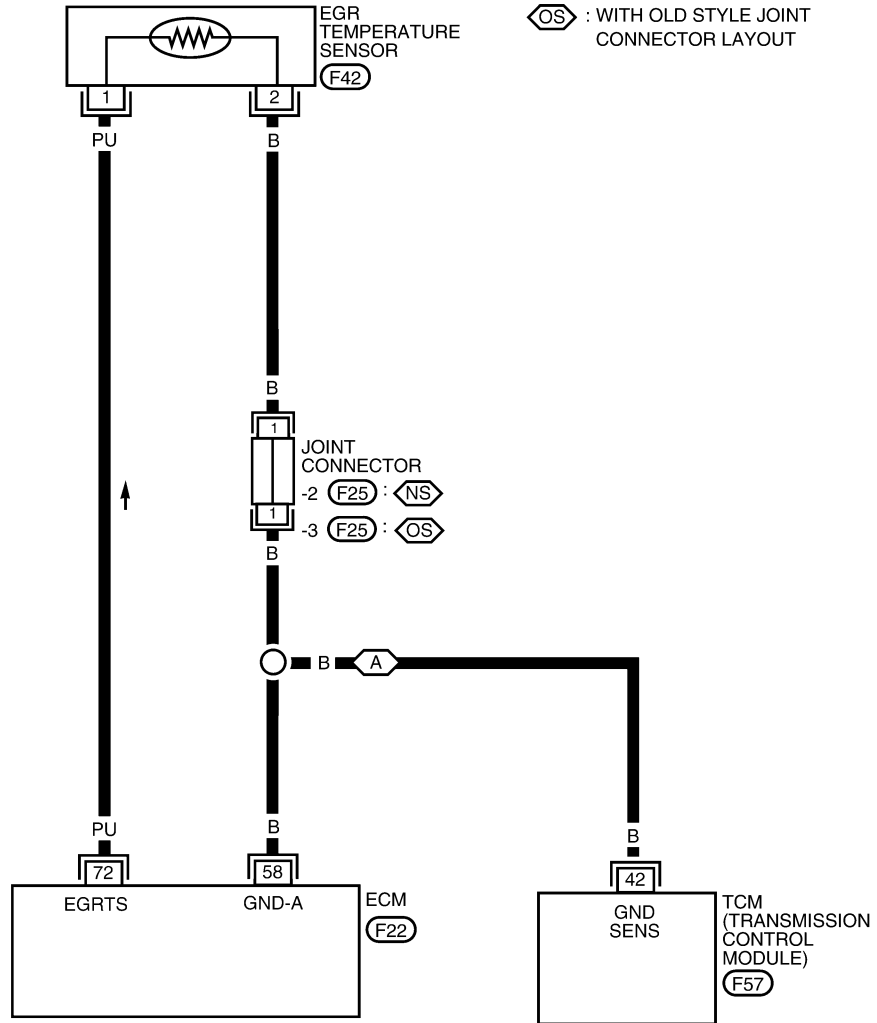


Wiring Diagram

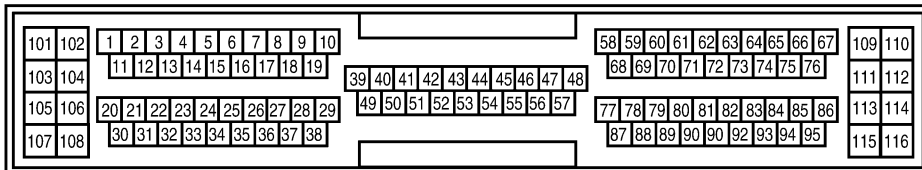
NIEC1064

EC-EGR/TS-01

- : DETECTABLE LINE FOR DTC
- : NON-DETECTABLE LINE FOR DTC
- A** : WITH A/T
- NS** : WITH NEW STYLE JOINT CONNECTOR LAYOUT
- OS** : WITH OLD STYLE JOINT CONNECTOR LAYOUT



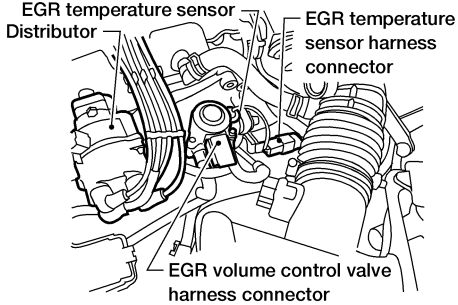
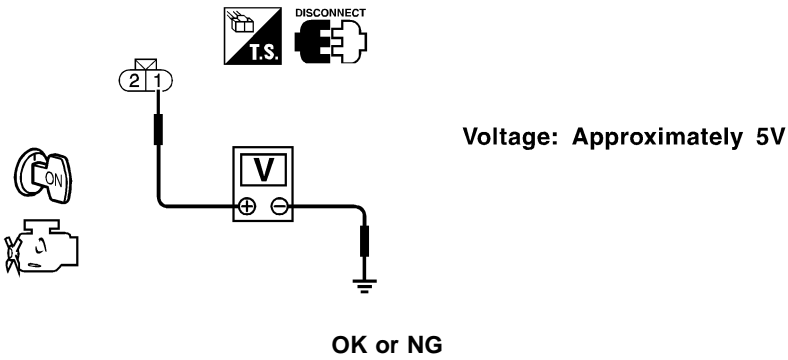
REFER TO THE FOLLOWING.
F25 - JOINT CONNECTOR



WEC956

Diagnostic Procedure

NIEC1065

1	CHECK EGR TEMPERATURE SENSOR POWER SUPPLY CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect EGR temperature sensor harness connector.		
		
3. Turn ignition switch "ON". 4. Check voltage between EGR temperature sensor terminal 2 and ground with CONSULT-II or tester.		
		
OK	▶	GO TO 2.
NG	▶	Repair or replace harness or connectors.

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2	CHECK EGR TEMPERATURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT	
1. Turn ignition switch "OFF". 2. Check harness continuity between EGR temperature sensor terminal 1 and engine ground. Refer to "Wiring Diagram", EC-1816. Continuity should exist. 3. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

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3	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Joint connector-3 ● Harness for open or short between ECM and EGR temperature sensor ● Harness for open or short between TCM (Transmission Control Module) and EGR temperature sensor 		
▶		Repair open circuit or short to power in harness or connector.

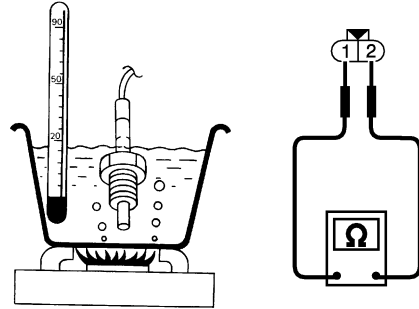
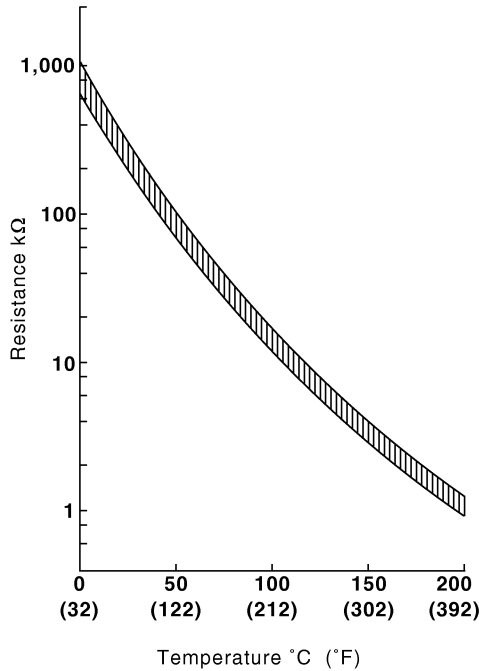
SC

EL

IDX

4 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

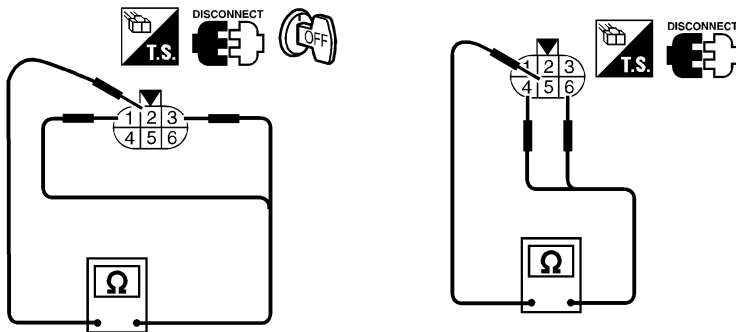
SEF483YA

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 5. |
| NG | ▶ | Replace EGR temperature sensor. |

5 CHECK EGR VOLUME CONTROL VALVE-I

1. Disconnect EGR volume control valve.
2. Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 6. |
| OK (Without CONSULT-II) | ▶ | GO TO 7. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P1401 EGR TEMPERATURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

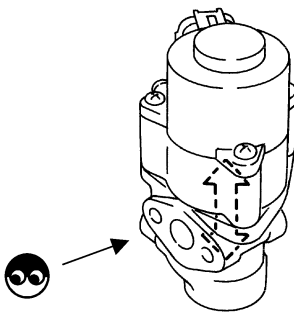
GI
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EL
IDX

6 CHECK EGR VOLUME CONTROL VALVE-II

With CONSULT-II

1. Remove EGR volume control valve.
2. Reconnect ECM harness connector and EGR volume control valve harness connector.
3. Turn ignition switch ON.
4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II.
5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps.

ACTIVE TEST	
EGR VOL CONT/V	20 step
MONITOR	
ENG SPEED	XXX rpm



SEF067Y

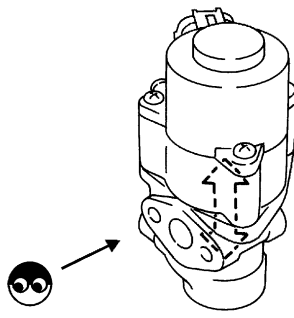
OK or NG

OK	▶	GO TO 8.
NG	▶	Replace EGR volume control valve.

7 CHECK EGR VOLUME CONTROL VALVE-II

Without CONSULT-II

1. Remove EGR volume control valve.
2. Reconnect ECM harness connector and EGR volume control valve harness connector.
3. Turn ignition switch ON and OFF.
4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position.



SEF560W

OK or NG

OK	▶	GO TO 8.
NG	▶	Replace EGR volume control valve.

8 CHECK INTERMITTENT INCIDENT

Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.

	▶	INSPECTION END
--	---	-----------------------

Description SYSTEM DESCRIPTION

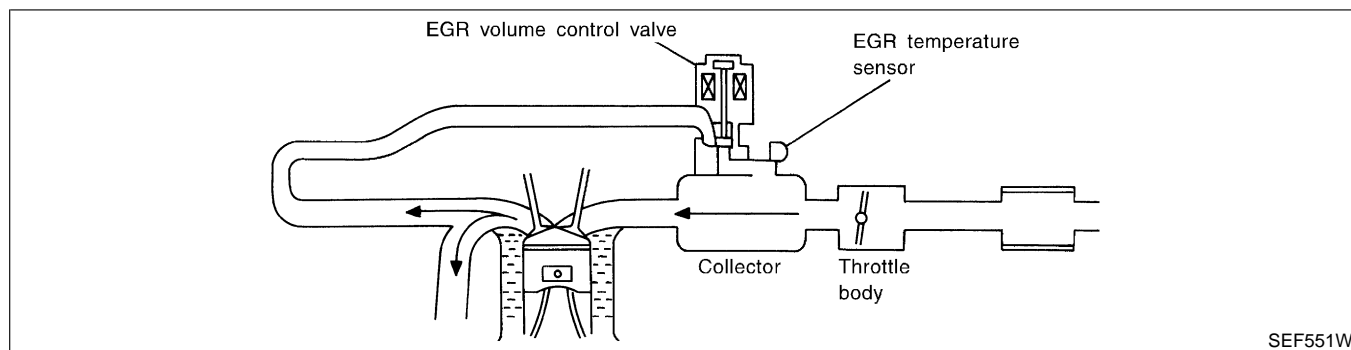
NIEC1066

NIEC1066S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EGR volume control	EGR volume control valve
Vehicle speed sensor	Vehicle speed		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Battery	Battery voltage		
Mass air flow sensor	Amount of intake air		
Air conditioner switch	Air conditioner operation		
Power steering oil pressure switch	Power steering load signal		
Electrical load	Electrical load signal		
Park/Neutral position switch	Park/Neutral position		
TCM (Transmission Control Module)	Gear position, shifting signal		

This system controls flow rate of EGR led from exhaust manifold to intake manifold. The opening of the EGR bypass passage in the EGR volume control valve changes to control the flow rate. A built-in step motor moves the valve in steps corresponding to the ECM output pulses. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. The EGR volume control valve remains close under the following conditions.

- Engine stopped
- Engine starting
- Engine idling
- Low engine coolant temperature
- Excessively high engine coolant temperature
- High engine speed
- Wide open throttle
- Low battery voltage

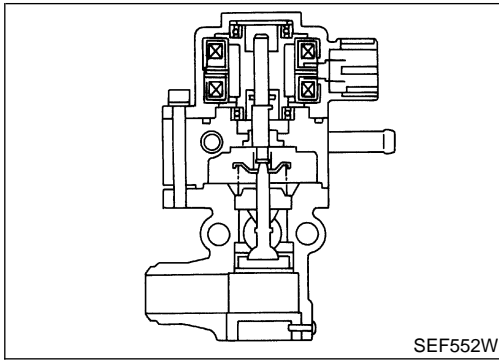


SEF551W

DTC P1402 EGR FUNCTION (OPEN)

SR20DE

Description (Cont'd)



COMPONENT DESCRIPTION

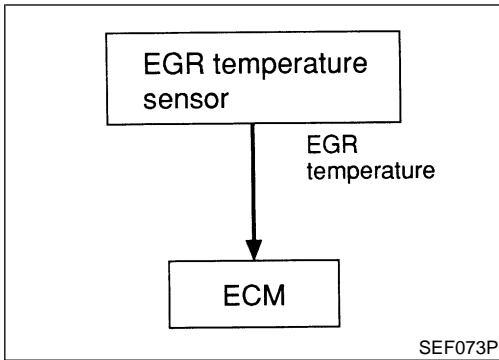
EGR Volume Control Valve

The EGR volume control valve uses a step motor to control the flow rate of EGR from exhaust manifold. This motor has four winding phases. It operates according to the output pulse signal of the ECM. Two windings are turned ON and OFF in sequence. Each time an ON pulse is issued, the valve opens or closes, changing the flow rate. When no change in the flow rate is needed, the ECM does not issue the pulse signal. A certain voltage signal is issued so that the valve remains at that particular opening.

CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
EGR TEMP SEN	● Engine: After warming up		Less than 4.5V
EGR VOL CON/V	● Engine: After warming up ● Air conditioner switch: "OFF" ● Shift lever: "N" ● No-load	Idle	0 step
		Revvng engine up to 3,000 rpm quickly	10 - 55 steps



On Board Diagnosis Logic

If the EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Malfunction is detected when EGR flow is detected under condition that does not call for EGR.

NOTE:

Diagnosis for this DTC will occur when engine coolant temperature is below 50 to 60°C (122 to 140°F). Therefore, it will be better to turn ignition switch "ON" (start engine) at the engine coolant temperature below 30°C (86°F) when starting DTC confirmation procedure.

Possible Cause

- Harness or connectors (EGR volume control valve circuit is open or shorted.)
- EGR volume control valve leaking or stuck open
- EGR temperature sensor

DATA MONITOR	
MONITOR	NO DTC
COOLAN TEMP/S	XXX °C
EGR TEMP SEN	XXX V

SEF202Y

4

EGR SYSTEM P1402	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF203Y

4

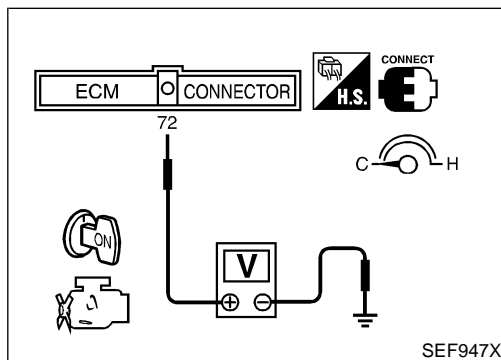
EGR SYSTEM P1402	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF204Y

4

EGR SYSTEM P1402	
COMPLETED	

SEF236Y



DTC Confirmation Procedure

NIEC1070

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

- Always perform the test at a temperature above -10°C (14°F).
- Engine coolant temperature and EGR temperature must be verified in "DATA MONITOR" mode with CONSULT-II before starting DTC WORK SUPPORT test. If it is out of range below, the test cannot be conducted.

COOLAN TEMP/S: -10 to 50°C (14 to 122°F)*

EGR TEMP SEN: Less than 4.8V

If the values are out of the ranges indicated above, park the vehicle in a cool place and allow the engine temperature to stabilize. Do not attempt to reduce the engine coolant temperature or EGR temperature with a fan or means other than ambient air. Doing so may produce an inaccurate diagnostic result.

*: Although CONSULT-II screen displays " -10 to 40°C (14 to 104°F)" as a range of engine coolant temperature, ignore it.

WITH CONSULT-II

NIEC1070S01

- Turn ignition switch "OFF", and wait at least 10 seconds, and then turn "ON".
- Select "EGR SYSTEM P1402" of "EGR SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- Touch "START".
- Start engine and let it idle until "TESTING" on CONSULT-II screen is turned to "COMPLETED". (It will take 80 seconds or more.)
If "TESTING" is not displayed after 5 minutes, turn ignition "OFF" and cool the engine coolant temperature to the range of -10 to 50°C (14 to 122°F). Retry from step 1.
- Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1824.

WITH GST

NIEC1070S02

- Turn ignition switch "ON" and select "MODE 1" with GST.
 - Check that engine coolant temperature is within the range of -10 to 50°C (14 to 122°F).
 - Check that voltage between ECM terminal 72 (EGR temperature sensor signal) and ground is less than 4.8V.
 - Start engine and let it idle for at least 80 seconds.
 - Stop engine.
 - Perform from step 1 to 4.
 - Select "MODE 3" with GST.
 - If DTC is detected, go to "Diagnostic Procedure", EC-1824.
- When using GST, "DTC Confirmation Procedure" should be performed twice as much as when using CONSULT-II because GST cannot display MODE 7 (1st trip DTC) concerning this diagnosis. Therefore, using CONSULT-II is recommended.

DTC P1402 EGR FUNCTION (OPEN)

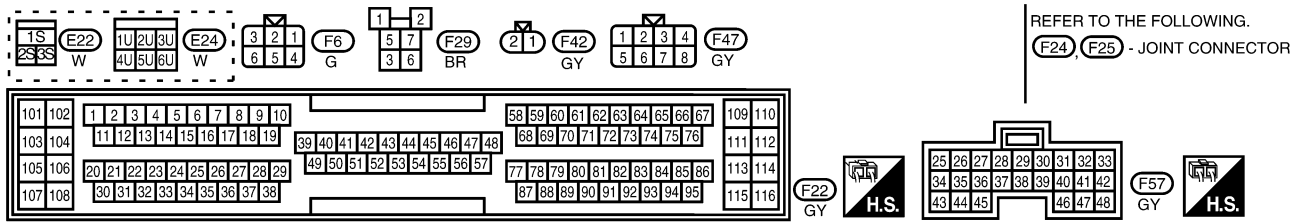
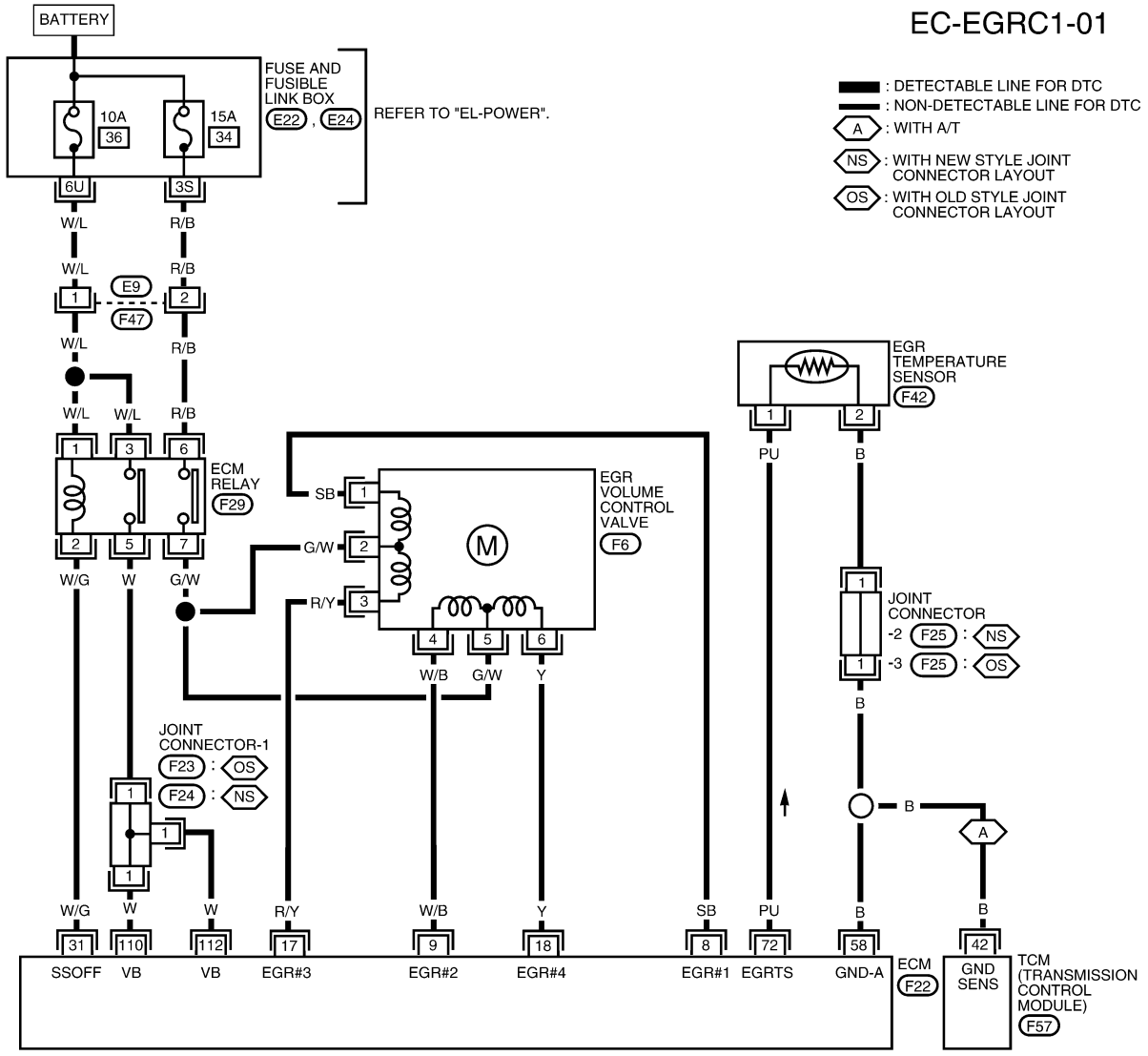
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1071

EC-EGRC1-01



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION: DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
8	SB	EGR VOLUME CONTROL VALVE	ENGINE RUNNING AT IDLE SPEED	0.1 - 14V
9	W/B			
17	R/Y			
18	Y			

WEC953

HA

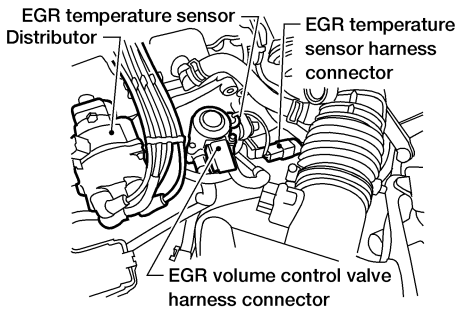
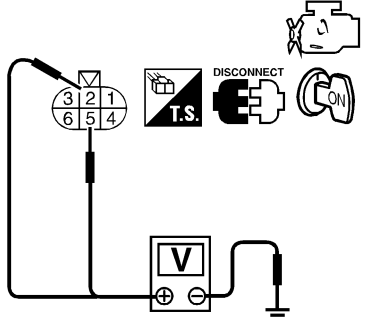
SC

EL

IDX

Diagnostic Procedure

NIEC1072

1	CHECK EGR VOLUME CONTROL VALVE POWER SUPPLY CIRCUIT						
<p>1. Disconnect EGR volume control valve harness connector.</p> <div style="text-align: center;">  </div> <p style="text-align: right;">LEC285</p> <p>2. Turn ignition switch ON.</p> <p>3. Check voltage between EGR volume control valve terminals 2, 5 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p style="text-align: center;">Voltage: Battery voltage</p> <p style="text-align: right;">SEF327X</p> </div> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 2.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		OK	▶	GO TO 2.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
OK	▶	GO TO 2.					
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.					

2	CHECK EGR VOLUME CONTROL VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT																
<p>1. Turn ignition switch OFF.</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminals and EGR volume control valve terminals as follows. Refer to "Wiring Diagram", EC-1823.</p> <table border="1" style="margin-left: auto; margin-right: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">ECM terminal</th> <th style="text-align: center;">EGR volume control valve</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">8</td> <td style="text-align: center;">1</td> </tr> <tr> <td style="text-align: center;">9</td> <td style="text-align: center;">4</td> </tr> <tr> <td style="text-align: center;">17</td> <td style="text-align: center;">3</td> </tr> <tr> <td style="text-align: center;">18</td> <td style="text-align: center;">6</td> </tr> </tbody> </table> <p style="text-align: right;">MTBL0389</p> <p style="color: blue;">Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 3.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair open circuit or short to ground or short to power in harness or connectors.</td> </tr> </table>		ECM terminal	EGR volume control valve	8	1	9	4	17	3	18	6	OK	▶	GO TO 3.	NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
ECM terminal	EGR volume control valve																
8	1																
9	4																
17	3																
18	6																
OK	▶	GO TO 3.															
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.															

DTC P1402 EGR FUNCTION (OPEN)

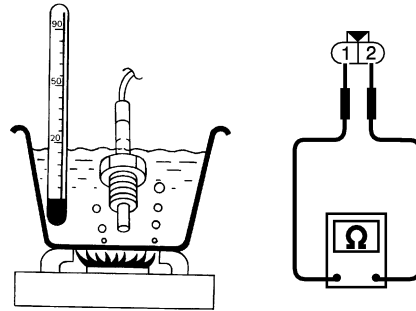
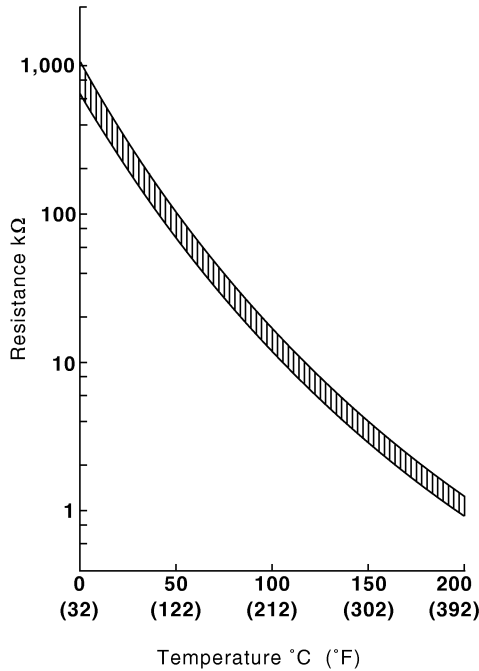
SR20DE

Diagnostic Procedure (Cont'd)

GI
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SU
BR
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RS
BT
HA
SC
EL
IDX

3 CHECK EGR TEMPERATURE SENSOR

1. Remove EGR temperature sensor.
2. Check resistance between EGR temperature sensor terminals 1 and 2 under the following conditions.



<Reference data>

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

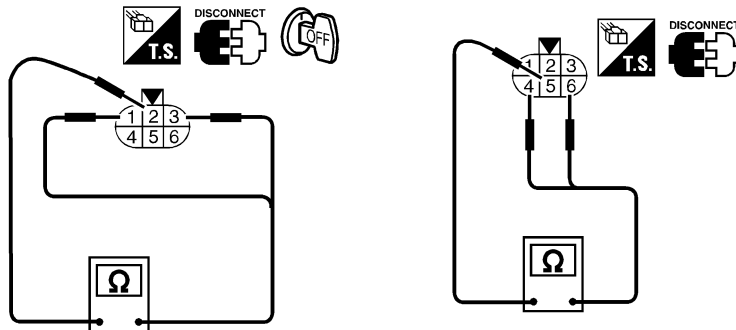
SEF483YA

OK or NG

- | | | |
|----|---|---------------------------------|
| OK | ▶ | GO TO 4. |
| NG | ▶ | Replace EGR temperature sensor. |

4 CHECK EGR VOLUME CONTROL VALVE-I

Check resistance between EGR volume control valve terminal 2 and terminals 1, 3, terminal 5 and terminals 4, 6.



Resistance:
20.9 - 23.1 Ω [At 20°C (68°F)]

SEF588X

OK or NG

- | | | |
|-------------------------|---|-----------------------------------|
| OK (With CONSULT-II) | ▶ | GO TO 5. |
| OK (Without CONSULT-II) | ▶ | GO TO 6. |
| NG | ▶ | Replace EGR volume control valve. |

DTC P1402 EGR FUNCTION (OPEN)

SR20DE

Diagnostic Procedure (Cont'd)

5	CHECK EGR VOLUME CONTROL VALVE-II																								
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch "ON". 4. Perform "EGR VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 5. Check that EGR volume control valve shaft moves smoothly forward and backward according to the valve opening steps. 																									
<table border="1" style="display: inline-table; border-collapse: collapse; margin-right: 20px;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>EGR VOL CONT/V</th> <th>20 step</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <th>ENG SPEED</th> <th>XXX rpm</th> </tr> </thead> <tbody> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </tbody> </table>		ACTIVE TEST		EGR VOL CONT/V	20 step	MONITOR		ENG SPEED	XXX rpm																
ACTIVE TEST																									
EGR VOL CONT/V	20 step																								
MONITOR																									
ENG SPEED	XXX rpm																								
SEF067Y																									
OK or NG																									
OK	▶	GO TO 7.																							
NG	▶	Replace EGR volume control valve.																							

6	CHECK EGR VOLUME CONTROL VALVE-II	
<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Remove EGR volume control valve. 2. Reconnect ECM harness connector and EGR volume control valve harness connector. 3. Turn ignition switch ON and OFF. 4. Check that EGR volume control valve shaft moves smoothly forward and backward according to the ignition switch position. 		
SEF560W		
OK or NG		
OK	▶	GO TO 7.
NG	▶	Replace EGR volume control valve.

7	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶ INSPECTION END	

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

NIEC1073

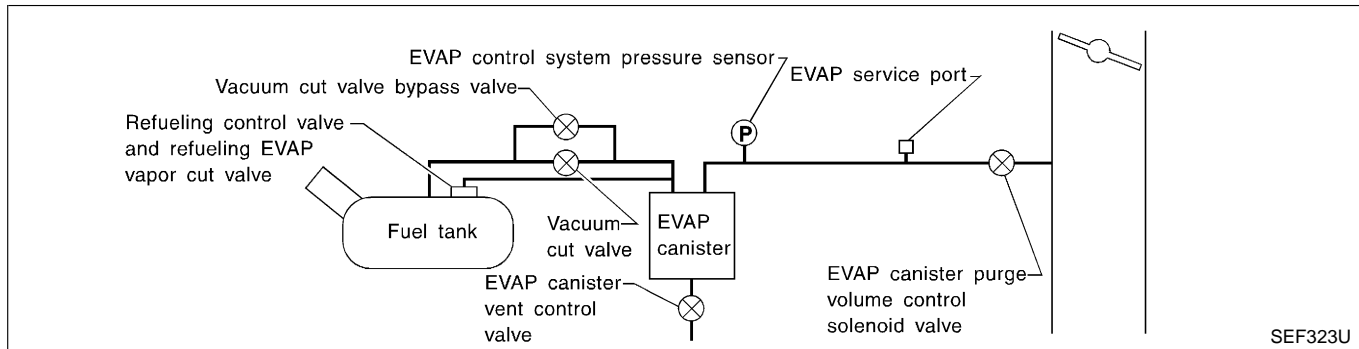
NOTE:

If DTC P1440 is displayed with P1448, perform trouble diagnosis for DTC P1448 first. (See EC-1861.)

This diagnosis detects leaks in the EVAP purge line using vapor pressure in the fuel tank.

The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge volume control solenoid valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge volume control solenoid valve.



Malfunction is detected when EVAP control system has a leak, EVAP control system does not operate properly.

CAUTION:

- Use only a genuine NISSAN fuel filler cap as a replacement. If an incorrect fuel filler cap is used, the MIL may come on.
- If the fuel filler cap is not tightened properly, the MIL may come on.
- Use only a genuine NISSAN rubber tube as a replacement.

Possible Cause

NIEC1074

- Incorrect fuel tank vacuum relief valve
- Incorrect fuel filler cap used
- Fuel filler cap remains open or fails to close
- Foreign matter caught in fuel filler cap
- Leak is in line between intake manifold and EVAP canister purge volume control solenoid valve
- Foreign matter caught in EVAP canister vent control valve
- EVAP canister or fuel tank leaks
- EVAP purge line (pipe and rubber tube) leaks

DTC P1440 EVAP CONTROL SYSTEM (SMALL LEAK) (POSITIVE PRESSURE)

SR20DE

Possible Cause (Cont'd)

- EVAP purge line rubber tube bent
- Blocked or bent rubber tube to EVAP control system pressure sensor
- Loose or disconnected rubber tube
- EVAP canister vent control valve and the circuit
- EVAP canister purge volume control solenoid valve
- Fuel tank temperature sensor
- O-ring of EVAP canister vent control valve is missing or damaged
- Water separator
- EVAP canister is saturated with water
- Fuel level sensor and the circuit
- EVAP control system pressure sensor
- Refueling control valve
- ORVR system leaks

DTC Confirmation Procedure

Refer to "P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)", EC-1700. ^{NIEC1075}

Diagnostic Procedure

Refer to "P0440 EVAP CONTROL SYSTEM (SMALL LEAK) (NEGATIVE PRESSURE)", EC-1701. ^{NIEC1076}

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE
Description

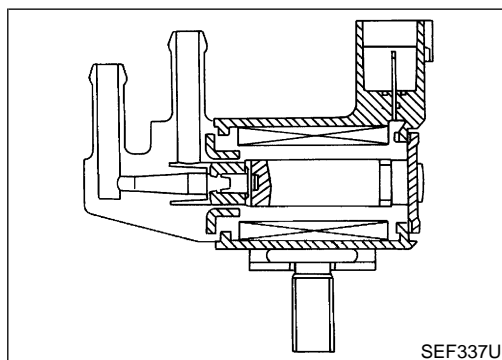
Description SYSTEM DESCRIPTION

NIEC1077

NIEC1077S01

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	EVAP canister purge flow control	EVAP canister purge volume control solenoid valve
Mass air flow sensor	Amount of intake air		
Engine coolant temperature sensor	Engine coolant temperature		
Ignition switch	Start signal		
Throttle position sensor	Throttle position		
Throttle position switch	Closed throttle position		
Heated oxygen sensor 1 (front)	Density of oxygen in exhaust gas (Mixture ratio feedback signal)		
Fuel tank temperature sensor	Fuel temperature in fuel tank		
Vehicle speed sensor	Vehicle speed		

This system controls flow rate of fuel vapor from the EVAP canister. The opening of the vapor bypass passage in the EVAP canister purge volume control solenoid valve changes to control the flow rate. The EVAP canister purge volume control solenoid valve repeats ON/OFF operation according to the signal sent from the ECM. The opening of the valve varies for optimum engine control. The optimum value stored in the ECM is determined by considering various engine conditions. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



COMPONENT DESCRIPTION

NIEC1077S02

The EVAP canister purge volume control solenoid valve uses a ON/OFF duty to control the flow rate of fuel vapor from the EVAP canister. The EVAP canister purge volume control solenoid valve is moved by ON/OFF pulses from the ECM. The longer the ON pulse, the greater the amount of fuel vapor that will flow through the valve.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1078

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
PURG VOL C/V	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch "OFF" ● Shift lever: "N" ● No-load 	Idle (Vehicle stopped)
	2,000 rpm	0%
		—

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

On Board Diagnosis Logic

On Board Diagnosis Logic

Malfunction is detected when the canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control solenoid valve is completely closed. NIEC1079

Possible Cause

- EVAP control system pressure sensor NIEC1080
- EVAP canister purge volume control solenoid valve (The valve is stuck open.)
- EVAP canister vent control valve
- EVAP canister
- Hoses
(Hoses are connected incorrectly or clogged.)

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. NIEC1081

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

DTC Confirmation Procedure (Cont'd)

6	PURG VOL CN/V P1444					
	OUT OF CONDITION					
	MONITOR					
	<table border="0"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> </table>	ENG SPEED	XXX rpm	THRTL POS SEN	XXX V	B/FUEL SCHDL
ENG SPEED	XXX rpm					
THRTL POS SEN	XXX V					
B/FUEL SCHDL	XXX msec					

SEF205Y

6	PURG VOL CN/V P1444					
	TESTING					
	MONITOR					
	<table border="0"> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td>B/FUEL SCHDL</td> <td>XXX msec</td> </tr> </table>	ENG SPEED	XXX rpm	THRTL POS SEN	XXX V	B/FUEL SCHDL
ENG SPEED	XXX rpm					
THRTL POS SEN	XXX V					
B/FUEL SCHDL	XXX msec					

SEF206Y

6	PURG VOL CN/V P1444
	COMPLETED

SEF237Y

WITH CONSULT-II

NIEC1081S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "PURG VOL CN/V P1444" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 5) Touch "START".
- 6) Start engine and let it idle until "TESTING" on CONSULT-II changes to "COMPLETED". (It will take for approximately 10 seconds.)

If "TESTING" is not displayed after 5 minutes, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1833.

WITH GST

NIEC1081S02

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 20 seconds.
- 4) Select "MODE 7" with GST.
- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1833.

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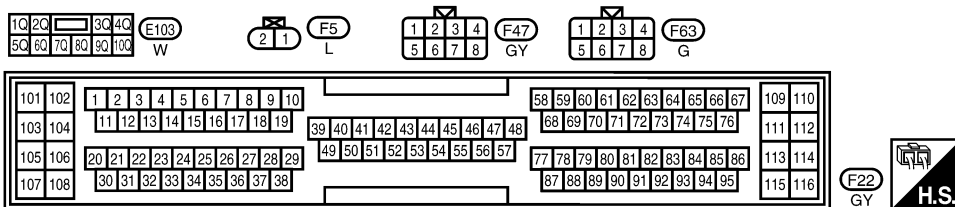
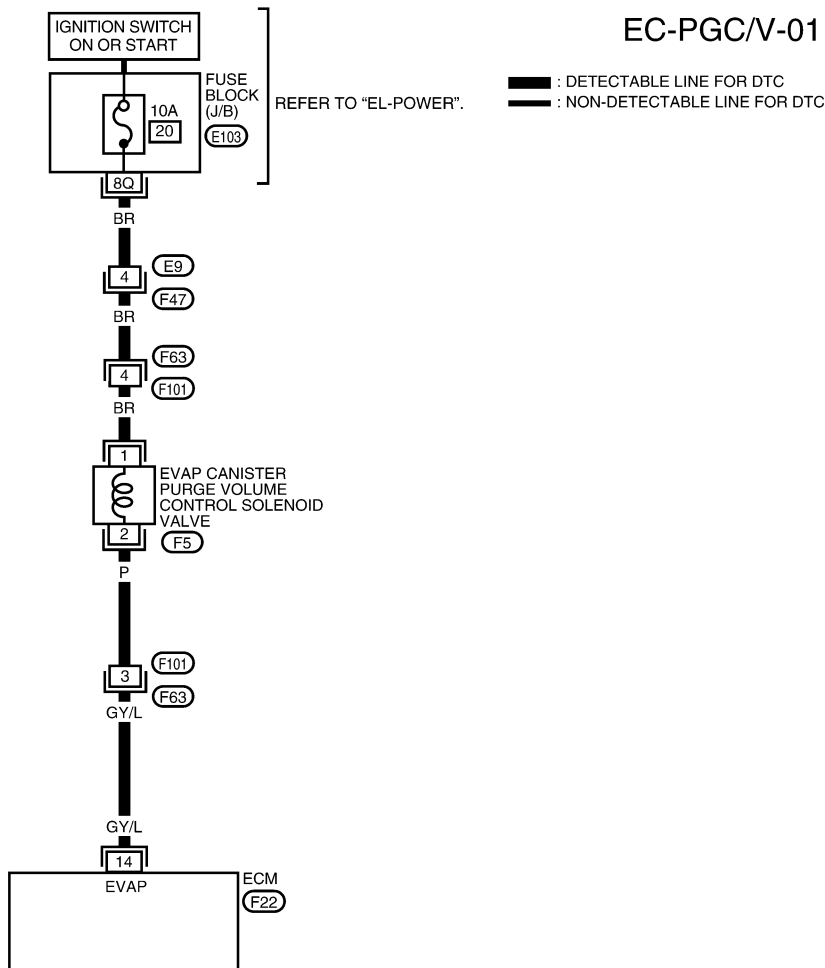
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Wiring Diagram

Wiring Diagram

NIEC1082



WEC589

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
14	GY/L	EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	ENGINE RUNNING AT IDLE SPEED	BATTERY VOLTAGE (V)
			ENGINE RUNNING AT 2,000 RPM (MORE THAN 100 SECONDS AFTER STARTING ENGINE)	BATTERY VOLTAGE (V)

SEF576Y

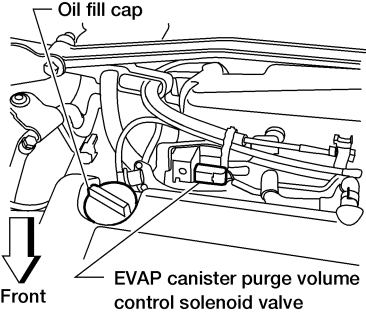
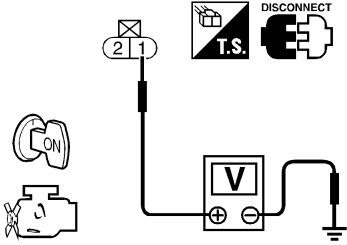
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC1083

1	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE POWER SUPPLY CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect EVAP canister purge volume control solenoid valve harness connector.</p> <div style="text-align: center;">  </div> <p>3. Turn ignition switch "ON". 4. Check voltage between EVAP canister purge volume control solenoid valve terminal 1 and engine ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> </div> <p style="text-align: right;">LEC273</p> <p style="text-align: right;">SEF948X</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 3.
NG	▶	GO TO 2.

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2	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● Harness connectors F63, F101 ● Fuse block (J/B) connector E103 ● 10A fuse ● Harness for open or short between EVAP canister purge volume control solenoid valve and fuse 		
▶		Repair harness or connectors.

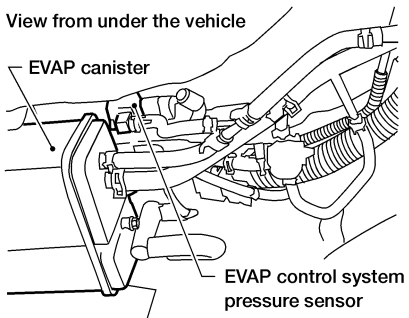
3	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 14 and EVAP canister purge volume control solenoid valve terminal 2. Refer to "Wiring Diagram", EC-1832. Continuity should exist. 4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	GO TO 4.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

4	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors F101, F63 ● Harness for open or short between EVAP canister purge volume control solenoid valve and ECM 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

5	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
<p>Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>	
	
LEC294	
OK or NG	
OK	▶ GO TO 6.
NG	▶ Repair hose connection.

6	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
<ol style="list-style-type: none"> 1. Disconnect EVAP control system pressure sensor harness connector. 2. Check connectors for water. Water should not exist. 	
OK or NG	
OK	▶ GO TO 7.
NG	▶ Replace EVAP control system pressure sensor.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

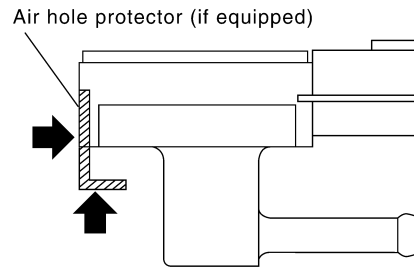
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7 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

3. Turn ignition switch "ON".

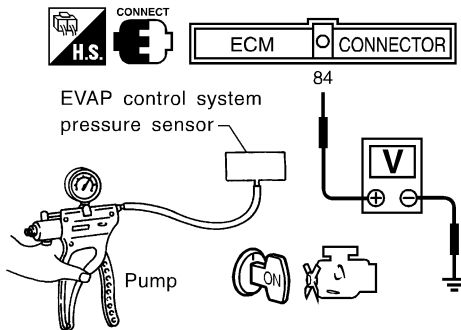
4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.

- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

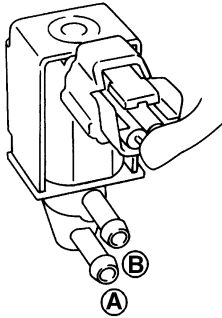
OK (With CONSULT-II)	▶	GO TO 8.
OK (Without CONSULT-II)	▶	GO TO 9.
NG	▶	Replace EVAP control system pressure sensor.

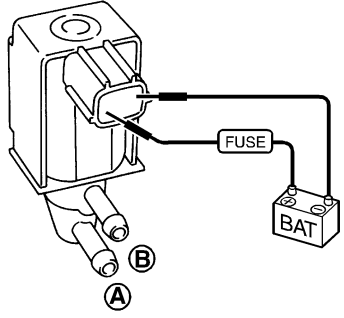
DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

8	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE																				
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Reconnect harness connectors disconnected. 3. Start engine. 4. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening. 																					
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>PURG VOL CONT/V</td><td>XXX %</td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 MNTR (B1)</td><td>LEAN</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table>		ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V						
ACTIVE TEST																					
PURG VOL CONT/V	XXX %																				
MONITOR																					
ENG SPEED	XXX rpm																				
A/F ALPHA-B1	XXX %																				
HO2S1 MNTR (B1)	LEAN																				
THRTL POS SEN	XXX V																				
SEF801Y																					
OK or NG																					
OK	▶ GO TO 10.																				
NG	▶ GO TO 9.																				

9	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE						
<p>④ With CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition PURG VOL CONT/V value</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">100.0%</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">0.0%</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition PURG VOL CONT/V value	Air passage continuity between A and B	100.0%	Yes	0.0%	No
Condition PURG VOL CONT/V value	Air passage continuity between A and B						
100.0%	Yes						
0.0%	No						
SEF334X							

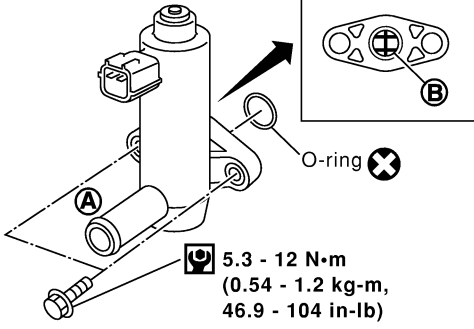
<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>							
							
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">12V direct current supply between terminals 1 and 2</td> <td style="text-align: center;">Yes</td> </tr> <tr> <td style="text-align: center;">No supply</td> <td style="text-align: center;">No</td> </tr> </tbody> </table>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
SEF335X							
OK or NG							
OK	▶ GO TO 10.						
NG	▶ Replace EVAP canister purge volume control solenoid valve.						

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

10	CHECK RUBBER TUBE FOR CLOGGING	
1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.		
OK or NG		
OK	▶	GO TO 11.
NG	▶	Clean the rubber tube using an air blower.

11	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.		
		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister vent control valve.

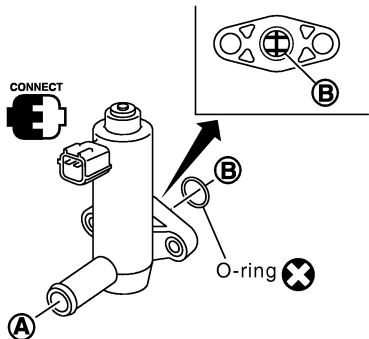
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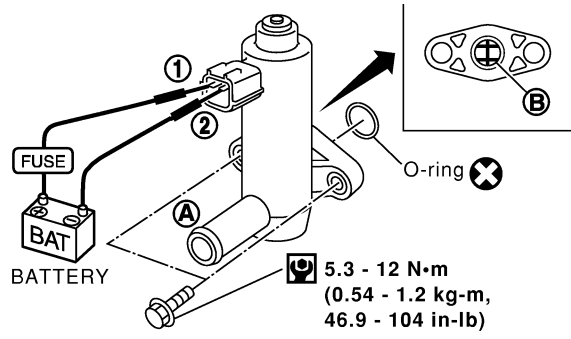
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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

12	CHECK EVAP CANISTER VENT CONTROL VALVE-II																										
<p>Ⓜ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Reconnect harness connectors disconnected. 2. Turn ignition switch "ON". 3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time. 																											
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 30%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><th>VENT CONTROL/V</th><th>OFF</th></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>A/F ALPHA-B1</td><td>XXX %</td></tr> <tr><td>HO2S1 (B1)</td><td>XXX V</td></tr> <tr><td>THRTL POS SEN</td><td>XXX V</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th>Condition</th><th>Air passage continuity between A and B</th></tr> <tr><td>VENT CONTROL/V ON</td><td>No</td></tr> <tr><td>VENT CONTROL/V OFF</td><td>Yes</td></tr> </table> <p>Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition	Air passage continuity between A and B	VENT CONTROL/V ON	No	VENT CONTROL/V OFF	Yes
ACTIVE TEST																											
VENT CONTROL/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 (B1)	XXX V																										
THRTL POS SEN	XXX V																										
Condition	Air passage continuity between A and B																										
VENT CONTROL/V ON	No																										
VENT CONTROL/V OFF	Yes																										
SEF925Z																											

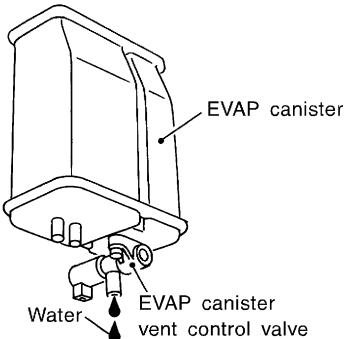
<p>ⓧ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>							
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;">  </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr><th>Condition</th><th>Air passage continuity between A and B</th></tr> <tr><td>12V direct current supply between terminals 1 and 2</td><td>No</td></tr> <tr><td>OFF</td><td>Yes</td></tr> </table> <p>Operation takes less than 1 second.</p> </div> </div>		Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	No	OFF	Yes
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	No						
OFF	Yes						
SEF378Z							
Make sure new O-ring is installed properly.							
OK or NG							
OK	▶	GO TO 14.					
NG	▶	GO TO 13.					

13	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform procedure 10 again. 		
OK or NG		
OK	▶	GO TO 14.
NG	▶	Replace EVAP canister vent control valve.

DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

14	CHECK IF EVAP CANISTER SATURATED WITH WATER	
<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p>		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 15.
No	▶	GO TO 18.

GI

MA

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15	CHECK EVAP CANISTER	
<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p>		
OK or NG		
OK	▶	GO TO 17.
NG	▶	GO TO 16.

MT

AT

AX

16	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
	▶	Repair hose or replace EVAP canister.

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DTC P1444 EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

SR20DE

Diagnostic Procedure (Cont'd)

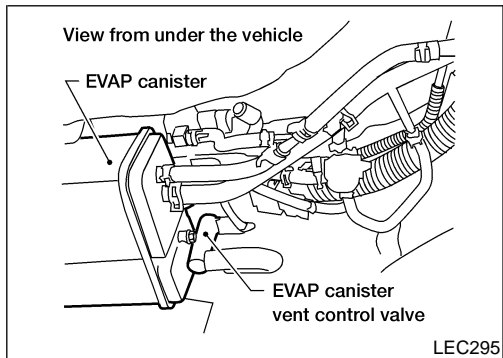
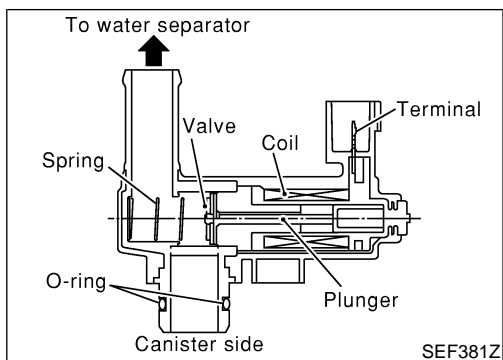
17	CHECK WATER SEPARATOR
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. <div style="text-align: center; margin: 10px 0;"> <p style="margin: 0;">* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p> </div> <p style="text-align: right; margin-top: 10px;">SEF829T</p>	
<p>5. In case of NG in items 2 - 4, replace the parts.</p> <p>NOTE:</p> <ul style="list-style-type: none"> ● Do not disassemble water separator. <p style="text-align: center; margin-top: 10px;">OK or NG</p>	
OK	▶ GO TO 18.
NG	▶ Clean or replace water separator.

18	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

Component Description



Component Description

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent. NIEC1084

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

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EC

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1085

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

Malfunction is detected when EVAP canister vent control valve remains closed under specified driving conditions. NIEC1086

ST

RS

BT

HA

Possible Cause

- EVAP canister vent control valve
- EVAP control system pressure sensor and the circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water

NIEC1087

SC

EL

IDX

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

DTC Confirmation Procedure

4	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm
	COOLAN TEMP/S	XXX °C
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF189Y

DTC Confirmation Procedure

NIEC1088

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ WITH CONSULT-II

NIEC1088S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine.
- 4) Drive vehicle at a speed of approximately 80 km/h (50 MPH) for a maximum of 15 minutes.

NOTE:

If a malfunction exists, NG result may be displayed quicker.

- 5) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1844.

Ⓜ WITH GST

NIEC1088S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

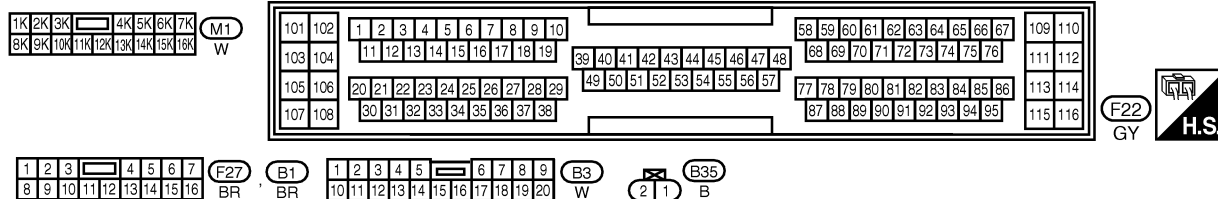
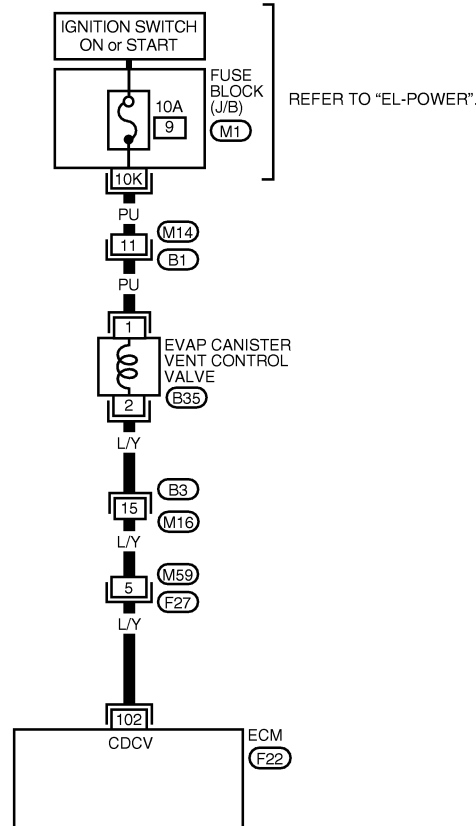
Wiring Diagram

Wiring Diagram

NIEC1089

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

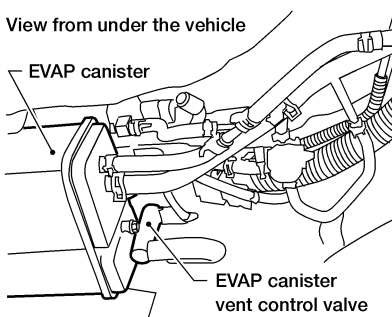
DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

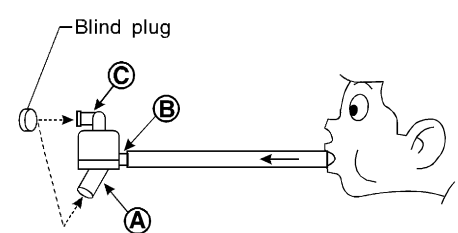
SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC1090

1	CHECK RUBBER TUBE	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. 		
		
LEC295		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

2	CHECK WATER SEPARATOR	
<ol style="list-style-type: none"> 1. Check visually for insect nests in the water separator air inlet. 2. Check visually for cracks or flaws in the appearance. 3. Check visually for cracks or flaws in the hose. 4. Check that A and C are not clogged by blowing air into B with A, and then C plugged. 		
		
<p>* (A) : Bottom hole (To atmosphere) (B) : Emergency tube (From EVAP canister) (C) : Inlet port (To member)</p>		
SEF829T		
5. In case of NG in items 2 - 4, replace the parts.		
NOTE:		
<ul style="list-style-type: none"> ● Do not disassemble water separator. 		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Clean or replace water separator.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

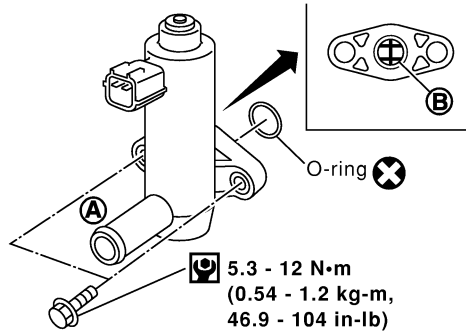
SR20DE

Diagnostic Procedure (Cont'd)

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3 CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.



SEF376Z

OK or NG

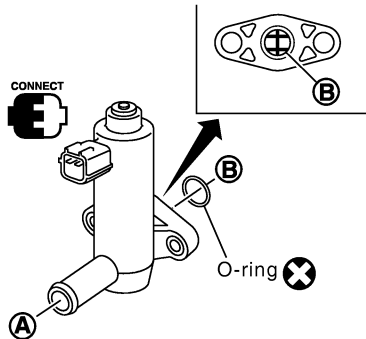
OK ► GO TO 4.

NG ► Replace EVAP canister vent control valve.

4 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Turn ignition switch ON.
2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
3. Check air passage continuity and operation delay time.



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

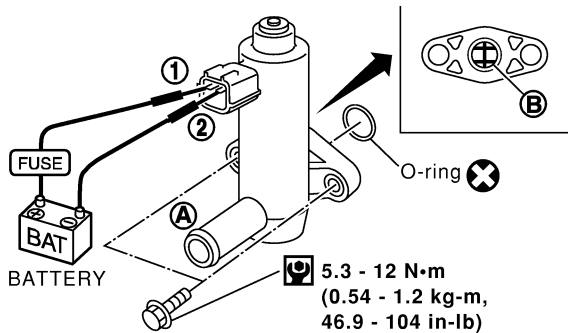
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

SEF925Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK ► GO TO 6.

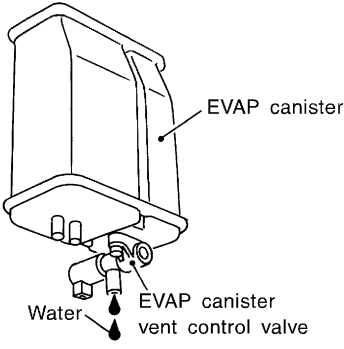
NG ► GO TO 5.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

Diagnostic Procedure (Cont'd)

5	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the procedure 4 again.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Replace EVAP canister vent control valve.

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	
1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.		
		
SEF596U		
Yes or No		
Yes	▶	GO TO 7.
No	▶	GO TO 9.

7	CHECK EVAP CANISTER	
Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).		
OK or NG		
OK	▶	GO TO 9.
NG	▶	GO TO 8.

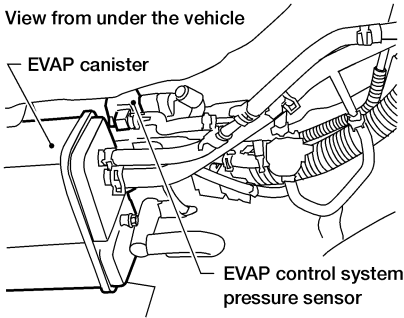
8	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 		
▶ Repair hose or replace EVAP canister.		

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.		
OK or NG		
OK	▶	GO TO 10.
NG	▶	Repair hose connection.

DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

Diagnostic Procedure (Cont'd)

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;">  </div>		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

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DTC P1446 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (CLOSE)

SR20DE

Diagnostic Procedure (Cont'd)

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. 	
OK or NG	
OK	▶ GO TO 12.
NG	▶ Replace EVAP control system pressure sensor.

12	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

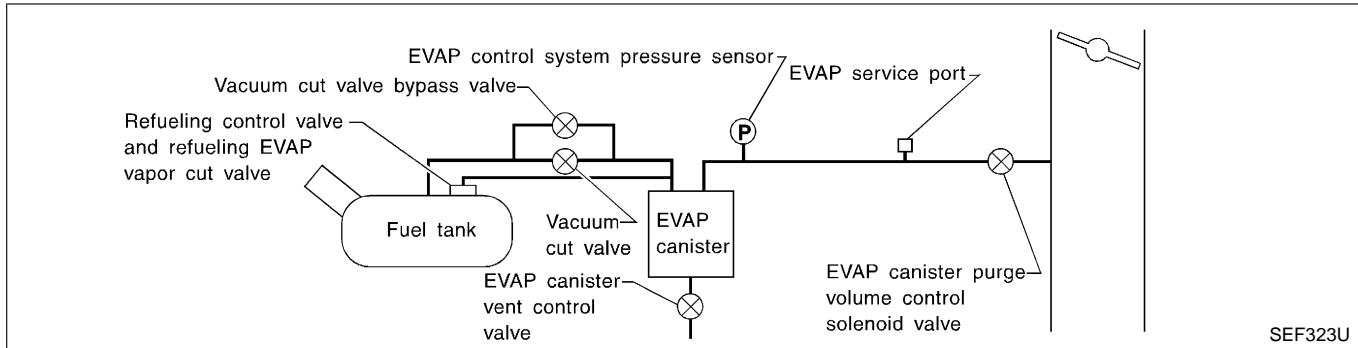
System Description

System Description

NIEC1091

NOTE:

If DTC P1447 is displayed with P0510, perform trouble diagnosis for DTC P0510 first. (See EC-1773.)



SEF323U

In this evaporative emission (EVAP) control system, purge flow occurs during non-closed throttle conditions. Purge volume is related to air intake volume. Under normal purge conditions (non-closed throttle), the EVAP canister purge volume control solenoid valve is open to admit purge flow. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

On Board Diagnosis Logic

NIEC1092

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Malfunction is detected when EVAP control system does not operate properly, EVAP control system has a leak between intake manifold and EVAP control system pressure sensor.

Possible Cause

NIEC1093

- EVAP canister purge volume control solenoid valve stuck closed
- EVAP control system pressure sensor and the circuit
- Loose, disconnected or improper connection of rubber tube
- Blocked rubber tube
- Cracked EVAP canister
- EVAP canister purge volume control solenoid valve circuit
- Closed throttle position switch
- Blocked purge port
- EVAP canister vent control valve

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

DTC Confirmation Procedure

5

PURG FLOW P1447	
OUT OF CONDITION	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF207Y

6

PURG FLOW P1447	
TESTING	
MONITOR	
ENG SPEED	XXX rpm
THRTL POS SEN	XXX V
B/FUEL SCHDL	XXX msec

SEF208Y

6

PURG FLOW P1447	
COMPLETED	

SEF238Y

DTC Confirmation Procedure

NIEC1094

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5°C (41°F) or more.

WITH CONSULT-II

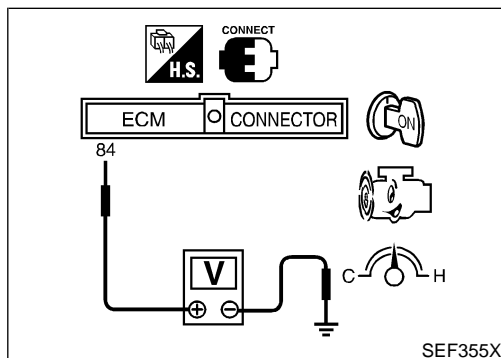
NIEC1094S01

- 1) Start engine and warm it up to normal operating temperature.
- 2) Turn ignition switch "OFF" and wait at least 10 seconds.
- 3) Start engine and let it idle for at least 70 seconds.
- 4) Select "PURG FLOW P1447" of "EVAPORATIVE SYSTEM" in "DTC CONFIRMATION" mode with CONSULT-II.
- 5) Touch "START".
If "COMPLETED" is displayed, go to step 7.
- 6) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 35 seconds.)

Selector lever	Suitable position
Vehicle speed	32 - 120 km/h (20 - 75 MPH)
ENG SPEED	500 - 3,650 rpm
B/FUEL SCHDL	1.0 - 8.9 msec
Engine coolant temperature	More than 70°C (158°F)

If "TESTING" is not changed for a long time, retry from step 2.

- 7) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1852.



Overall Function Check

NIEC1095

Use this procedure to check the overall monitoring function of the EVAP control system purge flow monitoring. During this check, a 1st trip DTC might not be confirmed.

WITH GST

NIEC1095S01

- 1) Lift up drive wheels.
- 2) Start engine (TCS switch "OFF") and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF", wait at least 10 seconds.
- 4) Start engine and wait at least 70 seconds.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

Overall Function Check (Cont'd)

- 5) Set voltmeter probes to ECM terminals 84 (EVAP control system pressure sensor signal) and ground.
- 6) Check EVAP control system pressure sensor value at idle speed and note it.
- 7) Establish and maintain the following conditions for at least 1 minute.

Air conditioner switch	ON	GI
Steering wheel	Fully turned	MA
Headlamp switch	ON	EM
Rear window defogger switch	ON	LC
Engine speed	Approx. 3,000 rpm	EC
Gear position	Any position other than "P", "N" or "R"	

- 8) Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed (measured at step 6) for at least 1 second.
- 9) If NG, go to "Diagnostic Procedure", EC-1852.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

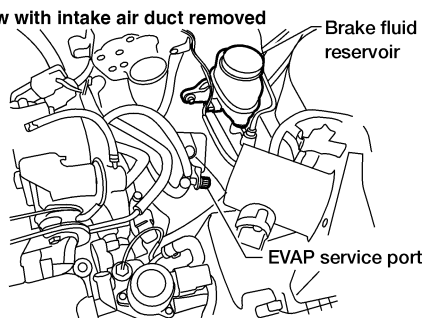
SR20DE

Diagnostic Procedure

Diagnostic Procedure

=NIEC1096

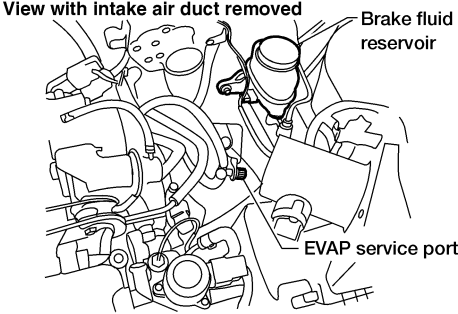
1	CHECK EVAP CANISTER	
1. Turn ignition switch "OFF". 2. Check EVAP canister for cracks.		
OK or NG		
OK (With CONSULT-II)	▶	GO TO 2.
OK (Without CONSULT-II)	▶	GO TO 3.
NG	▶	Replace EVAP canister.

2	CHECK PURGE FLOW																											
④ With CONSULT-II 1. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge.																												
<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;"> <p>View with intake air duct removed</p>  <p>EVAP service port</p> </div> <div style="text-align: center;"> <p>Brake fluid reservoir</p> </div> </div>																												
LEC288																												
2. Start engine and let it idle. 3. Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. 4. Rev engine up to 2,000 rpm. 5. Touch "Qd" and "Qu" on CONSULT-II screen to adjust "PURG VOL CONT/V" opening and check vacuum existence.																												
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> </thead> <tbody> <tr> <td>PURG VOL CONT/V</td> <td>XXX %</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>LEAN</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <table border="1" style="margin: auto; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th>PURG VOL CONT/V</th> <th>VACUUM</th> </tr> </thead> <tbody> <tr> <td>100.0%</td> <td>Should exist</td> </tr> <tr> <td>0.0%</td> <td>Should not exist</td> </tr> </tbody> </table>			ACTIVE TEST		PURG VOL CONT/V	XXX %	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	LEAN	THRTL POS SEN	XXX V							PURG VOL CONT/V	VACUUM	100.0%	Should exist	0.0%	Should not exist
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100.0%	Should exist																											
0.0%	Should not exist																											
SEF804Y																												
OK or NG																												
OK	▶	GO TO 7.																										
NG	▶	GO TO 4.																										

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK PURGE FLOW								
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine and warm it up to normal operating temperature. 2. Stop engine. 3. Disconnect vacuum hose connected to EVAP canister purge volume control solenoid valve at EVAP service port and install vacuum gauge. <div style="text-align: center; margin: 10px 0;">  </div> <ol style="list-style-type: none"> 4. Start engine and let it idle for at least 80 seconds. 5. Check vacuum gauge indication when revving engine up to 2,000 rpm. Vacuum should exist. 6. Release the accelerator pedal fully and let idle. Vacuum should not exist. <p style="text-align: center; margin-top: 10px;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 4.</td> </tr> </table>				OK	▶	GO TO 7.	NG	▶	GO TO 4.
OK	▶	GO TO 7.							
NG	▶	GO TO 4.							

LEC288

4	CHECK EVAP PURGE LINE								
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check EVAP purge line for improper connection or disconnection. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389. <p style="text-align: center; margin-top: 10px;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair hose connection.</td> </tr> </table>				OK	▶	GO TO 5.	NG	▶	Repair hose connection.
OK	▶	GO TO 5.							
NG	▶	Repair hose connection.							

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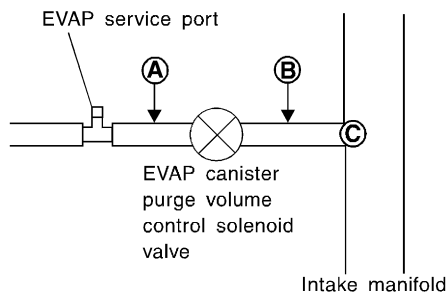
DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

Diagnostic Procedure (Cont'd)

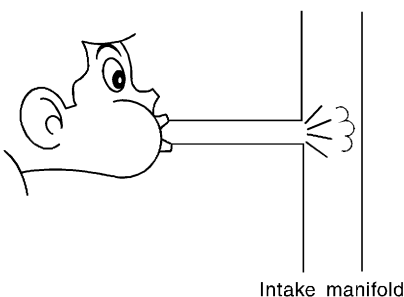
5 CHECK EVAP PURGE HOSE AND PURGE PORT

1. Disconnect purge hoses connected to EVAP service port **A** and EVAP canister purge volume control solenoid valve **B**.



SEF367U

2. Blow air into each hose and EVAP purge port **C**.
3. Check that air flows freely.



SEF368U

OK or NG

OK (With CONSULT-II) ► GO TO 6.

OK (Without CONSULT-II) ► GO TO 7.

NG ► Repair or clean hoses and/or purge port.

6 CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE

With CONSULT-II

1. Start engine.
2. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT-II. Check that engine speed varies according to the valve opening.

ACTIVE TEST	
PURG VOL CONT/V	XXX %
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	LEAN
THRTL POS SEN	XXX V

SEF801Y

OK or NG

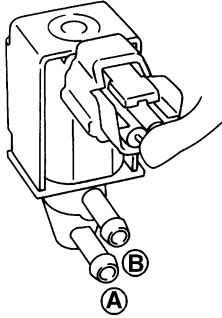
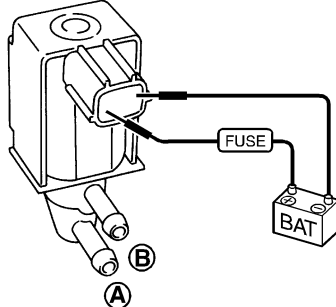
OK ► GO TO 8.

NG ► GO TO 7.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

Diagnostic Procedure (Cont'd)

7	CHECK EVAP CANISTER PURGE VOLUME CONTROL SOLENOID VALVE	
<p>Ⓟ With CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF334X		
<p>ⓧ Without CONSULT-II Check air passage continuity of EVAP canister purge volume control solenoid valve under the following conditions.</p>		
		
SEF335X		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Replace EVAP canister purge volume control solenoid valve.

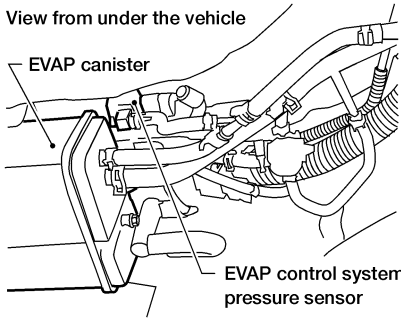
8	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	
<p>1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.</p>		
OK or NG		
OK	▶	GO TO 9.
NG	▶	Repair hose connection.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

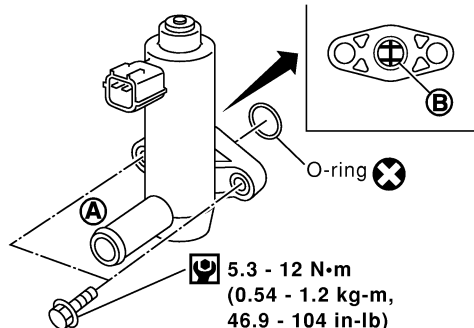
SR20DE

Diagnostic Procedure (Cont'd)

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	
<p>1. Disconnect EVAP control system pressure sensor harness connector.</p> <div style="text-align: center;">  </div>		
LEC294		
<p>2. Check connectors for water. Water should not exist.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 10.
NG	▶	Replace EVAP control system pressure sensor.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR FUNCTION	
<p>Refer to "DTC Confirmation Procedure" for DTC P0450, EC-1728.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 11.
NG	▶	Replace EVAP control system pressure sensor.

11	CHECK RUBBER TUBE FOR CLOGGING	
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve. 2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 12.
NG	▶	Clean the rubber tube using an air blower.

12	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<p>1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted.</p> <div style="text-align: center;">  </div>		
SEF376Z		
OK or NG		
OK	▶	GO TO 13.
NG	▶	Replace EVAP canister vent control valve.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

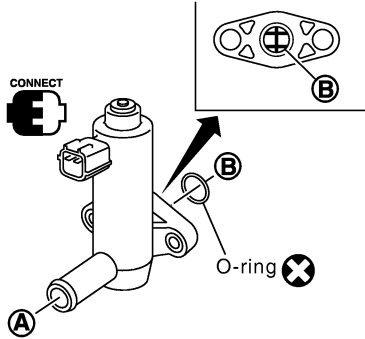
SR20DE

Diagnostic Procedure (Cont'd)

13 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness connectors disconnected.
2. Turn ignition switch "ON".
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.



ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

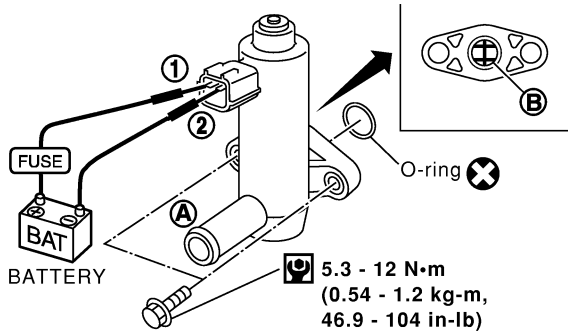
Condition	Air passage continuity between A and B
VENT CONTROL/V ON	No
VENT CONTROL/V OFF	Yes

Operation takes less than 1 second.

SEF925Z

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

SEF378Z

Make sure new O-ring is installed properly.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	GO TO 14.

14 CHECK EVAP CANISTER VENT CONTROL VALVE-III

1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower.
2. Perform Test No. 13 again.

OK or NG

OK (With CONSULT-II)	▶	GO TO 15.
OK (Without CONSULT-II)	▶	GO TO 16.
NG	▶	Replace EVAP canister vent control valve.

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DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

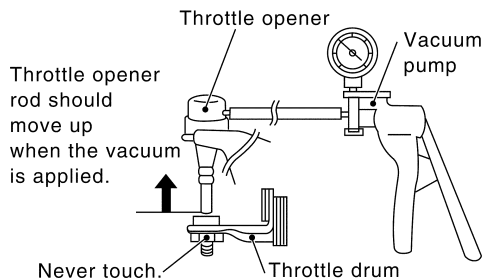
SR20DE

Diagnostic Procedure (Cont'd)

15 CHECK THROTTLE POSITION SWITCH

With CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Turn ignition switch "ON".
8. Select "DATA MONITOR" mode with CONSULT-II.
9. Check indication of "CLSD THL/P SW" under the following conditions.
Measurement must be made with throttle position switch installed in vehicle.

Throttle valve conditions	CLSD THL/P SW
Completely closed	ON
Partially open or completely open	OFF

MTBL0355

OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 17.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

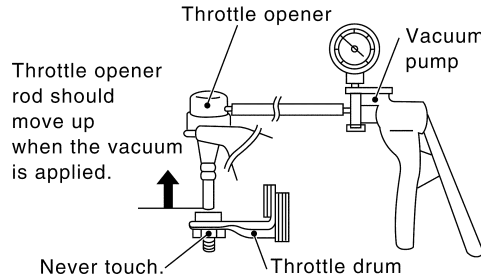
Diagnostic Procedure (Cont'd)

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16 CHECK THROTTLE POSITION SWITCH

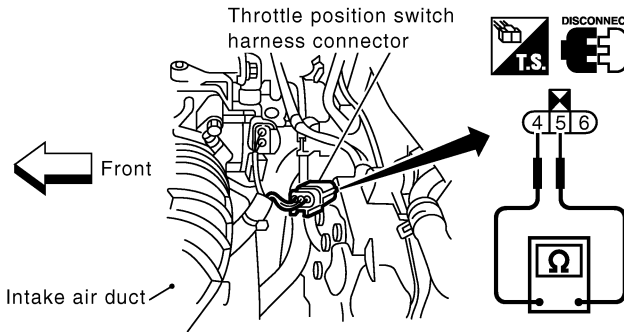
⊗ Without CONSULT-II

1. Install all removed parts.
2. Start engine and warm it up to normal operating temperature.
3. Turn ignition switch "OFF".
4. Remove vacuum hose connected to throttle opener.
5. Connect suitable vacuum hose to vacuum pump and the throttle opener.
6. Apply vacuum [more than -40.0 kPa (-300 mmHg, -11.81 inHg)] until the throttle drum becomes free from the rod of the throttle opener.



SEF793W

7. Disconnect closed throttle position switch harness connector.
8. Check continuity between closed throttle position switch terminals 4 and 5 under the following conditions. Resistance measurement must be made with throttle position switch installed in vehicle.



Throttle valve condition	Continuity
Completely closed	Yes
Partially open	No
Completely open	No

SEF911Z

OK or NG

OK	▶	GO TO 18.
NG	▶	GO TO 17.

17 ADJUST THROTTLE POSITION SWITCH

Check the following items. Refer to "Basic Inspection", EC-1461.

Items	Specifications
Ignition timing	15°±2° BTDC
Closed throttle position switch idle position adjustment	Feeler gauge thickness and switch condition 0.05 mm (0.0020 in): ON 0.15 mm (0.0059 in): OFF
Target idle speed	M/T: 800±50 A/T: 800±50 rpm (in "P" or "N" position)

MTBL0450

Is it possible to adjust closed throttle position switch?

Yes or No

Yes	▶	GO TO 18.
No	▶	Replace throttle position switch.

DTC P1447 EVAPORATIVE EMISSION (EVAP) CONTROL SYSTEM PURGE FLOW MONITORING

SR20DE

Diagnostic Procedure (Cont'd)

18	CHECK EVAP PURGE LINE
Inspect EVAP purge line (pipe and rubber tube). Check for evidence of leaks. Refer to "EVAPORATIVE EMISSION LINE DRAWING", EC-1389.	
OK or NG	
OK	▶ GO TO 19.
NG	▶ Replace it.

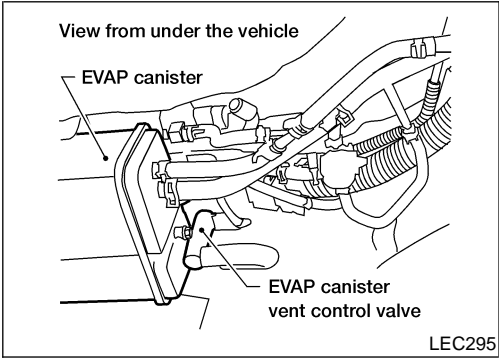
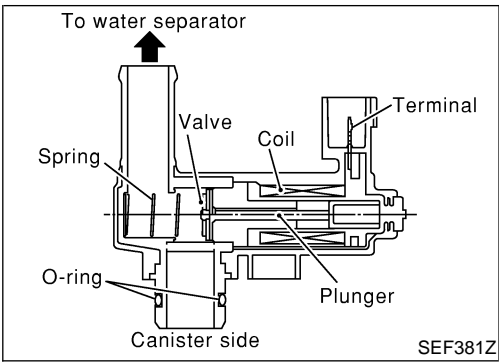
19	CLEAN EVAP PURGE LINE
Clean EVAP purge line (pipe and rubber tube) using air blower.	
	▶ GO TO 20.

20	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Component Description



Component Description

NIEC1097

NOTE:

If DTC P1448 is displayed with P0440, perform trouble diagnosis for DTC P1448 first.

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid valve responds to signals from the ECM. When the ECM sends an ON signal, the coil in the solenoid valve is energized. A plunger will then move to seal the canister vent. The ability to seal the vent is necessary for the on board diagnosis of other evaporative emission control system components.

This solenoid valve is used only for diagnosis, and usually remains opened.

When the vent is closed, under normal purge conditions, the evaporative emission control system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

GI

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1098

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VENT CONT/V	● Ignition switch: ON	OFF

AX

SU

BR

On Board Diagnosis Logic

NIEC1099

Malfunction is detected when EVAP canister vent control valve remains opened under specified driving conditions.

ST

RS

BT

HA

Possible Cause

NIEC1100

- EVAP canister vent control valve
- EVAP control system pressure sensor and circuit
- Blocked rubber tube to EVAP canister vent control valve
- Water separator
- EVAP canister is saturated with water
- Vacuum cut valve

SC

EL

IDX

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

DTC Confirmation Procedure

DTC Confirmation Procedure

NIEC1101

NOTE:

- If DTC P1448 is displayed with P0440 or P1440, perform trouble diagnosis for DTC P1448 first.
- If “DTC Confirmation Procedure” has been previously conducted, always turn ignition switch “OFF” and wait at least 10 seconds before conducting the next test.

EVAP SML LEAK P0440/P1440

1)FOR BEST RSLT,PERFORM AT FOLLOWING CONDITIONS.
 -FUEL LEVEL: 1/4-3/4
 -AMBIENT TEMP: 0-30 C(32-86F)
 -OPEN ENGINE HOOD.
 2)START ENG WITH VHCL STOPPED. IF ENG IS ON,STOP FOR 5 SEC. THEN RESTART.
 3)TOUCH START.

SEF565X

EVAP SML LEAK P0440/P1440

WAIT
2 TO 10 MINUTES.
KEEP ENGINE RUNNING
AT IDLE SPEED.

SEF566X

EVAP SML LEAK P0440/P1440

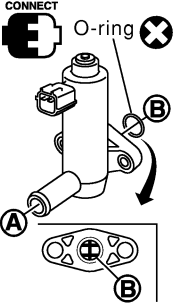
OK

SELF-DIAG RESULTS

NO DTC DETECTED.
FURTHER TESTING
MAY BE REQUIRED.

SEF567X

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

CONNECT 

SEF379Z

WITH CONSULT-II

NIEC1101S01

TESTING CONDITION:

- Perform “DTC WORK SUPPORT” when the fuel level is between 1/4 to 3/4 full and vehicle is placed on flat level surface.
 - Always perform test at a temperature of 0 to 30°C (32 to 86°F).
- 1) Turn ignition switch “ON”.
 - 2) Turn ignition switch “OFF” and wait at least 10 seconds.
 - 3) Turn ignition switch “ON” and select “DATA MONITOR” mode with CONSULT-II.
 - 4) Make sure that the following conditions are met.

COOLAN TEMP/S	0 - 70°C (32 - 158°F)
INT/A TEMP SE	0 - 30°C (32 - 86°F)

- 5) Select “EVAP SML LEAK P0440/P1440” of “EVAPORATIVE SYSTEM” in “DTC WORK SUPPORT” mode with CONSULT-II.
Follow the instruction displayed.
If the engine speed cannot be maintained within the range displayed on the CONSULT-II screen, go to “Basic Inspection”, EC-1461.
- 6) Make sure that “OK” is displayed.
If “NG” is displayed, go to the following step.

NOTE:

Make sure that EVAP hoses are connected to EVAP canister purge volume control solenoid valve properly.

- 7) Stop engine and wait at least 10 seconds, then turn “ON”.
- 8) Disconnect hose from water separator.
- 9) Select “VENT CONTROL/V” of “ACTIVE TEST” mode with CONSULT-II.
- 10) Touch “ON” and “OFF” alternately.

- 11) Make sure the following.

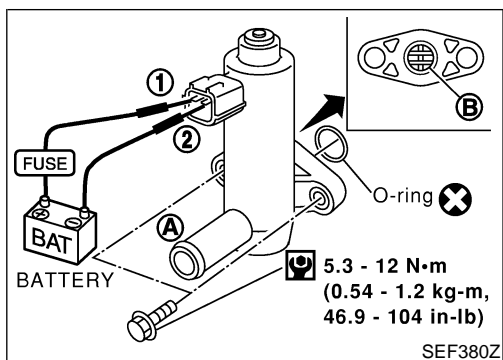
Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

If the result is NG, go to “Diagnostic Procedure”, EC-1865.
If the result is OK, go to “Diagnostic Procedure” for DTC P0440, EC-1701.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Overall Function Check



Overall Function Check

Use this procedure to check the overall function of the EVAP canister vent control valve circuit. During this check, a DTC might not be confirmed.

WITH GST

- 1) Disconnect hose from water separator.
- 2) Disconnect EVAP canister vent control valve harness connector.
- 3) Verify the following.

Condition	Air passage continuity
12V direct current supply between terminals 1 and 2	No
No supply	Yes

If the result is NG, go to "Diagnostic Procedure", EC-1865.
 If the result is OK, go to "Diagnostic Procedure" for DTC P0440, EC-1701.

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DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

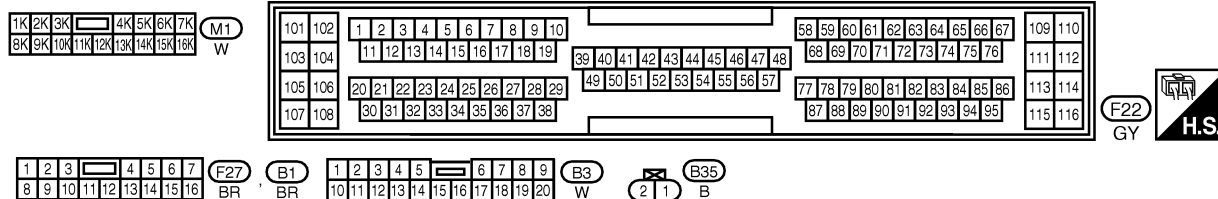
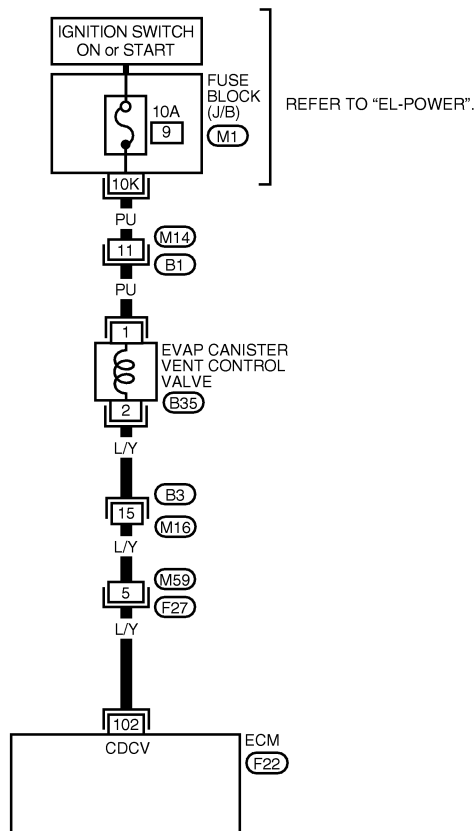
Wiring Diagram

Wiring Diagram

NIEC1103

EC-VENT/V-01

: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



LEC202

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
102	L/Y	EVAP CANISTER VENT CONTROL VALVE	IGN ON	BATTERY VOLTAGE

SEF577Y

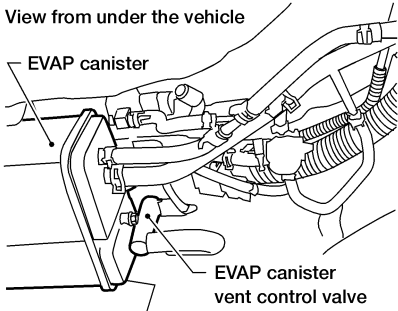
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

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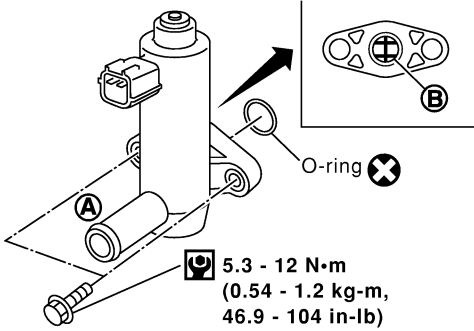
Diagnostic Procedure

Diagnostic Procedure

NIEC1104

1	CHECK RUBBER TUBE	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect rubber tube connected to EVAP canister vent control valve. 3. Check the rubber tube for clogging. 		
<p>View from under the vehicle</p> 		
LEC295		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Clean rubber tube using an air blower.

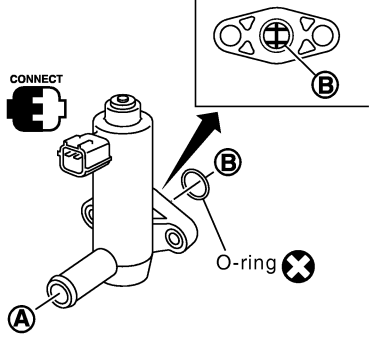
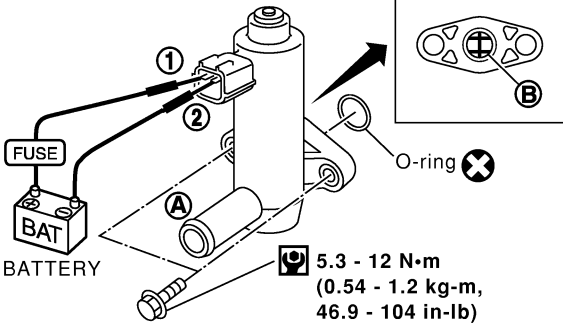
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2	CHECK EVAP CANISTER VENT CONTROL VALVE-I	
<ol style="list-style-type: none"> 1. Remove EVAP canister vent control valve from EVAP canister. 2. Check portion B of EVAP canister vent control valve for being rusted. 		
		
SEF376Z		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Replace EVAP canister vent control valve.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Diagnostic Procedure (Cont'd)

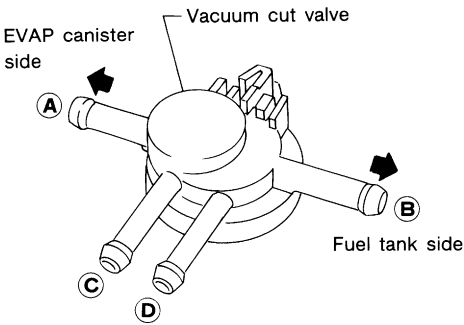
3	CHECK EVAP CANISTER VENT CONTROL VALVE-II																										
<p>④ With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch ON. 2. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode. 3. Check air passage continuity and operation delay time. 																											
<div style="display: flex; justify-content: space-between; align-items: flex-start;"> <div style="width: 30%;">  </div> <div style="width: 25%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VENT CONTROL/V</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 (B1)</td> <td>XXX V</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> </div> <div style="width: 35%;"> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> </thead> <tbody> <tr> <td>ON</td> <td>No</td> </tr> <tr> <td>OFF</td> <td>Yes</td> </tr> </tbody> </table> <p>Operation takes less than 1 second.</p> </div> </div>		ACTIVE TEST		VENT CONTROL/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 (B1)	XXX V	THRTL POS SEN	XXX V							Condition	Air passage continuity between A and B	ON	No	OFF	Yes
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Condition	Air passage continuity between A and B																										
ON	No																										
OFF	Yes																										
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<p>⊗ Without CONSULT-II</p> <p>Check air passage continuity and operation delay time under the following conditions.</p>																											
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SEF378Z																											
<p>Make sure new O-ring is installed properly.</p> <p style="text-align: center;">OK or NG</p>																											
OK	▶	GO TO 5.																									
NG	▶	GO TO 4.																									

4	CHECK EVAP CANISTER VENT CONTROL VALVE-III	
<ol style="list-style-type: none"> 1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform Test No. 3 again. 		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Replace EVAP canister vent control valve.

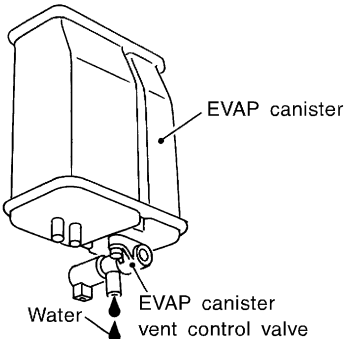
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Diagnostic Procedure (Cont'd)

5	CHECK VACUUM CUT VALVE	<p>1. Turn ignition switch OFF. 2. Remove vacuum cut valve. 3. Check vacuum cut valve as follows:</p> <div style="text-align: center;">  </div> <p>a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D.</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 6.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 6.	NG	▶	Replace vacuum cut valve.	GI MA EM LC EC FE CL MT AT
OK	▶	GO TO 6.							
NG	▶	Replace vacuum cut valve.							

SEF379Q

6	CHECK IF EVAP CANISTER SATURATED WITH WATER	<p>1. Remove EVAP canister with EVAP canister vent control valve attached. 2. Check if water will drain from the EVAP canister.</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Yes or No</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Yes</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>No</td> <td style="text-align: center;">▶</td> <td>GO TO 9.</td> </tr> </table>	Yes	▶	GO TO 7.	No	▶	GO TO 9.	AX SU BR ST RS BT HA
Yes	▶	GO TO 7.							
No	▶	GO TO 9.							

SEF596U

7	CHECK EVAP CANISTER	<p>Weigh the EVAP canister with the EVAP canister vent control valve attached. The weight should be less than 1.8 kg (4.0 lb).</p> <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 9.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>GO TO 8.</td> </tr> </table>	OK	▶	GO TO 9.	NG	▶	GO TO 8.	SC EL IDX
OK	▶	GO TO 9.							
NG	▶	GO TO 8.							

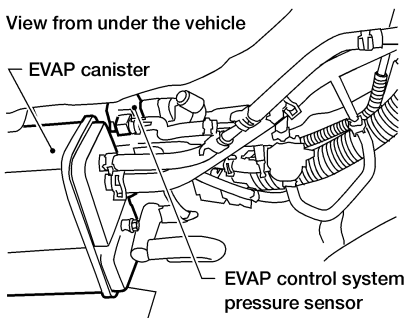
DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Diagnostic Procedure (Cont'd)

8	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● EVAP canister for damage ● EVAP hose between EVAP canister and water separator for clogging or poor connection 	
▶	Repair hose or replace EVAP canister.

9	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE
Check disconnection or improper connection of hose connected to EVAP control system pressure sensor.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Repair hose connection.

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR
1. Disconnect EVAP control system pressure sensor harness connector.	
<div style="display: flex; justify-content: center; align-items: center;"> <div style="text-align: left; margin-right: 10px;">View from under the vehicle</div>  </div>	
LEC294	
2. Check connectors for water. Water should not exist.	
OK or NG	
OK	▶ GO TO 11.
NG	▶ Replace EVAP control system pressure sensor.

DTC P1448 EVAPORATIVE EMISSION (EVAP) CANISTER VENT CONTROL VALVE (OPEN)

SR20DE

Diagnostic Procedure (Cont'd)

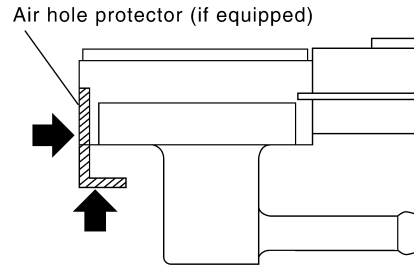
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11 CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR

1. Remove EVAP control system pressure sensor with its harness connector connected.

CAUTION:

- Never apply force to the air hole protector of the sensor if equipped.



SEF799W

2. Remove hose from EVAP control system pressure sensor.

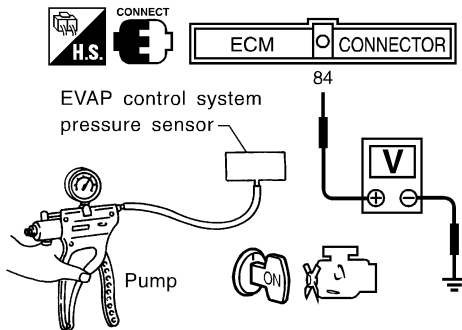
3. Turn ignition switch "ON".

4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.

CAUTION:

- Always calibrate the vacuum pump gauge when using it.
- Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure.

5. Check input voltage between ECM terminal 84 and ground.



Pressure (Relative to atmospheric pressure)	Voltage V
0 kPa (0 mmHg, 0 inHg)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg)	0.4 - 0.6

SEF342X

CAUTION:

- Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

OK or NG

OK	▶	GO TO 12.
NG	▶	Replace EVAP control system pressure sensor.

12 CHECK INTERMITTENT INCIDENT

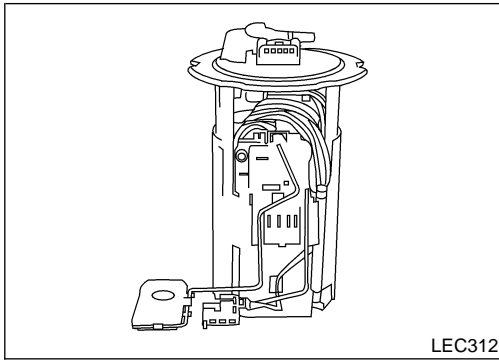
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.

▶ INSPECTION END

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

SR20DE

Component Description



Component Description

The fuel level sensor is mounted in the fuel level sensor unit. ^{NIEC1105} The sensor detects a fuel level in the fuel tank and transmits a signal to the ECM.

It consists of two parts, one is mechanical float and the other side is variable resistor. Fuel level sensor output voltage changes depending on the movement of the fuel mechanical float.

On Board Diagnostic Logic

ECM receives two signals from the fuel level sensor. ^{NIEC1106}

One is fuel level sensor power supply circuit, and the other is fuel level sensor ground circuit.

This diagnosis indicates the latter to detect open circuit malfunction. Malfunction is detected when a high voltage from the sensor is sent to ECM.

Possible Cause

- Fuel level sensor circuit
(The fuel level sensor circuit is open or shorted.) ^{NIEC1107}

DTC Confirmation Procedure

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test. ^{NIEC1108}

DATA MONITOR	
MONITOR	NO DTC
FUEL T/TMP SE	XXX °C
FUEL LEVEL SE	XXX V

SEF195Y

Ⓟ WITH CONSULT-II

- 1) Turn ignition switch "ON". ^{NIEC1108S01}
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Wait at least 10 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1872.

Ⓞ WITH GST

Follow the procedure "WITH CONSULT-II" above. ^{NIEC1108S02}

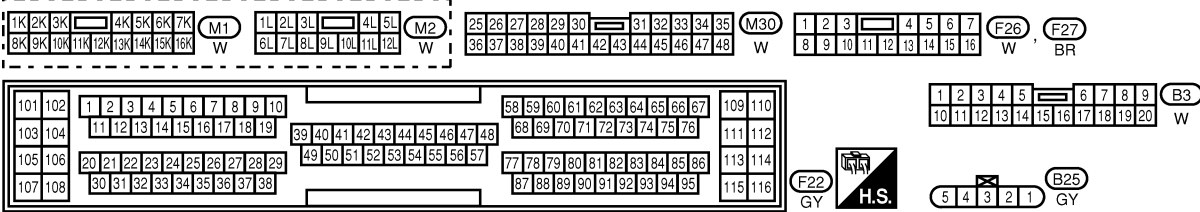
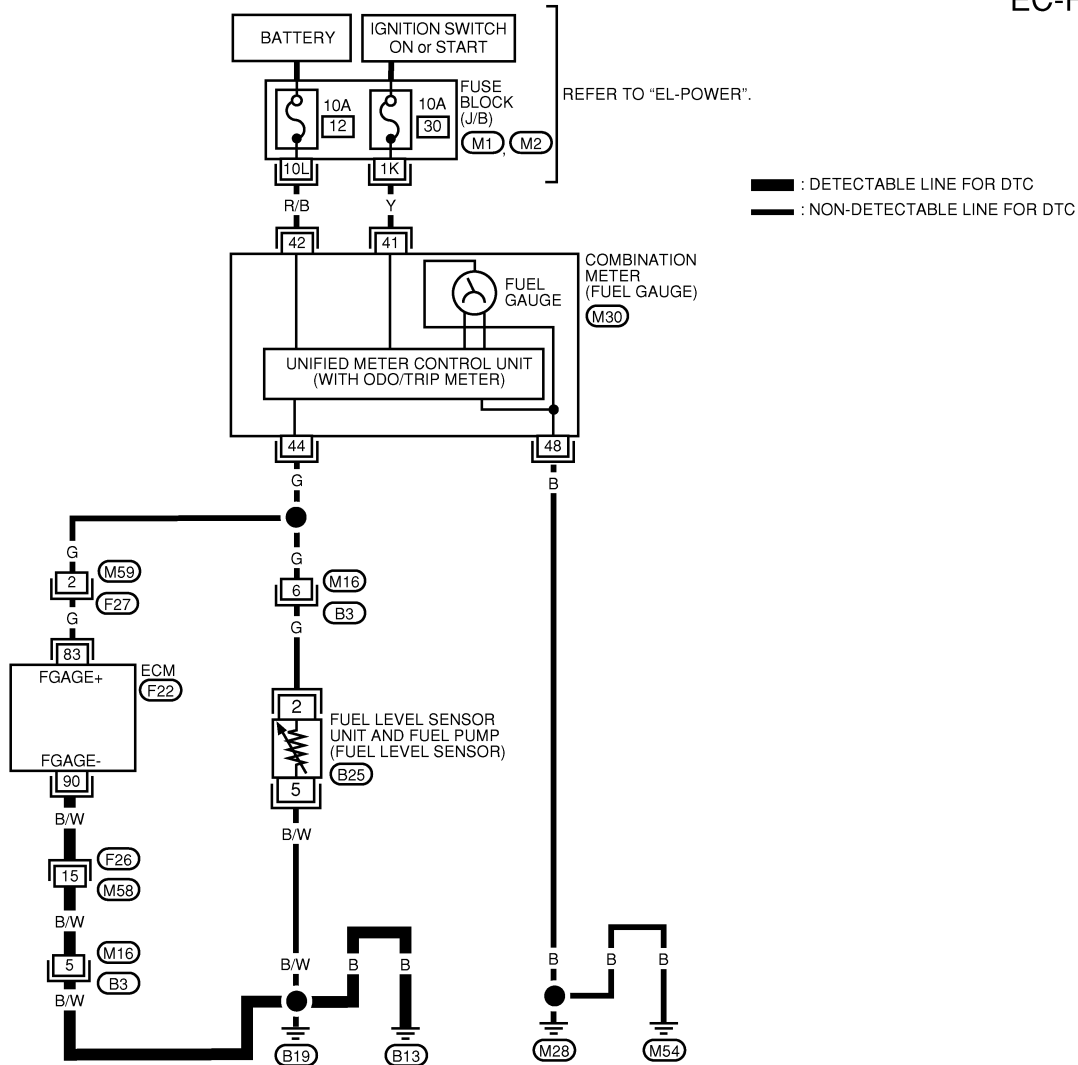
DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

SR20DE
Wiring Diagram

Wiring Diagram

NIEC1109

EC-FLS3-01



WEC148A

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
83	G	FUEL LEVEL SENSOR	IGN ON	APPROX. 0 - 4.8V
90	B/W	FUEL LEVEL SENSOR GROUND	ENGINE RUNNING AT IDLE SPEED	APPROX. 0V

SEF579Y

DTC P1464 FUEL LEVEL SENSOR CIRCUIT (GROUND SIGNAL)

SR20DE

Diagnostic Procedure

Diagnostic Procedure

=NIEC1110

1	CHECK FUEL LEVEL SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between ECM terminal 90 and body ground. Refer to "Wiring Diagram", EC-1871. Continuity should exist. 4. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 3.
NG	▶ GO TO 2.

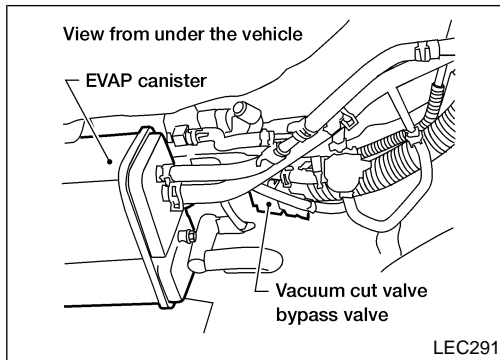
2	DETECT MALFUNCTIONING PART
1. Check the following. <ul style="list-style-type: none">● Harness connectors F26, M58● Harness connectors M16, B3● Harness for open and short between ECM and body ground	
	▶ Replace open circuit or short to power in harness or connectors.

3	CHECK FUEL LEVEL SENSOR
Refer to EL-102 , "Fuel Level Sensor Unit Check".	
OK or NG	
OK	▶ GO TO 4.
NG	▶ Replace fuel level sensor unit.

4	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499	
OK or NG	
	▶ INSPECTION END

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

Description



Description

COMPONENT DESCRIPTION

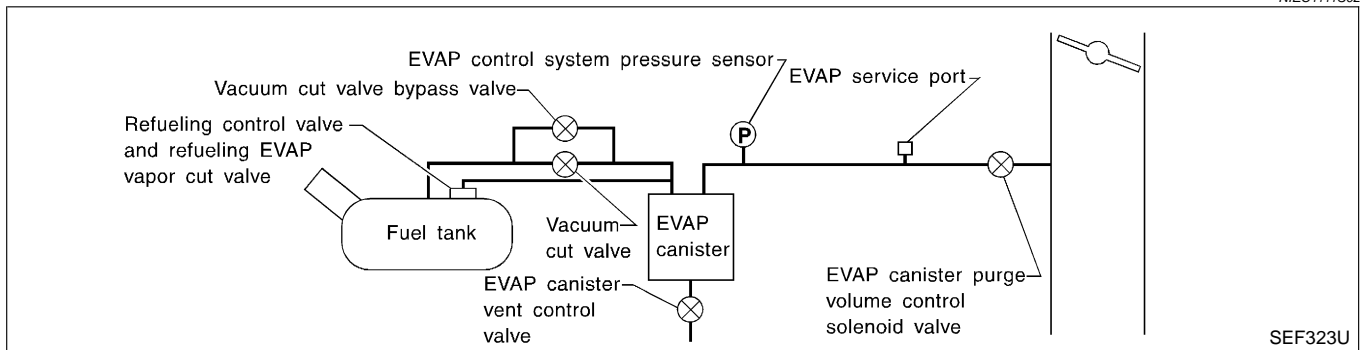
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

Malfunction is detected when an improper voltage signal is sent to ECM through vacuum cut valve bypass valve.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

Possible Cause

Possible Cause

NIEC1114

- Harness or connectors
(The vacuum cut valve bypass valve circuit is open or shorted.)
- Vacuum cut valve bypass valve

DTC Confirmation Procedure

NIEC1115

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Before performing the following procedure, confirm that battery voltage is more than 11V at idle speed.

3	DATA MONITOR	
	MONITOR	NO DTC
	ENG SPEED	XXX rpm

SEF058Y

WITH CONSULT-II

NIEC1115S01

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and wait at least 5 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1876.

WITH GST

NIEC1115S02

Follow the procedure "WITH CONSULT-II" above.

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

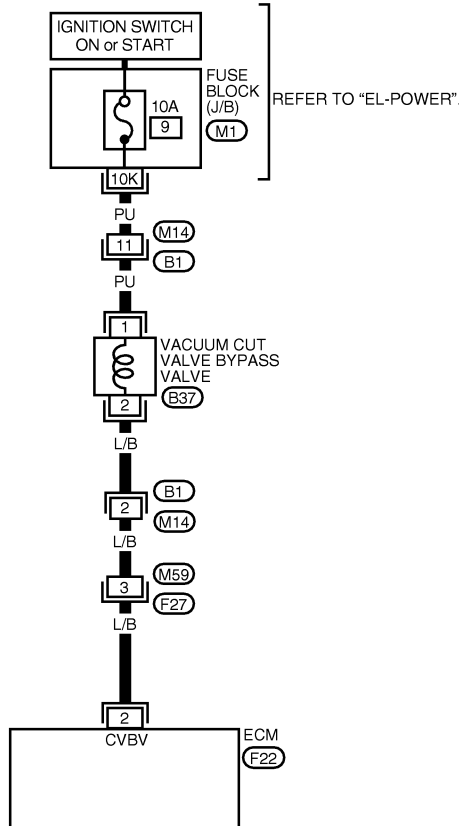
Wiring Diagram

Wiring Diagram

NIEC1116

EC-BYPS/V-01

— : DETECTABLE LINE FOR DTC
— : NON-DETECTABLE LINE FOR DTC



GI

MA

EM

LC

EC

FE

CL

MT

AT

AX

SU

BR

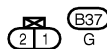
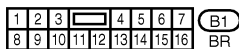
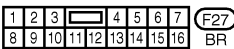
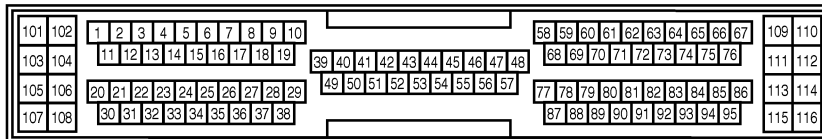
ST

RS

BT

LEC211

HA



ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
2	L/B	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

EL

IDX

SEF585Y

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

Diagnostic Procedure

Diagnostic Procedure

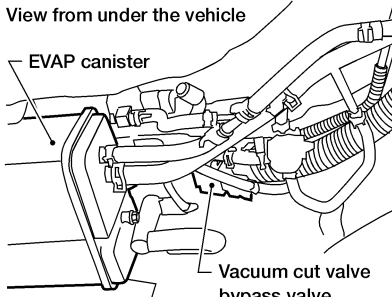
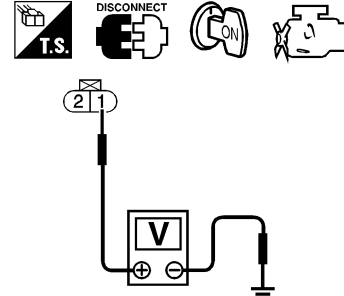
NIEC1117

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE CIRCUIT																					
<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF" and then "ON". 2. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II. 3. Touch "ON/OFF" on CONSULT-II screen. 																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td style="text-align: center;">VC/V BYPASS/V</td> <td style="text-align: center;">OFF</td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td style="text-align: center;">ENG SPEED</td> <td style="text-align: center;">XXX rpm</td> </tr> <tr> <td style="text-align: center;">A/F ALPHA-B1</td> <td style="text-align: center;">XXX %</td> </tr> <tr> <td style="text-align: center;">HO2S1 MNTR (B1)</td> <td style="text-align: center;">RICH</td> </tr> <tr> <td style="text-align: center;">THRTL POS SEN</td> <td style="text-align: center;">XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	RICH																					
THRTL POS SEN	XXX V																					
<p>4. Make sure that clicking sound is heard from the vacuum cut valve bypass valve.</p> <p style="text-align: right;">SEF806Y</p>																						
OK or NG																						
OK	▶	GO TO 7.																				
NG	▶	GO TO 3.																				

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

Diagnostic Procedure (Cont'd)

3	CHECK VACUUM CUT VALVE BYPASS VALVE POWER SUPPLY CIRCUIT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect vacuum cut valve bypass valve harness connector.</p> <div style="text-align: center;">  <p>View from under the vehicle</p> <p>EVAP canister</p> <p>Vacuum cut valve bypass valve</p> </div> <p>3. Turn ignition switch "ON".</p> <p>4. Check voltage between vacuum cut valve bypass valve terminal 1 and ground with CONSULT-II or tester.</p> <div style="text-align: center;">  <p>Voltage: Battery voltage</p> <p>OK or NG</p> </div>	<p>GI</p> <p>MA</p> <p>EM</p> <p>LC</p> <p style="background-color: black; color: white; padding: 5px;">EC</p> <p>FE</p> <p>CL</p> <p>MT</p> <p>AT</p> <p>AX</p>					
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 5.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>GO TO 4.</td> </tr> </table>		OK	▶	GO TO 5.	NG	▶	GO TO 4.	<p>LEC291</p> <p>SEF356X</p>
OK	▶	GO TO 5.						
NG	▶	GO TO 4.						

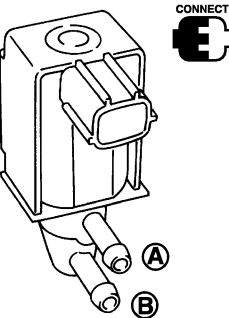
4	DETECT MALFUNCTIONING PART	<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M14, B1 ● Fuse block (J/B) connector M1 ● 10A fuse ● Harness for open or short between vacuum cut valve bypass valve and fuse <p style="text-align: right;">▶ Repair harness or connectors.</p>	<p>BR</p> <p>ST</p> <p>RS</p>
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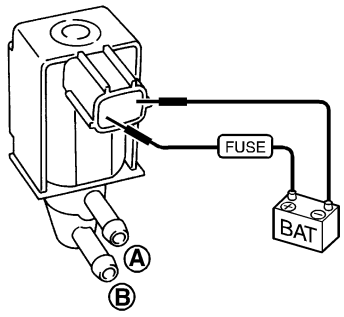
5	CHECK VACUUM CUT VALVE BYPASS VALVE OUTPUT SIGNAL CIRCUIT FOR OPEN AND SHORT	<p>1. Turn ignition switch "OFF".</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Check harness continuity between ECM terminal 2 and vacuum cut valve bypass valve terminal 2. Refer to "Wiring Diagram", EC-1875. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	<p>BT</p> <p>HA</p> <p>SC</p> <p>EL</p> <p>IDX</p>					
<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 7.</td> </tr> <tr> <td>NG</td> <td>▶</td> <td>GO TO 6.</td> </tr> </table>		OK	▶	GO TO 7.	NG	▶	GO TO 6.	
OK	▶	GO TO 7.						
NG	▶	GO TO 6.						

DTC P1490 VACUUM CUT VALVE BYPASS VALVE (CIRCUIT) SR20DE

Diagnostic Procedure (Cont'd)

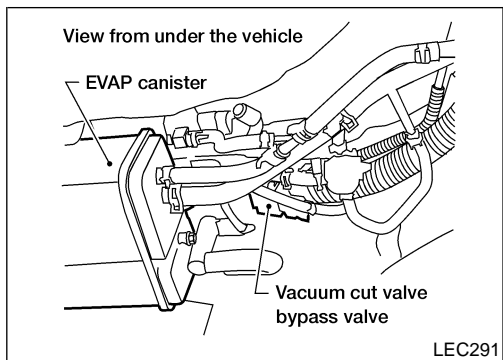
6	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M59, F27 ● Harness for open or short between vacuum cut valve bypass valve and ECM 	
	Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK VACUUM CUT VALVE BYPASS VALVE																										
(E) With CONSULT-II <ol style="list-style-type: none"> 1. Reconnect harness disconnected connectors. 2. Turn ignition switch ON. 3. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode. 4. Check air passage continuity and operation delay time under the following conditions. 																											
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VC/V BYPASS/V</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>Condition VC/V BYPASS/V</th> <th>Air passage continuity between A and B</th> </tr> <tr> <td>ON</td> <td>Yes</td> </tr> <tr> <td>OFF</td> <td>No</td> </tr> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V							Condition VC/V BYPASS/V	Air passage continuity between A and B	ON	Yes	OFF	No
ACTIVE TEST																											
VC/V BYPASS/V	OFF																										
MONITOR																											
ENG SPEED	XXX rpm																										
A/F ALPHA-B1	XXX %																										
HO2S1 MNTR (B1)	RICH																										
THRTL POS SEN	XXX V																										
Condition VC/V BYPASS/V	Air passage continuity between A and B																										
ON	Yes																										
OFF	No																										
SEF807Y																											

(X) Without CONSULT-II <p>Check air passage continuity and operation delay time under the following conditions.</p>							
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <tr> <th>Condition</th> <th>Air passage continuity between A and B</th> </tr> <tr> <td>12V direct current supply between terminals 1 and 2</td> <td>Yes</td> </tr> <tr> <td>No supply</td> <td>No</td> </tr> </table> <p style="text-align: center;">Operation takes less than 1 second.</p>	Condition	Air passage continuity between A and B	12V direct current supply between terminals 1 and 2	Yes	No supply	No
Condition	Air passage continuity between A and B						
12V direct current supply between terminals 1 and 2	Yes						
No supply	No						
OK or NG							
SEF557Y							

OK		GO TO 8.
NG		Replace vacuum cut valve bypass valve.

8	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	INSPECTION END



Description

COMPONENT DESCRIPTION

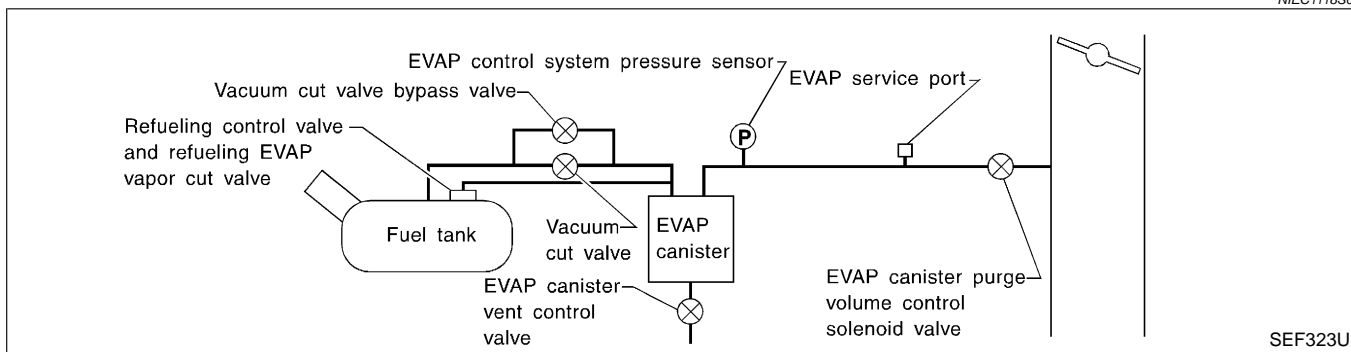
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

The vacuum cut valve prevents the intake manifold vacuum from being applied to the fuel tank.

The vacuum cut valve bypass valve is a solenoid type valve and generally remains closed. It opens only for on board diagnosis.

The vacuum cut valve bypass valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the valve is opened. The vacuum cut valve is then bypassed to apply intake manifold vacuum to the fuel tank.

EVAPORATIVE EMISSION SYSTEM DIAGRAM



CONSULT-II Reference Value in Data Monitor Mode

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
VC/V BYPASS/V	● Ignition switch: ON	OFF

On Board Diagnosis Logic

Malfunction is detected when vacuum cut valve bypass valve does not operate properly.

Possible Cause

NIEC1121

- Vacuum cut valve bypass valve
- Vacuum cut valve
- Bypass hoses for clogging
- EVAP control system pressure sensor and circuit
- EVAP canister vent control valve
- Hose between fuel tank and vacuum cut valve clogged
- Hose between vacuum cut valve and EVAP canister clogged
- EVAP canister
- EVAP purge port of fuel tank for clogging

7	VC CUT/V BP/V P1491	
	OUT OF CONDITION	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF210Y

7	VC CUT/V BP/V P1491	
	TESTING	
	MONITOR	
	ENG SPEED	XXX rpm
	VHCL SPEED SE	XXX km/h
	B/FUEL SCHDL	XXX msec

SEF211Y

7	VC CUT/V BP/V P1491	
	COMPLETED	

SEF239Y

DTC Confirmation Procedure

NIEC1122

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

TESTING CONDITION:

Always perform test at a temperature of 5 to 30°C (41 to 86°F).

WITH CONSULT-II

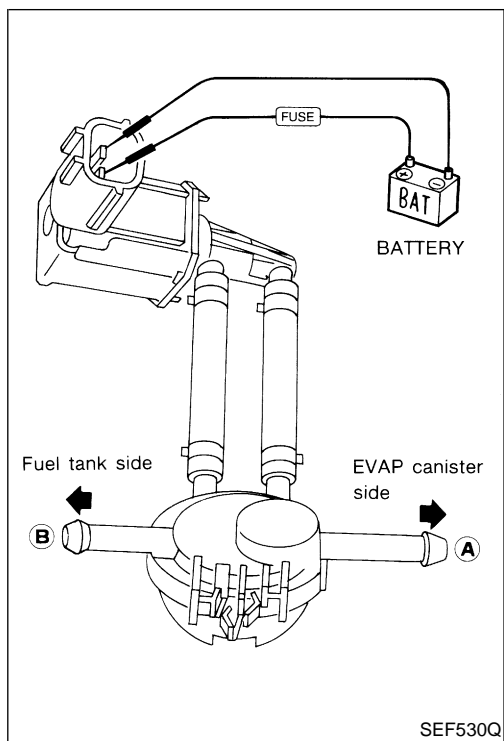
NIEC1122S01

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up to normal operating temperature.
- 3) Turn ignition switch "OFF" and wait at least 10 seconds.
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Select "VC CUT/V BP/V P1491" of "EVAPORATIVE SYSTEM" in "DTC WORK SUPPORT" mode with CONSULT-II.
- 6) Touch "START".
- 7) When the following conditions are met, "TESTING" will be displayed on the CONSULT-II screen. Maintain the conditions continuously until "TESTING" changes to "COMPLETED". (It will take at least 30 seconds.)

ENG SPEED	More than 1,000 rpm
Selector lever	Suitable position
Vehicle speed	More than 37 km/h (23 MPH)
B/FUEL SCHDL	1 - 8.9 msec

If "TESTING" is not displayed after 5 minutes, retry from step 3.

- 8) Make sure that "OK" is displayed after touching "SELF-DIAG RESULTS". If "NG" is displayed, refer to "Diagnostic Procedure", EC-1883.



Overall Function Check

Use this procedure to check the overall function of vacuum cut valve bypass valve. During this check, the 1st trip DTC might not be confirmed.

WITH GST

- 1) Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly.
- 2) Apply vacuum to port **A** and check that there is no suction from port **B**.
- 3) Apply vacuum to port **B** and check that there is suction from port **A**.
- 4) Blow air in port **B** and check that there is a resistance to flow out of port **A**.
- 5) Supply battery voltage to the terminal.
- 6) Blow air in port **A** and check that air flows freely out of port **B**.
- 7) Blow air in port **B** and check that air flows freely out of port **A**.
- 8) If NG, go to "Diagnostic Procedure", EC-1883.

GI

MA

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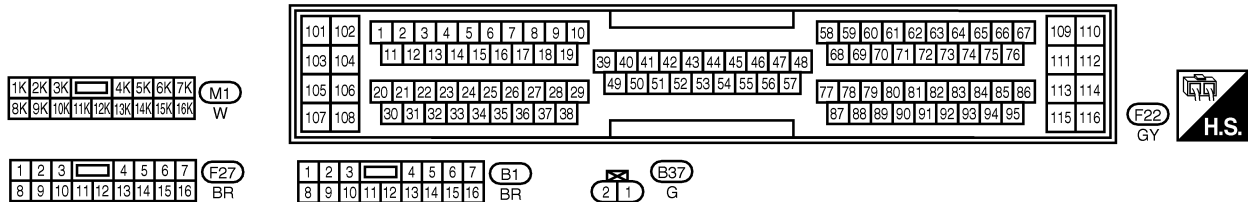
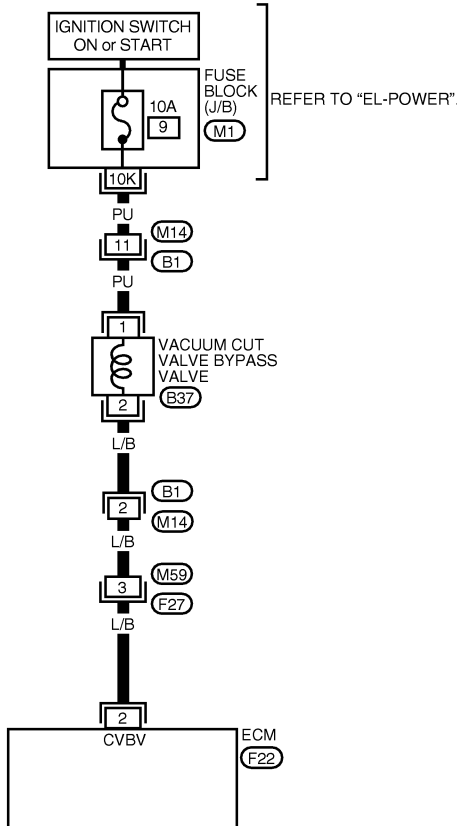
IDX

Wiring Diagram

NIEC1124

EC-BYPS/V-01

— : DETECTABLE LINE FOR DTC
 — : NON-DETECTABLE LINE FOR DTC



LEC211

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

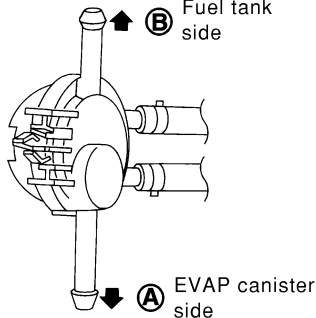
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
2	L/B	VACUUM CUT VALVE BYPASS VALVE	IGN ON	BATTERY VOLTAGE

SEF585Y

Diagnostic Procedure

NIEC1125

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION																					
<p>📄 With CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Turn ignition switch "ON". 7. Select "VC/V BYPASS/V" in "ACTIVE TEST" mode with CONSULT-II and touch "ON". 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 																						
																						
<table border="1" style="margin: auto; border-collapse: collapse;"> <thead> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <th>VC/V BYPASS/V</th> <th>OFF</th> </tr> <tr> <th colspan="2">MONITOR</th> </tr> </thead> <tbody> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>A/F ALPHA-B1</td> <td>XXX %</td> </tr> <tr> <td>HO2S1 MNTR (B1)</td> <td>RICH</td> </tr> <tr> <td>THRTL POS SEN</td> <td>XXX V</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table>			ACTIVE TEST		VC/V BYPASS/V	OFF	MONITOR		ENG SPEED	XXX rpm	A/F ALPHA-B1	XXX %	HO2S1 MNTR (B1)	RICH	THRTL POS SEN	XXX V						
ACTIVE TEST																						
VC/V BYPASS/V	OFF																					
MONITOR																						
ENG SPEED	XXX rpm																					
A/F ALPHA-B1	XXX %																					
HO2S1 MNTR (B1)	RICH																					
THRTL POS SEN	XXX V																					
OK or NG																						
OK	▶	GO TO 4.																				
NG	▶	GO TO 5.																				

SEF808Y

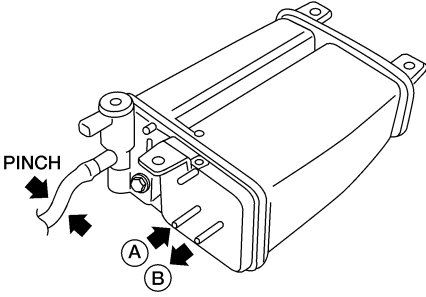
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3	CHECK VACUUM CUT VALVE BYPASS VALVE OPERATION	
<p>⊗ Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Remove vacuum cut valve and vacuum cut valve bypass valve as an assembly. 3. Apply vacuum to port A and check that there is no suction from port B. 4. Apply vacuum to port B and check that there is suction from port A. 5. Blow air in port B and check that there is a resistance to flow out of port A. 6. Disconnect vacuum cut valve bypass valve harness connector. 7. Supply battery voltage to the terminal. 8. Blow air in port A and check that air flows freely out of port B. 9. Blow air in port B and check that air flows freely out of port A. 		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 7.

SEF914U

4	CHECK EVAP PURGE LINE	
Check EVAP purge line between EVAP canister and fuel tank for clogging or disconnection.		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair it.

5	CHECK EVAP PURGE PORT	
Check EVAP purge port of fuel tank for clogging.		
OK or NG		
OK	▶	GO TO 6.
NG	▶	Clean EVAP purge port.

6	CHECK EVAP CANISTER	
<p>1. Pinch the fresh air hose. 2. Blow air into port A and check that it flows freely out of port B.</p>		
		
AEC630A		
OK or NG		
OK	▶	GO TO 12.
NG	▶	Replace EVAP canister.

7	CHECK BYPASS HOSE	
Check bypass hoses for clogging.		
OK or NG		
OK	▶	GO TO 8.
NG	▶	Repair or replace hoses.

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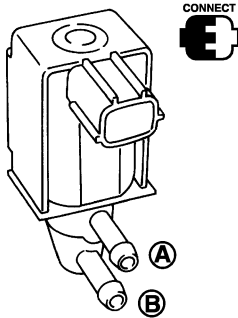
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8 CHECK VACUUM CUT VALVE BYPASS VALVE

With CONSULT-II

1. Perform "VC/V BYPASS/V" in "ACTIVE TEST" mode.
2. Check air passage continuity and operation delay time under the following conditions.



ACTIVE TEST	
VC/V BYPASS/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 MNTR (B1)	RICH
THR TL POS SEN	XXX V

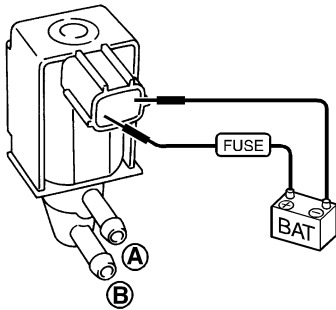
Condition VC/V BYPASS/V	Air passage continuity between A and B
ON	Yes
OFF	No

Operation takes less than 1 second.

SEF807Y

Without CONSULT-II

- Check air passage continuity and operation delay time under the following conditions.



Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	Yes
No supply	No

Operation takes less than 1 second.

SEF557Y

OK or NG

OK	▶	GO TO 9.
NG	▶	Replace vacuum cut valve bypass valve.

9	CHECK VACUUM CUT VALVE	<p>Check vacuum cut valve as follows:</p> <div style="text-align: center;"> </div> <p style="text-align: right;">SEF379Q</p> <ol style="list-style-type: none"> a. Plug port C and D with fingers. b. Apply vacuum to port A and check that there is no suction from port B. c. Apply vacuum to port B and check that there is suction from port A. d. Blow air in port B and check that there is a resistance to flow out of port A. e. Open port C and D. f. Blow air in port A check that air flows freely out of port C. g. Blow air in port B check that air flows freely out of port D. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 10.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace vacuum cut valve.</td> </tr> </table>	OK	▶	GO TO 10.	NG	▶	Replace vacuum cut valve.	GI MA EM LC EC FE CL MT AT
OK	▶	GO TO 10.							
NG	▶	Replace vacuum cut valve.							

10	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR HOSE	<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Check disconnection or improper connection of hose connected to EVAP control system pressure sensor. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 11.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Repair or replace.</td> </tr> </table>	OK	▶	GO TO 11.	NG	▶	Repair or replace.	AX SU BR
OK	▶	GO TO 11.							
NG	▶	Repair or replace.							

11	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR CONNECTOR	<ol style="list-style-type: none"> 1. Disconnect EVAP control system pressure sensor harness connector. <div style="text-align: center;"> </div> <p style="text-align: right;">LEC294</p> <ol style="list-style-type: none"> 2. Check connectors for water. Water should not exist. <p style="text-align: center;">OK or NG</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">OK</td> <td style="width: 5%; text-align: center;">▶</td> <td>GO TO 12.</td> </tr> <tr> <td>NG</td> <td style="text-align: center;">▶</td> <td>Replace EVAP control system pressure sensor.</td> </tr> </table>	OK	▶	GO TO 12.	NG	▶	Replace EVAP control system pressure sensor.	ST RS BT HA SC EL IDX
OK	▶	GO TO 12.							
NG	▶	Replace EVAP control system pressure sensor.							

12	CHECK EVAP CONTROL SYSTEM PRESSURE SENSOR
<p>1. Remove EVAP control system pressure sensor with its harness connector connected.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Never apply force to the air hole protector of the sensor if equipped. 	
SEF799W	
<p>2. Remove hose from EVAP control system pressure sensor.</p> <p>3. Turn ignition switch "ON".</p> <p>4. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.</p> <p>CAUTION:</p> <ul style="list-style-type: none"> ● Always calibrate the vacuum pump gauge when using it. ● Do not apply below -20 kPa (-150 mmHg, -5.91 inHg) or over 20 kPa (150 mmHg, 5.91 inHg) of pressure. <p>5. Check input voltage between ECM terminal 84 and ground.</p>	
SEF342X	
<p>CAUTION:</p> <ul style="list-style-type: none"> ● Discard any EVAP control system pressure sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 13.
NG	▶ Replace EVAP control system pressure sensor.

13	CHECK RUBBER TUBE FOR CLOGGING
<p>1. Disconnect rubber tube connected to EVAP canister vent control valve.</p> <p>2. Check the rubber tube for clogging.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 14.
NG	▶ Clean the rubber tube using an air blower.

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14 CHECK EVAP CANISTER VENT CONTROL VALVE-I

1. Remove EVAP canister vent control valve from EVAP canister.
2. Check portion **B** of EVAP canister vent control valve for being rusted.

5.3 - 12 N·m
(0.54 - 1.2 kg-m,
46.9 - 104 in-lb)

OK or NG

OK	▶	GO TO 15.
NG	▶	Replace EVAP canister vent control valve.

15 CHECK EVAP CANISTER VENT CONTROL VALVE-II

With CONSULT-II

1. Reconnect harness disconnected connectors.
2. Turn ignition switch ON.
3. Perform "VENT CONTROL/V" in "ACTIVE TEST" mode.
4. Check air passage continuity and operation delay time.

ACTIVE TEST	
VENT CONTROL/V	OFF
MONITOR	
ENG SPEED	XXX rpm
A/F ALPHA-B1	XXX %
HO2S1 (B1)	XXX V
THRTL POS SEN	XXX V

Condition VENT CONTROL/V	Air passage continuity between A and B
ON	No
OFF	Yes

Operation takes less than 1 second.

Without CONSULT-II

Check air passage continuity and operation delay time under the following conditions.

Condition	Air passage continuity between A and B
12V direct current supply between terminals 1 and 2	No
OFF	Yes

Operation takes less than 1 second.

Make sure new O-ring is installed properly.

OK or NG

OK	▶	GO TO 17.
NG	▶	GO TO 16.

DTC P1491 VACUUM CUT VALVE BYPASS VALVE

SR20DE

Diagnostic Procedure (Cont'd)

16	CHECK EVAP CANISTER VENT CONTROL VALVE-III
1. Clean the air passage (Portion A to B) of EVAP canister vent control valve using an air blower. 2. Perform the Test No. 15 again.	
OK or NG	
OK	▶ GO TO 17.
NG	▶ Replace EVAP canister vent control valve.

17	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

System Description

NIEC1126

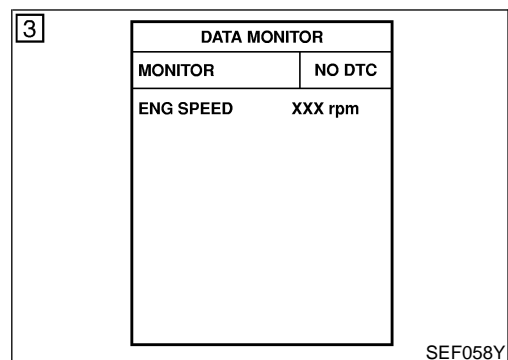
The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from TCM (Transmission Control Module) to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in TCM (Transmission Control Module) but also ECM after the A/T related repair.

On Board Diagnosis Logic

NIEC1127

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1605	<ul style="list-style-type: none"> ● An incorrect signal from TCM (Transmission Control Module) is sent to ECM. 	<ul style="list-style-type: none"> ● Harness or connectors [The communication line circuit between ECM and TCM (Transmission Control Module) is open or shorted.] ● Dead (Weak) battery ● TCM (Transmission Control Module)

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DTC Confirmation Procedure

NIEC1128

NOTE:

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

With CONSULT-II

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT-II.
- 3) Start engine and let it idle for at least 40 seconds.
- 4) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1893.

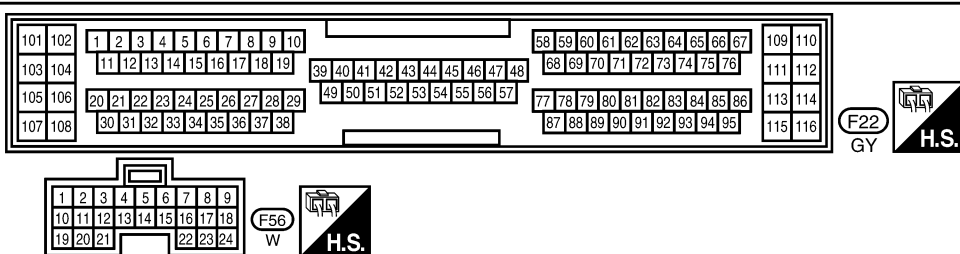
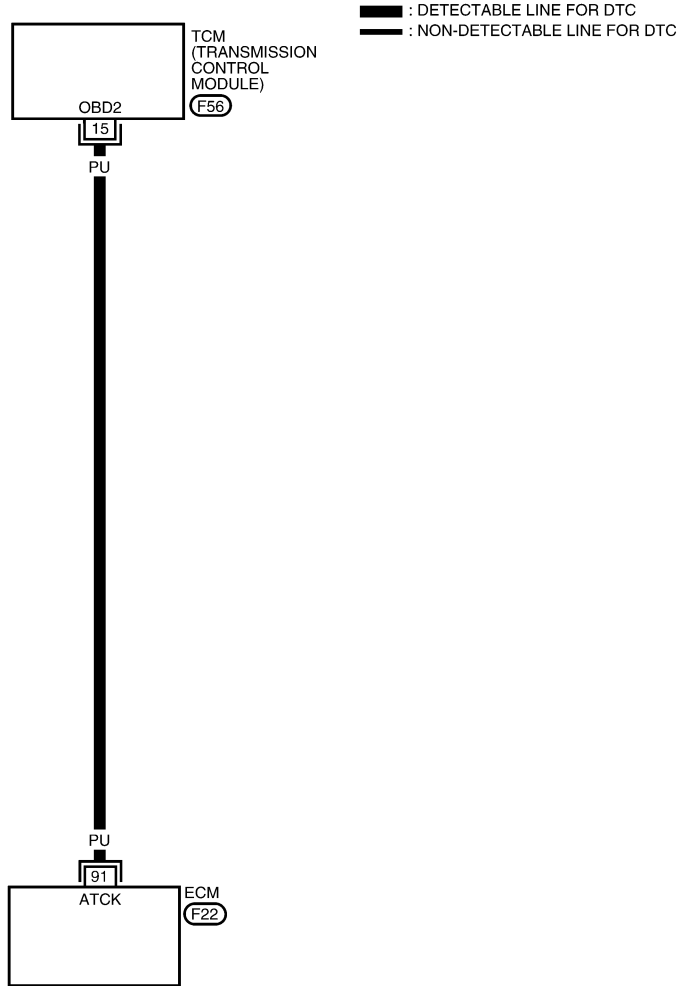
With GST

Follow the procedure "With CONSULT-II" above.

Wiring Diagram

NIEC1129

EC-ATDIAG-01



WEC598

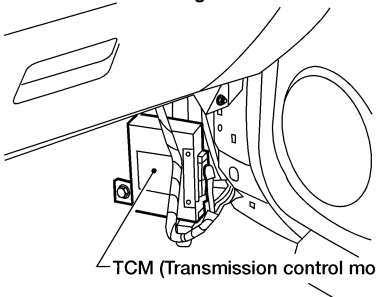
ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
91	PU	A/T CHECK SIGNAL	IGN ON	0 - APPROX. 5V

SEF586Y

Diagnostic Procedure

NIEC1130

1	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector and TCM harness connector.</p> <p style="text-align: center;">View with dash side lower garnish RH removed</p>  <p style="text-align: center;">TCM (Transmission control module)</p> <p style="text-align: right;">LEC306</p> <p>3. Check harness continuity between ECM terminal 91 and TCM terminal 15. Refer to "Wiring Diagram", EC-1892. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 2.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

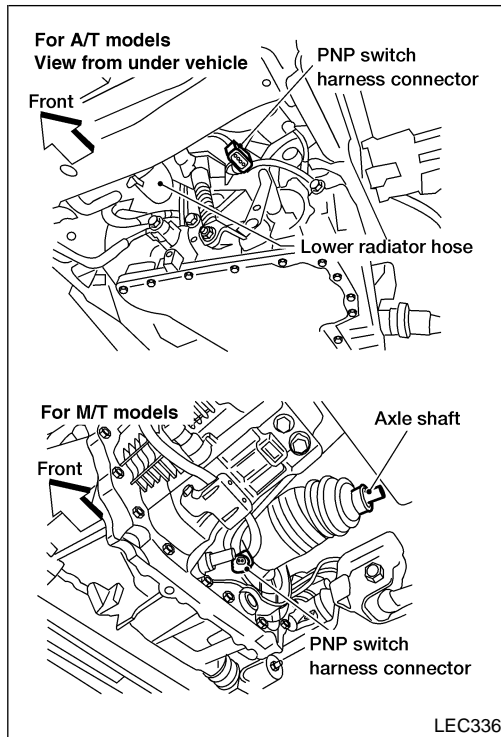
2	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END

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DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

SR20DE

Component Description



Component Description

NIEC1131

When the gear position is "P" (A/T models only) or "N", park/neutral position (PNP) switch is "ON".
ECM detects the park/neutral position when continuity with ground exists.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1132

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
P/N POSI SW	● Ignition switch: ON	Shift lever: "P" or "N" ON
		Except above OFF

On Board Diagnosis Logic

NIEC1133

DTC No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1706	● The signal of the PNP switch is not changed in the process of engine starting and driving.	● Harness or connectors (The PNP switch circuit is open or shorted.) ● PNP switch

2	DATA MONITOR	
	MONITOR	NO DTC
	P/N POSI SW	ON

SEF212Y

DTC Confirmation Procedure

NIEC1134

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

If "DTC Confirmation Procedure" has been previously conducted, always turn ignition switch "OFF" and wait at least 10 seconds before conducting the next test.

Ⓜ With CONSULT-II

- 1) Turn ignition switch "ON".

DTC P1706 PARK/NEUTRAL POSITION (PNP) SWITCH

SR20DE

DTC Confirmation Procedure (Cont'd)

5

DATA MONITOR	
MONITOR	NO DTC
ENG SPEED	XXX rpm
COOLAN TEMP/S	XXX °C
VHCL SPEED SE	XXX km/h
P/N POSI SW	OFF
B/FUEL SCHDL	XXX msec

SEF213Y

- 2) Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT-II. Then check the "P/N POSI SW" signal under the following conditions.

Position (Selector lever)	Known good signal
"N" and "P" (A/T only) position	ON
Except the above position	OFF

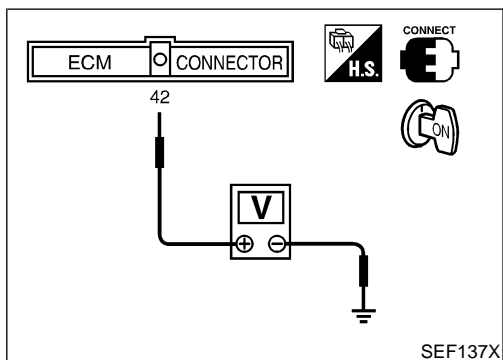
If NG, go to "Diagnostic Procedure", EC-1897.

If OK, go to following step.

- 3) Select "DATA MONITOR" mode with CONSULT-II.
 4) Start engine and warm it up to normal operating temperature.
 5) Maintain the following conditions for at least 50 consecutive seconds.

ENG SPEED	1,500 - 3,400 rpm
COOLAN TEMP/S	More than 70°C (158°F)
B/FUEL SCHDL	1.9 - 12.5 msec
VHCL SPEED SE	More than 64 km/h (40 MPH)
Selector lever	Suitable position

- 6) If 1st trip DTC is detected, go to "Diagnostic Procedure", EC-1897.



Overall Function Check

Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a 1st trip DTC might not be confirmed. NIEC1135

Without CONSULT-II

- 1) Turn ignition switch "ON".
 2) Check voltage between ECM terminal 42 (PNP switch signal) and body ground under the following conditions.

Condition (Gear position)	Voltage (V) (Known good data)
"P" (A/T only) and "N" position	Approx. 0
Except the above position	BATTERY VOLTAGE (11 - 14V)

- 3) If NG, go to "Diagnostic Procedure", EC-1897.

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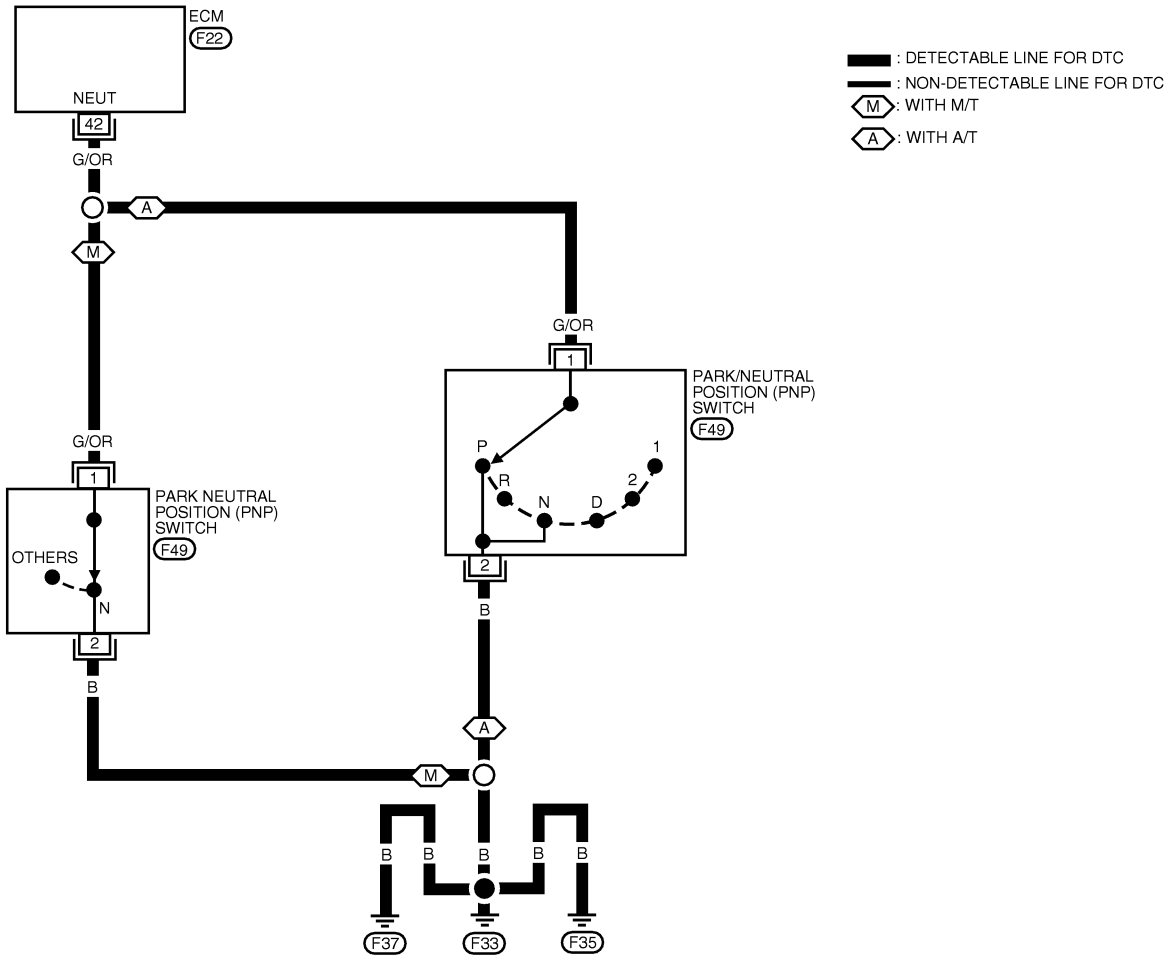
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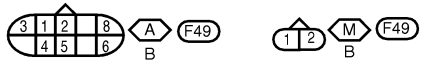
Wiring Diagram

NIEC1136

EC-PNP/SW-01



101	102	1	2	3	4	5	6	7	8	9	10			58	59	60	61	62	63	64	65	66	67	109	110										
103	104	11	12	13	14	15	16	17	18	19			39	40	41	42	43	44	45	46	47	48	68	69	70	71	72	73	74	75	76	111	112		
105	106	20	21	22	23	24	25	26	27	28	29			49	50	51	52	53	54	55	56	57	77	78	79	80	81	82	83	84	85	86	113	114	
107	108	30	31	32	33	34	35	36	37	38																								115	116



LEC220

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
 DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
42	G/OR	PARK/NEUTRAL POSITION (PNP) SWITCH	IGN ON WITH GEAR POSITION "N" OR "P"	APPROX. 0V
			IGN ON WITHOUT THE ABOVE GEAR POSITION	BATTERY VOLTAGE

SEF587Y

Diagnostic Procedure For M/T Models

NIEC1137

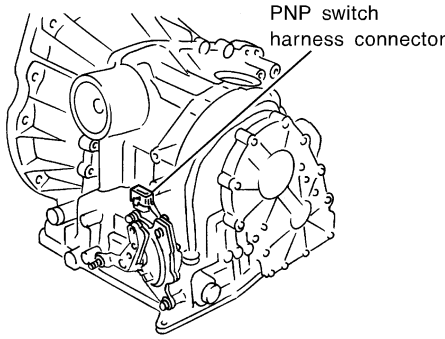
1	CHECK GROUND CIRCUIT	
1. Turn ignition switch "OFF". 2. Disconnect PNP switch harness connector.		
3. Check harness continuity between PNP switch terminal 2 and body ground. Refer to "Wiring Diagram", EC-1896. Continuity should exist.		
4. Also check harness for short to power.		
OK or NG		
OK	▶	GO TO 2.
NG	▶	Repair open circuit or short to power in harness or connectors.
2	CHECK INPUT SIGNAL CIRCUIT	
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 42 and PNP switch terminal 1. Refer to "Wiring Diagram", EC-1896. Continuity should exist.		
3. Also check harness for short to ground and short to power.		
OK or NG		
OK	▶	GO TO 3.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
3	CHECK PNP SWITCH	
Refer to <i>MT-10</i> , "PNP SWITCH".		
OK or NG		
OK	▶	GO TO 4.
NG	▶	Replace PNP switch.
4	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

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LEC442

Diagnostic Procedure For A/T Models

=NIEC1138

1	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect PNP switch harness connector.</p> <div style="text-align: center;">  <p style="margin-left: 150px;">PNP switch harness connector</p> </div> <p style="text-align: right;">SEF752Y</p> <p>3. Check continuity between PNP switch harness connector terminal 2 and ground with CONSULT-II or tester. "Refer to Wiring Diagram", EC-1896. Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 2.
NG		▶ Repair open circuit or short to power in harness or connectors.

2	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 42 and PNP switch terminals 1. "Refer to Wiring Diagram", EC-1896. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 3.
NG		▶ Repair open circuit or short to ground or short to power in harness or connectors.

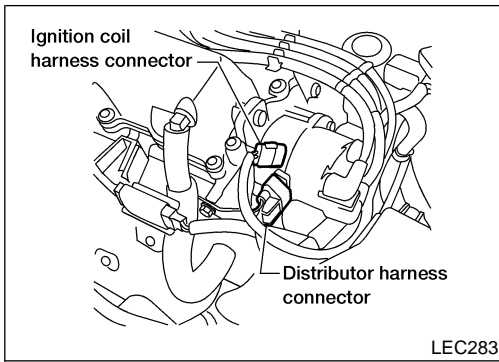
3	CHECK PNP SWITCH	
<p>Refer to AT-112, "Diagnostic Procedure".</p> <p style="text-align: center;">OK or NG</p>		
OK		▶ GO TO 4.
NG		▶ Replace PNP switch.

4	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>		
		▶ INSPECTION END

IGNITION SIGNAL

SR20DE

Component Description



Component Description

IGNITION COIL & POWER TRANSISTOR (BUILT INTO DISTRIBUTOR)

NIEC1047

NIEC1047S01

The ignition coil is built into distributor. The ignition signal from the ECM is sent to the power transistor. The power transistor switches on and off the ignition coil primary circuit. As the primary circuit is turned on and off, the proper high voltage is induced in the coil secondary circuit.

The distributor is not repairable and must be replaced as an assembly except distributor cap and rotor head.

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CONSULT-II Reference Value in Data Monitor Mode

NIEC1048

MONITOR ITEM	CONDITION		SPECIFICATION
IGN TIMING	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	15°±2° BTDC
		2,000 rpm	More than 25° BTDC

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IGNITION SIGNAL

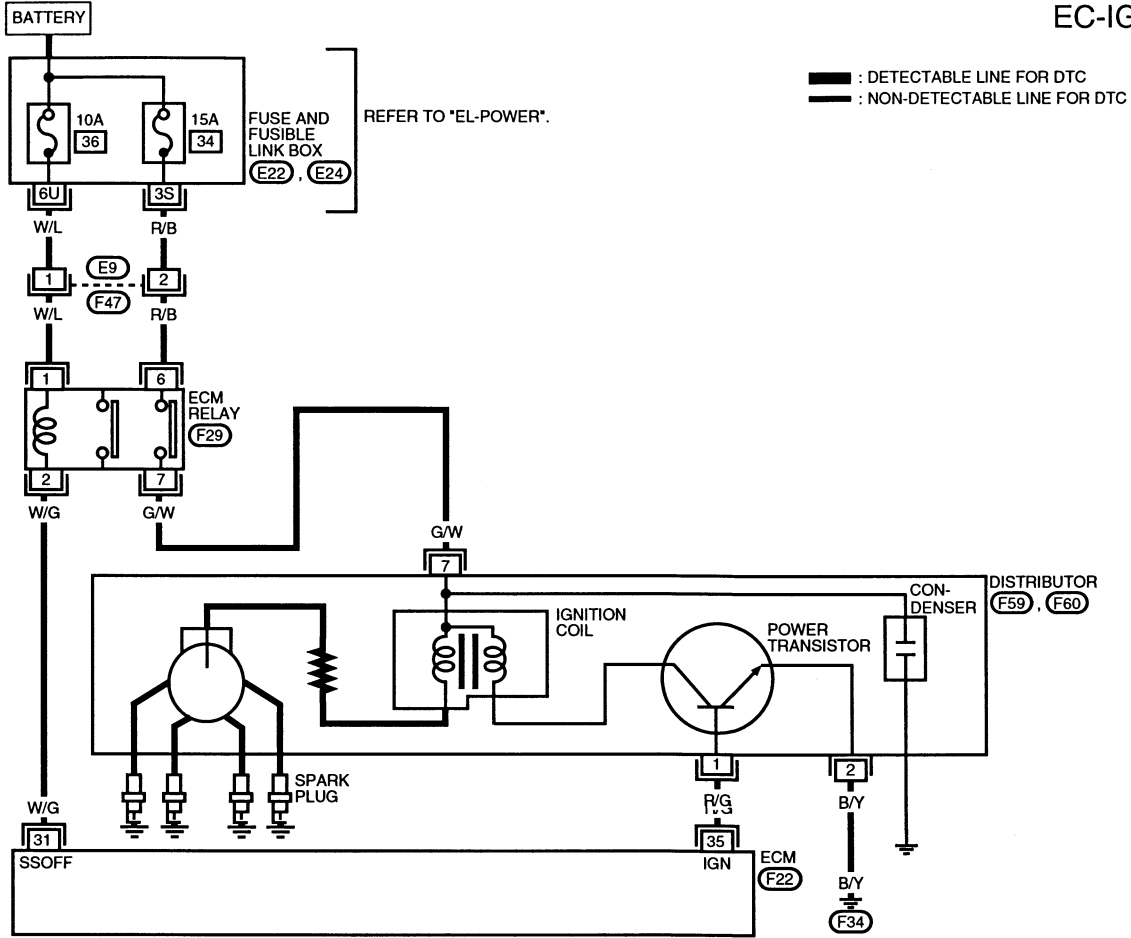
SR20DE

Wiring Diagram

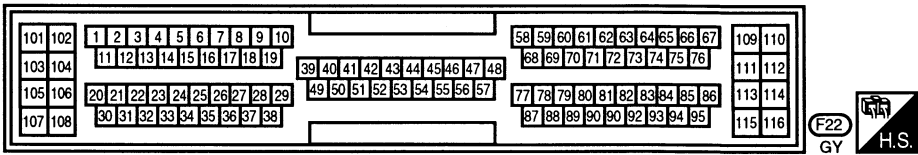
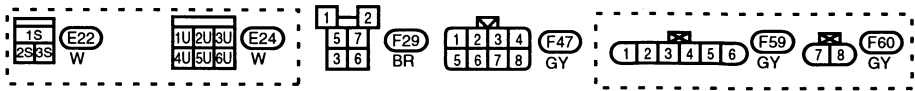
Wiring Diagram

NIEC1051

EC-IGNSYS-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC



WEC921

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
35	R/G	IGNITION SIGNAL	ENGINE RUNNING AT IDLE SPEED WARM-UP CONDITION	APPROX. 0.3V (V)
			ENGINE RUNNING AT 2,000 RPM	APPROX. 0.5V (V)

LEC920

IGNITION SIGNAL

SR20DE

Diagnostic Procedure

Diagnostic Procedure

NIEC1052


1	INSPECTION START	
Turn ignition switch "OFF", and restart engine. Is engine running?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

GI

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2	CHECK OVERALL FUNCTION																					
<p> With CONSULT-II</p> <p>1. Perform "POWER BALANCE" in "DATA MONITOR" mode with CONSULT-II. 2. Make sure that all circuits do not produce a momentary engine speed drop.</p>																						
<table border="1" style="margin: auto;"> <tr> <th colspan="2">ACTIVE TEST</th> </tr> <tr> <td>POWER BALANCE</td> <td></td> </tr> <tr> <th colspan="2">MONITOR</th> </tr> <tr> <td>ENG SPEED</td> <td>XXX rpm</td> </tr> <tr> <td>MAS AIF SE-B1</td> <td>XXX V</td> </tr> <tr> <td>IACV-AAC/V</td> <td>XXX step</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </table>			ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS AIF SE-B1	XXX V	IACV-AAC/V	XXX step								
ACTIVE TEST																						
POWER BALANCE																						
MONITOR																						
ENG SPEED	XXX rpm																					
MAS AIF SE-B1	XXX V																					
IACV-AAC/V	XXX step																					
SEF070Y																						
OK or NG																						
OK	▶	INSPECTION END																				
NG	▶	GO TO 8.																				

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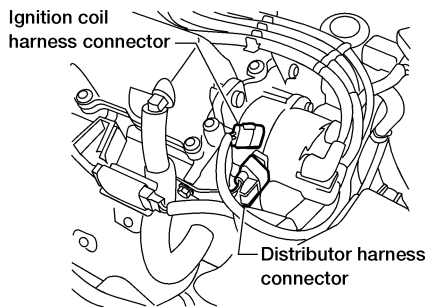
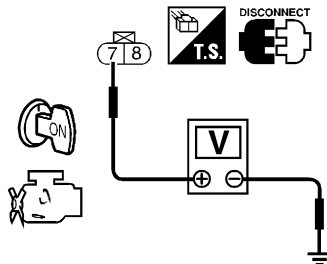
BT

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IDX

3	CHECK POWER SUPPLY		
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ignition coil harness connector. 			
			
LEC283			
<ol style="list-style-type: none"> 3. Turn ignition switch "ON". 4. Check voltage between ignition coil harness connector terminal 8 and ground with CONSULT-II or tester. 			
			
<p style="color: blue;">Voltage: Battery voltage</p> <p>OK or NG</p>			
OK	▶	GO TO 5.	
NG	▶	GO TO 4.	

4	DETECT MALFUNCTIONING PART		
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors E9, F47 ● ECM relay ● 15A fuse ● Harness for open or short between ignition coil and fuse 			
▶ Repair harness or connectors.			

5	CHECK GROUND CIRCUIT		
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect distributor harness connector. 3. Check harness continuity between distributor harness connector terminal 2 and engine ground. Refer to "Wiring Diagram", EC-1900. Continuity should exist. 4. Also check harness for short to power. 			
OK or NG			
OK	▶	GO TO 6.	
NG	▶	Repair open circuit or short to power in harness or connectors.	

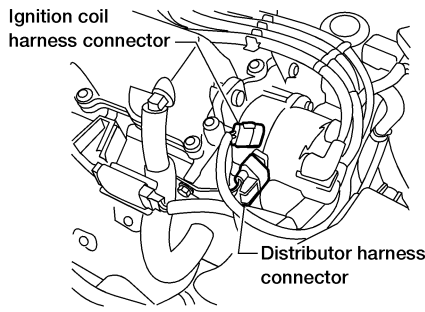
IGNITION SIGNAL

SR20DE

Diagnostic Procedure (Cont'd)

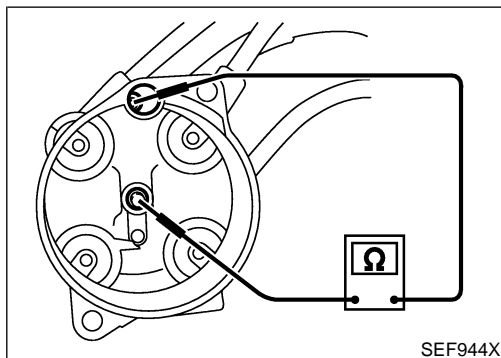
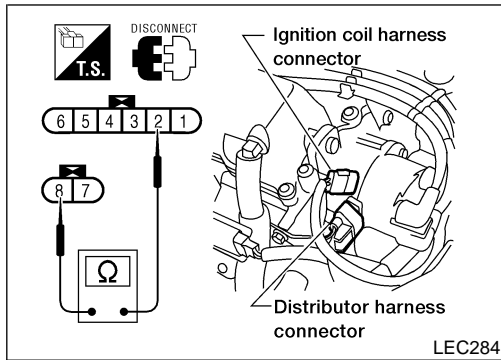
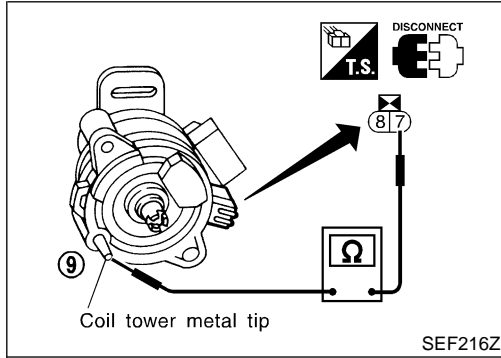
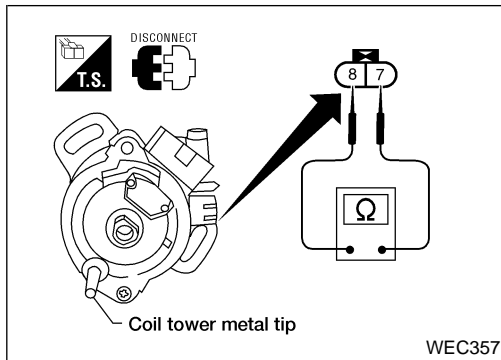
6	CHECK INPUT SIGNAL CIRCUIT-I
<ol style="list-style-type: none"> 1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 35 and distributor harness connector terminal 1. Refer to "Wiring Diagram", EC-1900. Continuity should exist. 3. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 7.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

7	CHECK IGNITION COIL, POWER TRANSISTOR AND RESISTOR
Refer to "Component Inspection", EC-1904.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ Replace malfunctioning component(s).

8	CHECK INPUT SIGNAL CIRCUIT-II
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect ignition coil harness connector. <div style="text-align: center;">  <p>The diagram shows a top-down view of the engine's ignition system. It features an ignition coil with a terminal labeled 'Ignition coil harness connector'. Below it is the distributor with a terminal labeled 'Distributor harness connector'. Various wires and components are shown in a technical drawing style.</p> </div> <p style="text-align: right;">LEC283</p> <ol style="list-style-type: none"> 3. Disconnect ECM harness connector. 4. Check harness continuity between ignition coil terminal 7 and ECM terminal 36. Refer to "Wiring Diagram", EC-1900. Continuity should exist. 5. Also check harness for short to ground and short to power. <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 9.
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.

9	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

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Component Inspection IGNITION COIL

=NIEC1053
NIEC1053S01

1. Disconnect ignition coil harness connector.
2. Check resistance as shown in the figure.
3. For checking secondary coil, remove distributor cap.
4. Check resistance between ignition coil harness connector terminal 7 and coil tower metal tip 9 (secondary terminal) on the distributor head.

Terminal	Resistance [at 25°C (77°F)]
7 - 8 (Primary coil)	Approximately 0.8Ω
7 - secondary terminal on distributor head (Secondary coil)	Approximately 16 kΩ

If NG, replace distributor.

POWER TRANSISTOR

NIEC1053S02

1. Disconnect distributor harness connector.
2. Check power transistor resistance between terminals 2 and 8.

Terminals	Resistance	Result
2 and 8	Except 0Ω	OK
	0Ω	NG

If NG, replace distributor.

RESISTOR

NIEC1053S03

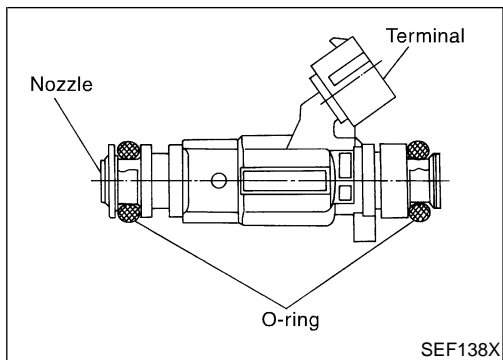
1. Remove distributor cap.
2. Check resistance as shown in the figure.
Resistance: 4 - 8 kΩ [at 25°C (77°F)]

If NG, replace distributor cap.

INJECTOR

SR20DE

Component Description



Component Description

The fuel injector is a small, precise solenoid valve. When the ^{NIEC1139}ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends upon the injection pulse duration. Pulse duration is the length of time the injector remains open. The ECM controls the injection pulse duration based on engine fuel needs.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1140

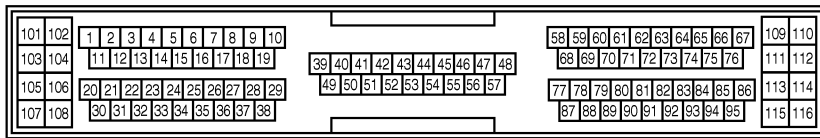
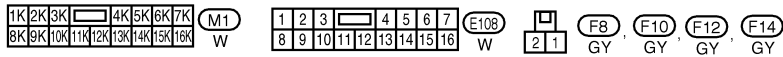
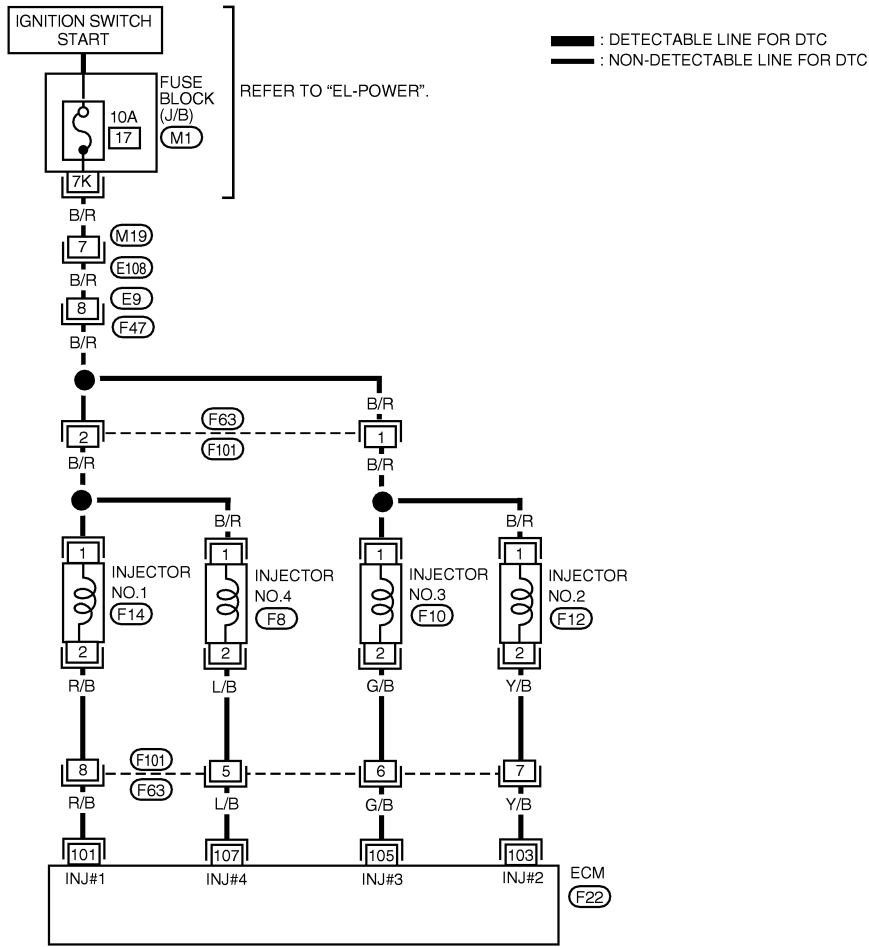
MONITOR ITEM	CONDITION		SPECIFICATION
INJ PULSE-B1	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	2.4 - 3.2 msec
		2,000 rpm	1.9 - 2.8 msec
B/FUEL SCHDL	<ul style="list-style-type: none"> ● Engine: After warming up ● Air conditioner switch: OFF ● Shift lever: "N" ● No-load 	Idle	1.0 - 1.6 msec
		2,000 rpm	0.7 - 1.3 msec

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Wiring Diagram

NIEC1141

EC-INJECT-01



LEC215



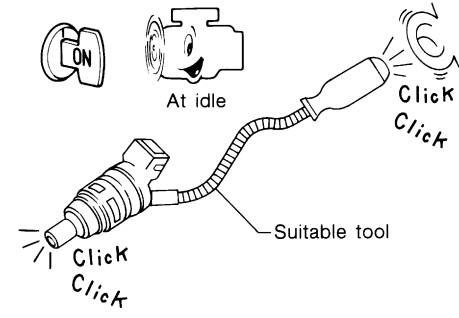
ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

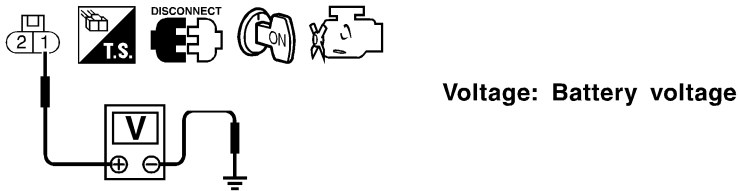
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
101 103 105 107	R/B Y/B G/B L/B	INJECTOR NO. 1 INJECTOR NO. 2 INJECTOR NO. 3 INJECTOR NO. 4	ENGINE RUNNING AT IDLE SPEED UNDER WARM-UP CONDITION	BATTERY VOLTAGE (V) 40 20 0 20 ms
			ENGINE RUNNING AT 2,000 RPM UNDER WARM-UP CONDITION	BATTERY VOLTAGE (V) 40 20 0 20 ms

SEF588Y

Diagnostic Procedure

NIEC1142

1	CHECK OVERALL FUNCTION																			
		<p> With CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT-II. 	<div style="text-align: center;"> <table border="1" style="margin: auto; border-collapse: collapse;"> <tr><th colspan="2">ACTIVE TEST</th></tr> <tr><td>POWER BALANCE</td><td></td></tr> <tr><th colspan="2">MONITOR</th></tr> <tr><td>ENG SPEED</td><td>XXX rpm</td></tr> <tr><td>MAS A/F SE-B1</td><td>XXX V</td></tr> <tr><td>IACV-AAC/V</td><td>XXX step</td></tr> <tr><td> </td><td> </td></tr> <tr><td> </td><td> </td></tr> </table> </div>	ACTIVE TEST		POWER BALANCE		MONITOR		ENG SPEED	XXX rpm	MAS A/F SE-B1	XXX V	IACV-AAC/V	XXX step					<p style="text-align: right;">GI</p> <p style="text-align: right;">MA</p> <p style="text-align: right;">EM</p> <p style="text-align: right;">LC</p> <div style="background-color: black; color: white; text-align: center; padding: 5px;">EC</div> <p style="text-align: right;">FE</p>
ACTIVE TEST																				
POWER BALANCE																				
MONITOR																				
ENG SPEED	XXX rpm																			
MAS A/F SE-B1	XXX V																			
IACV-AAC/V	XXX step																			
		<ol style="list-style-type: none"> 3. Make sure that each circuit produces a momentary engine speed drop. 	<p style="text-align: right;">SEF190Y</p>																	
		<p> Without CONSULT-II</p> <ol style="list-style-type: none"> 1. Start engine. 2. Listen to each injector operating sound. 	<p style="text-align: right;">CL</p> <p style="text-align: right;">MT</p> <p style="text-align: right;">AT</p> <p style="text-align: right;">AX</p> <p style="text-align: right;">SU</p>																	
			<p style="text-align: right;">BR</p>																	
		<p>Clicking noise should be heard.</p> <p style="text-align: center;">OK or NG</p>	<p style="text-align: right;">MEC703B</p>																	
OK	▶	INSPECTION END	ST																	
NG	▶	GO TO 2.	RS <p style="text-align: right;">BT</p> <p style="text-align: right;">HA</p> <p style="text-align: right;">SC</p> <p style="text-align: right;">EL</p> <p style="text-align: right;">IDX</p>																	

2	CHECK POWER SUPPLY	
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect injector harness connector. 3. Turn ignition switch "ON". 4. Check voltage between injector harness connector terminal 1 and ground with CONSULT-II or tester. 		
		
SEF949X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

3	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● 10A fuse ● Harness connectors M19, E108 ● Harness connectors E9, F47 ● Harness connectors F63, F101 ● Harness for open or short between injector and fuse 		
▶		Repair harness or connectors.

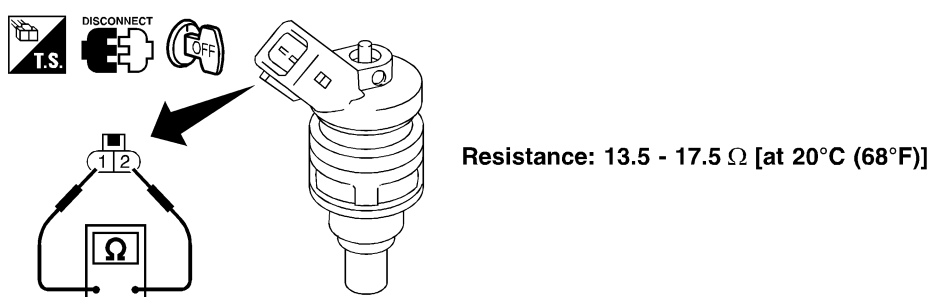
4	CHECK OUTPUT SIGNAL CIRCUIT	
<ol style="list-style-type: none"> 1. Turn ignition switch "OFF". 2. Disconnect ECM harness connector. 3. Check harness continuity between injector harness connector terminal 2 and ECM terminals 101, 103, 105, 107. Refer to "Wiring Diagram", EC-1906. Continuity should exist. 4. Also check harness for short to ground and short to power. 		
OK or NG		
OK	▶	GO TO 6.
NG	▶	GO TO 5.

5	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none"> ● Harness connectors F101, F63 ● Harness for open or short between ECM and injector 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

INJECTOR

SR20DE

Diagnostic Procedure (Cont'd)

6	CHECK INJECTOR	<p>1. Disconnect injector harness connector. 2. Check resistance between terminals as shown in the figure.</p> <div style="text-align: center;">  <p>Resistance: 13.5 - 17.5 Ω [at 20°C (68°F)]</p> <p>OK or NG</p> </div> <p style="text-align: right;">SEF964XA</p>	
OK	▶	GO TO 7.	
NG	▶	Replace injector.	

7	CHECK INTERMITTENT INCIDENT	Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶	INSPECTION END	

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START SIGNAL

SR20DE

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC1143

Specification data are reference values.

MONITOR ITEM	CONDITION	SPECIFICATION
START SIGNAL	● Ignition switch: ON → START → ON	OFF → ON → OFF

START SIGNAL

SR20DE

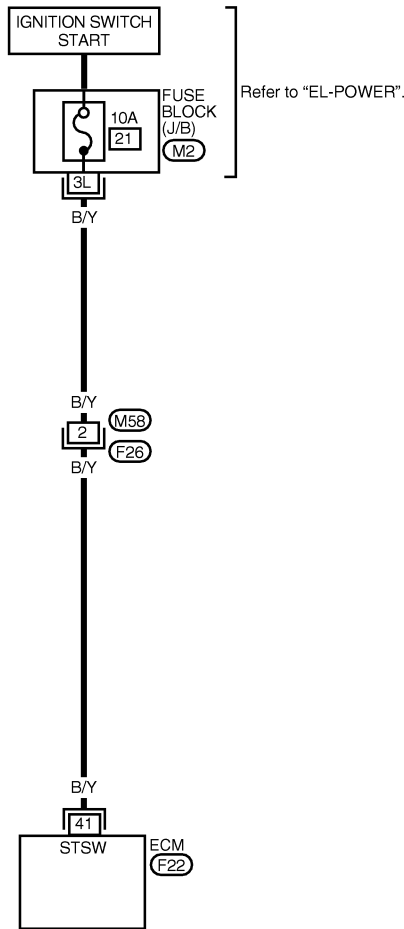
Wiring Diagram

Wiring Diagram

=NIEC1144

EC-S/SIG-01

: Detectable line for DTC
 : Non-detectable line for DTC



1L	2L	3L	4L	5L	M2		
6L	7L	8L	9L	10L	11L	12L	W

101	102	1	2	3	4	5	6	7	8	9	10	39	40	41	42	43	44	45	46	47	48	58	59	60	61	62	63	64	65	66	67	109	110
103	104	11	12	13	14	15	16	17	18	19	49	50	51	52	53	54	55	56	57	68	69	70	71	72	73	74	75	76	111	112			
105	106	20	21	22	23	24	25	26	27	28	29	77	78	79	80	81	82	83	84	85	86	113	114										
107	108	30	31	32	33	34	35	36	37	38	87	88	89	90	91	92	93	94	95	115	116												

1	2	3	4	5	6	7	F26		
8	9	10	11	12	13	14	15	16	W



LEC212

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
41	B/Y	START SIGNAL	IGN ON	APPROX. 0V
			IGN START	9 - 14V

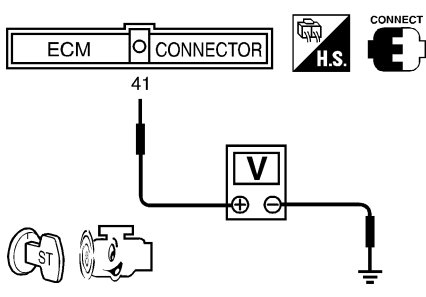
SEF589Y

Diagnostic Procedure

=NIEC1145

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION							
Ⓜ With CONSULT-II 1. Turn ignition switch "ON". 2. Check "START SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>START SIGNAL</td> <td>OFF</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	START SIGNAL	OFF
DATA MONITOR								
MONITOR	NO DTC							
START SIGNAL	OFF							
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>"START SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "ON"</td> <td>OFF</td> </tr> <tr> <td>Ignition switch "START"</td> <td>ON</td> </tr> </tbody> </table>			Condition	"START SIGNAL"	Ignition switch "ON"	OFF	Ignition switch "START"	ON
Condition	"START SIGNAL"							
Ignition switch "ON"	OFF							
Ignition switch "START"	ON							
SEF227Y								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

3	CHECK OVERALL FUNCTION							
⊗ Without CONSULT-II 1. Turn ignition switch to "START". 2. Check voltage between ECM terminal 41 and ground under the following conditions.								
								
SEF142X								
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Ignition switch "START"</td> <td>Battery voltage</td> </tr> <tr> <td>Except above</td> <td>Approximately 0V</td> </tr> </tbody> </table>			Condition	Voltage	Ignition switch "START"	Battery voltage	Except above	Approximately 0V
Condition	Voltage							
Ignition switch "START"	Battery voltage							
Except above	Approximately 0V							
MTBL0143								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

START SIGNAL

SR20DE*Diagnostic Procedure (Cont'd)*

4	DETECT MALFUNCTIONING PART	
Check the following. <ul style="list-style-type: none">● Harness connectors M58, F26● 10A fuse● Harness for open or short between ECM and fuse		
OK or NG		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.
5	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
	▶	INSPECTION END

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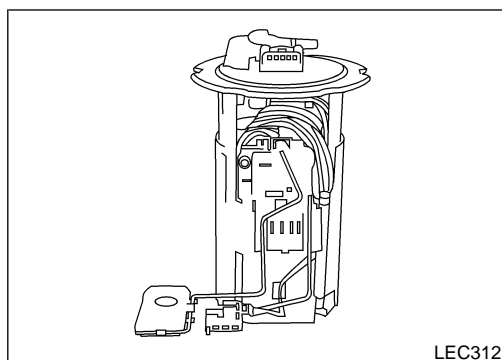
System Description

NIEC1146

Sensor	Input Signal to ECM	ECM function	Actuator
Camshaft position sensor	Engine speed	ECM	Fuel pump relay
Ignition switch	Start signal		

The ECM activates the fuel pump for several seconds after the ignition switch is turned on to improve engine startability. If the ECM receives a 180° signal from the camshaft position sensor, it knows that the engine is rotating, and causes the pump to perform. If the 180° signal is not received when the ignition switch is on, the engine stalls. The ECM stops pump operation and prevents battery discharging, thereby improving safety. The ECM does not directly drive the fuel pump. It controls the ON/OFF fuel pump relay, which in turn controls the fuel pump.

Condition	Fuel pump operation
Ignition switch is turned to ON.	Operates for 5 seconds
Engine running and cranking	Operates
When engine is stopped	Stops in 1 second
Except as shown above	Stops



Component Description

A turbine type design fuel pump is used in the fuel tank.

NIEC1147

CONSULT-II Reference Value in Data Monitor Mode

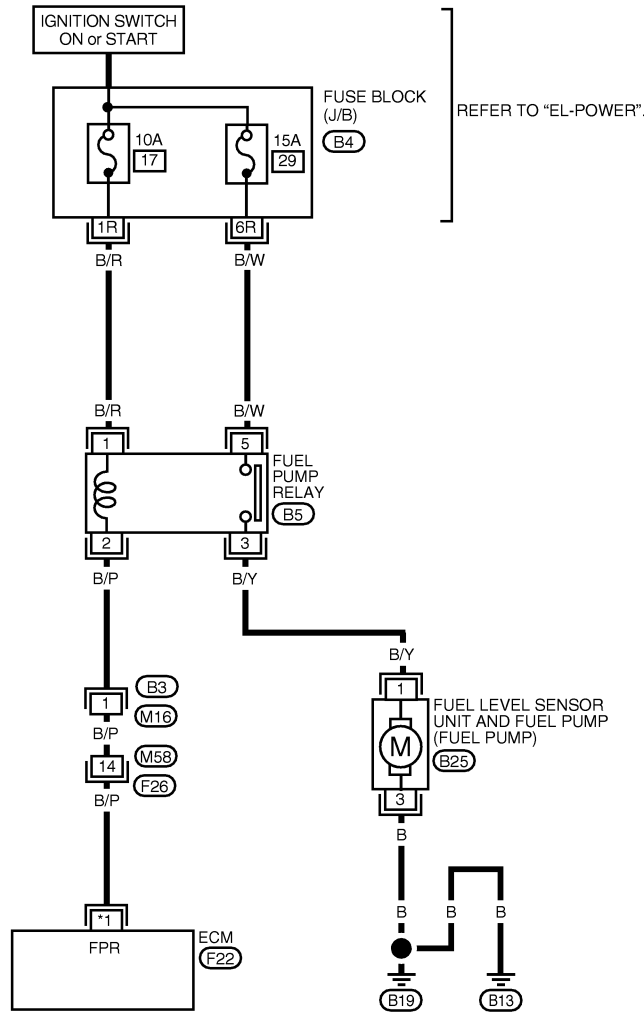
NIEC1148

MONITOR ITEM	CONDITION	SPECIFICATION
FUEL PUMP RLY	<ul style="list-style-type: none"> Ignition switch is turned to ON (Operates for 5 seconds) Engine running and cranking When engine is stopped (stops in 1.0 seconds) 	ON
	<ul style="list-style-type: none"> Except as shown above 	OFF

Wiring Diagram

NIEC1149

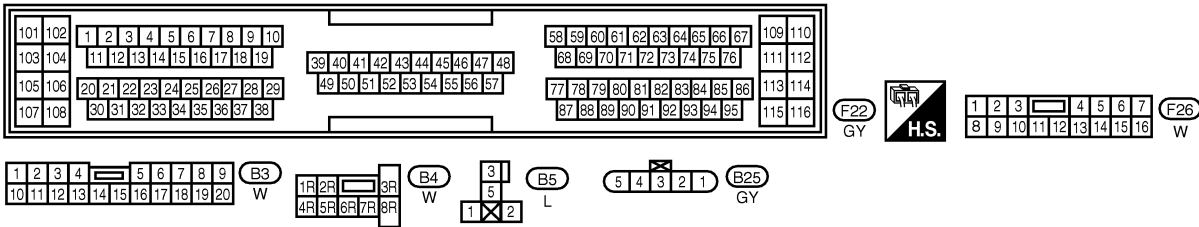
EC-F/PUMP-01



: DETECTABLE LINE FOR DTC
 : NON-DETECTABLE LINE FOR DTC
WN : WITH NVIS (NATS)
ON : WITHOUT NVIS (NATS)

*1 WN : 21
ON : 20

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LEC213

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

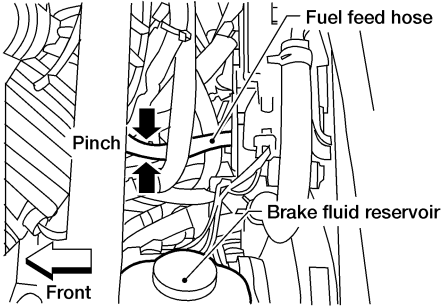
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

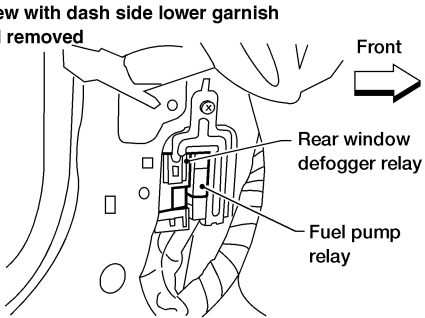
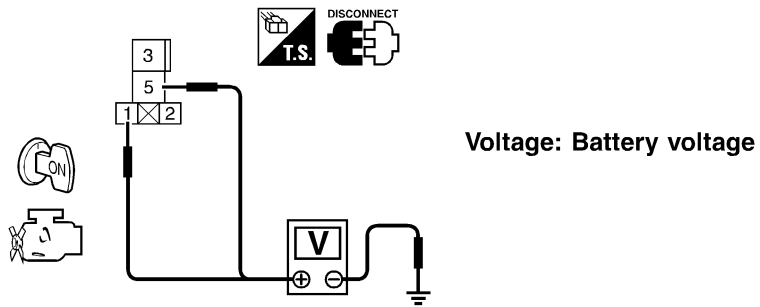
TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
20 (Without NVIS)	B/P	FUEL PUMP RELAY	FOR 5 SECONDS AFTER IGN ON	0 - 1V
21 (With NVIS)	B/P		ENGINE RUNNING	BATTERY VOLTAGE
			MORE THAN 5 SECONDS AFTER IGN ON	

SEF590Y

Diagnostic Procedure

NIEC1150

1	CHECK OVERALL FUNCTION	
<p>1. Turn ignition switch "ON". 2. Pinch fuel feed hose with fingers.</p>		
		
LEC305		
<p>Fuel pressure pulsation should be felt on the fuel feed hose for 5 seconds after ignition switch is turned "ON".</p> <p>OK or NG</p>		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

2	CHECK POWER SUPPLY	
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel pump relay.</p>		
<p>View with dash side lower garnish LH removed</p> 		
LEC363		
<p>3. Turn ignition switch "ON". 4. Check voltage between fuel pump relay terminals 1, 5 and ground with CONSULT-II or tester.</p>		
 <p style="text-align: right;">Voltage: Battery voltage</p>		
SEF607X		
<p>OK or NG</p>		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

FUEL PUMP

SR20DE

Diagnostic Procedure (Cont'd)

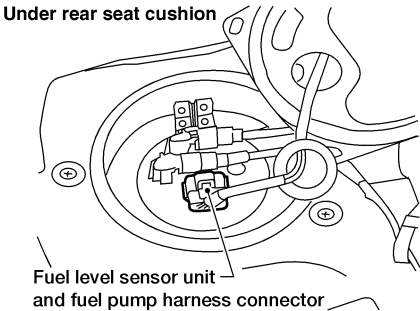
3	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● 10A fuse ● 15A fuse ● Harness for open or short between fuse and fuel pump relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

GI

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4	CHECK POWER AND GROUND CIRCUIT
<p>1. Turn ignition switch "OFF". 2. Disconnect fuel level sensor unit and fuel pump harness connector.</p>	
<p>Under rear seat cushion</p> 	
LEC304	
<p>3. Check harness continuity between fuel level sensor unit and fuel pump terminal 3 and body ground, fuel level sensor unit and fuel pump terminal 1 and fuel pump relay terminal 3. Refer to "Wiring Diagram", EC-1915. Continuity should exist.</p> <p>4. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

EC

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5	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness for open or short between fuel pump and body ground ● Harness for open or short between fuel pump and fuel pump relay 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

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6	CHECK OUTPUT SIGNAL CIRCUIT
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 21 (with NVIS) or 20 (without NVIS) and fuel pump relay terminal 2. Refer to "Wiring Diagram", EC-1915. Continuity should exist.</p> <p>3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

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FUEL PUMP

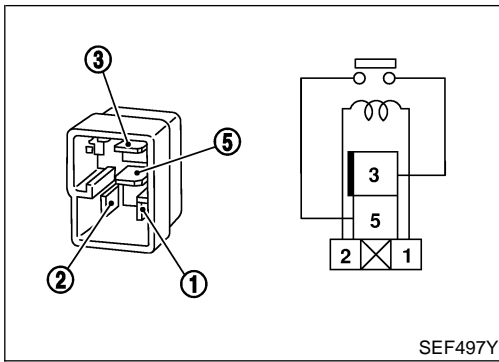
SR20DE*Diagnostic Procedure (Cont'd)*

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors B3, M16● Harness connectors M58, F26● Harness for open or short between ECM and fuel pump relay	
NG	▶ Repair open circuit or short to ground or short to power in harness or connectors.
8	CHECK FUEL PUMP RELAY
Refer to "Component Inspection", EC-1919.	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace fuel pump relay.
9	CHECK FUEL PUMP
Refer to "Component Inspection", EC-1919.	
OK or NG	
OK	▶ GO TO 10.
NG	▶ Replace fuel pump.
10	CHECK INTERMITTENT INCIDENT
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
	▶ INSPECTION END

FUEL PUMP

SR20DE

Component Inspection



Component Inspection

=NIEC1151

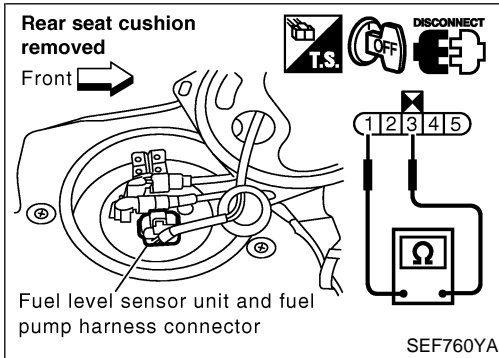
FUEL PUMP RELAY

NIEC1151S01

Check continuity between terminals 3 and 5.

Conditions	Continuity
12V direct current supply between terminals 1 and 2	Yes
No current supply	No

If NG, replace relay.



FUEL PUMP

NIEC1151S02

1. Disconnect fuel level sensor unit and fuel pump harness connector.
2. Check resistance between terminals 1 and 3.
Resistance: 0.2 - 5.0Ω [at 25°C (77°F)]
If NG, replace fuel pump.

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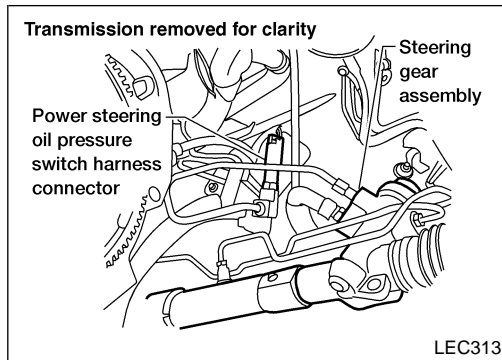
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POWER STEERING OIL PRESSURE SWITCH

SR20DE

Component Description



Component Description

NIEC1152

The power steering oil pressure switch is attached to the power steering high-pressure tube and detects a power steering load. When a power steering load is detected, it signals the ECM. The ECM adjusts the IACV-AAC valve to increase the idle speed and adjust for the increased load.

CONSULT-II Reference Value in Data Monitor Mode

NIEC1153

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
PW/ST SIGNAL	● Engine: After warming up, idle the engine	Steering wheel in neutral position (forward direction)	OFF
		The steering wheel is fully turned	ON

POWER STEERING OIL PRESSURE SWITCH

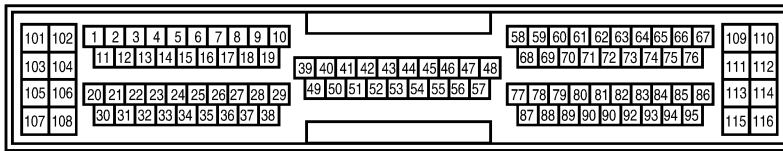
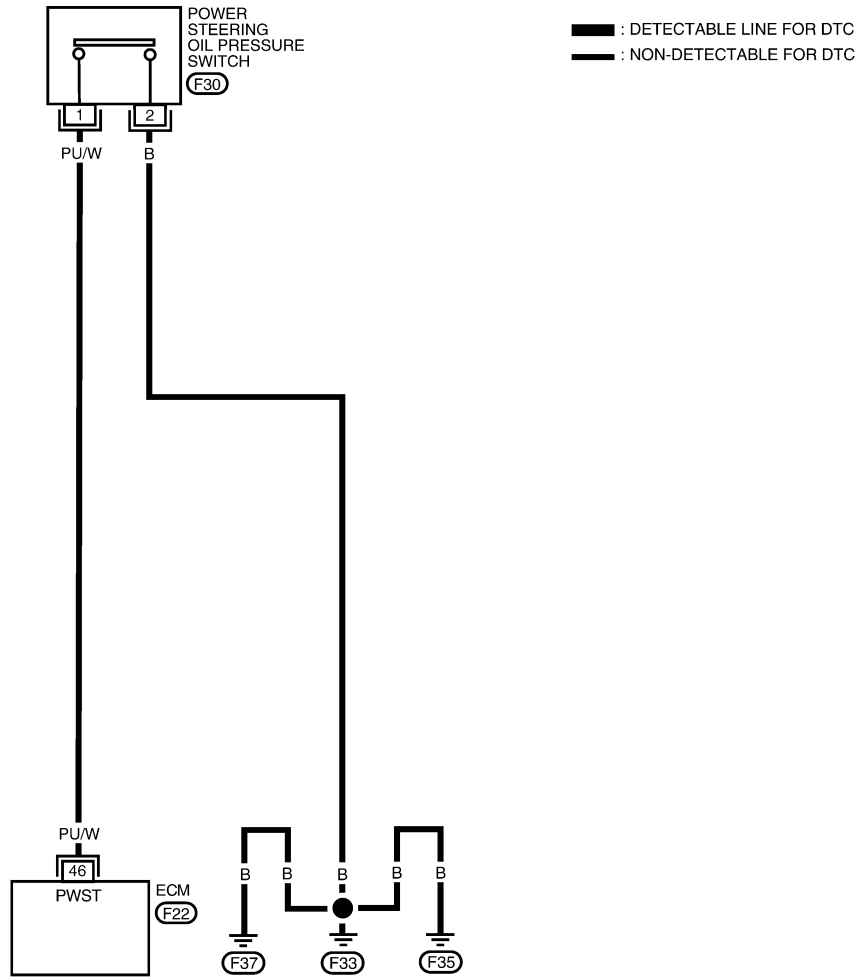
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1154

EC-PST/SW-01



WEC729

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
46	PU/W	POWER STEERING OIL PRESSURE SWITCH	ENGINE RUNNING WITH STEERING WHEEL BEING FULLY TURNED	APPROX. 0V
			ENGINE RUNNING WITH STEERING WHEEL NOT BEING TURNED	APPROX. 5V

SEF591Y

Diagnostic Procedure

=NIEC1155

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 3.

2	CHECK OVERALL FUNCTION							
Ⓜ With CONSULT-II 1. Start engine. 2. Check "PW/ST SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.								
<table border="1" style="margin: auto;"> <tr><th colspan="2">DATA MONITOR</th></tr> <tr><th>MONITOR</th><th>NO DTC</th></tr> <tr><td>PW/ST SIGNAL</td><td>OFF</td></tr> </table>			DATA MONITOR		MONITOR	NO DTC	PW/ST SIGNAL	OFF
DATA MONITOR								
MONITOR	NO DTC							
PW/ST SIGNAL	OFF							
<table border="1" style="margin: auto;"> <tr><td>Steering is in neutral position</td><td>OFF</td></tr> <tr><td>Steering is turned</td><td>ON</td></tr> </table>			Steering is in neutral position	OFF	Steering is turned	ON		
Steering is in neutral position	OFF							
Steering is turned	ON							
SEF228Y								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

3	CHECK OVERALL FUNCTION							
⊗ Without CONSULT-II 1. Start engine. 2. Check voltage between ECM terminal 46 and ground under the following conditions.								
SEF148X								
<table border="1" style="margin: auto;"> <thead> <tr><th>Condition</th><th>Voltage</th></tr> </thead> <tbody> <tr><td>When steering wheel is turned quickly</td><td>Approximately 0V</td></tr> <tr><td>Except above</td><td>Approximately 5V</td></tr> </tbody> </table>			Condition	Voltage	When steering wheel is turned quickly	Approximately 0V	Except above	Approximately 5V
Condition	Voltage							
When steering wheel is turned quickly	Approximately 0V							
Except above	Approximately 5V							
MTBL0142								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 4.						

POWER STEERING OIL PRESSURE SWITCH

SR20DE

Diagnostic Procedure (Cont'd)

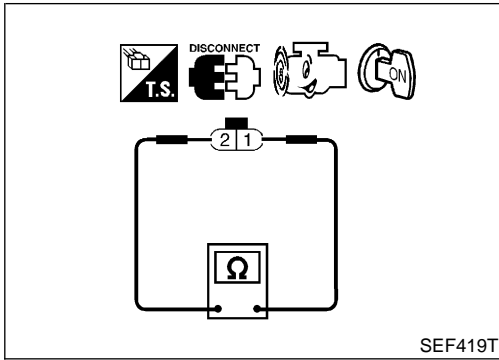
4	CHECK GROUND CIRCUIT	
<p>1. Turn ignition switch "OFF". 2. Disconnect power steering oil pressure switch harness connector. 3. Check harness continuity between power steering oil pressure switch terminal 2 and engine ground.</p> <div style="text-align: center;"> </div> <p style="text-align: right;">AEC760</p> <p>Continuity should exist.</p> <p>4. Also check harness for short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 5.
NG	▶	Repair open circuit or short to power in harness or connectors.

5	CHECK INPUT SIGNAL CIRCUIT	
<p>1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 46 and power steering oil pressure switch terminal 1. Refer to "Wiring Diagram", EC-1921. Continuity should exist. 3. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 6.
NG	▶	Repair open circuit or short to ground or short to power in harness or connectors.

6	CHECK POWER STEERING OIL PRESSURE SWITCH	
<p>Refer to "Component Inspection", EC-1924.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 7.
NG	▶	Replace power steering oil pressure switch.

7	CHECK INTERMITTENT INCIDENT	
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>		
▶		INSPECTION END

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Component Inspection

POWER STEERING OIL PRESSURE SWITCH

=NIEC1156

NIEC1156S01

1. Disconnect power steering oil pressure switch harness connector then start engine.
2. Check continuity between terminals 1 and 2.

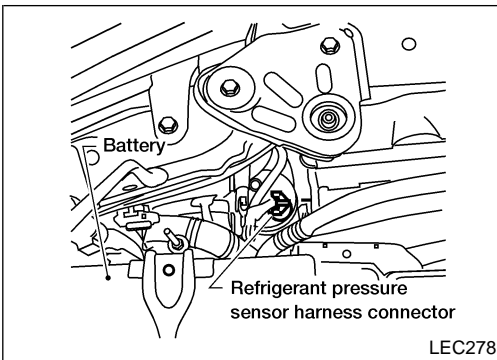
Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

If NG, replace power steering oil pressure switch.

REFRIGERANT PRESSURE SENSOR

SR20DE

Description



Description

The refrigerant pressure sensor is installed at the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. The voltage signal is sent to ECM, and ECM controls cooling fan system.

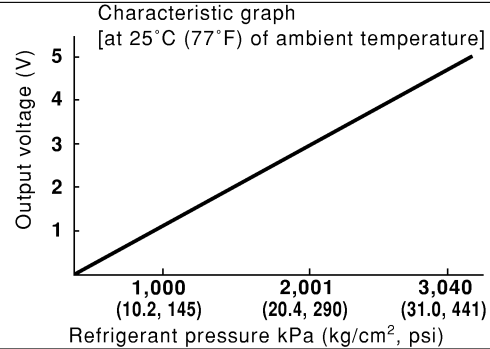
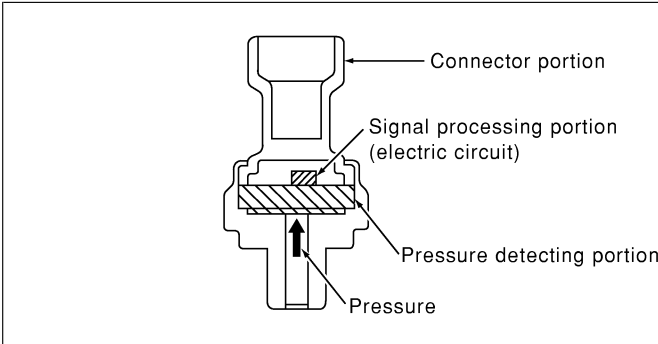
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REFRIGERANT PRESSURE SENSOR

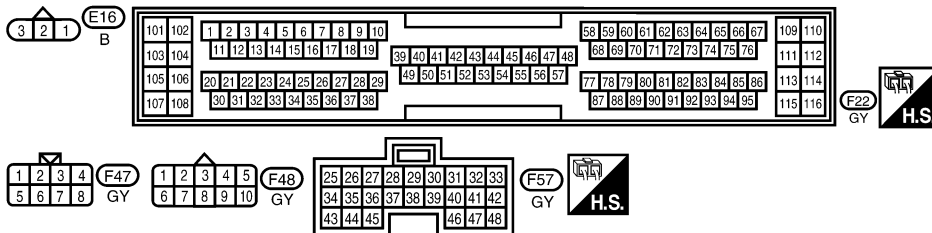
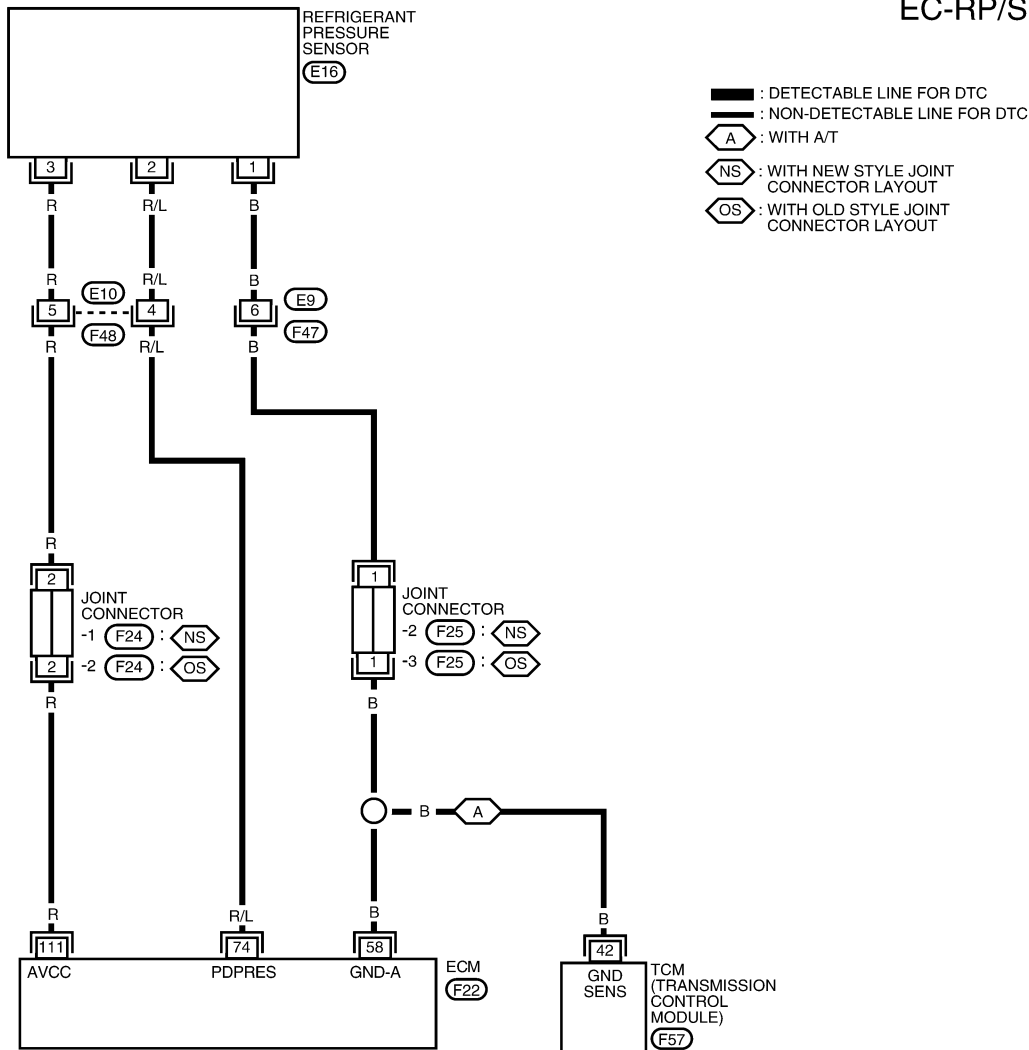
SR20DE

Wiring Diagram

Wiring Diagram

NIEC1158

EC-RP/SEN-01



REFER TO THE FOLLOWING.
 (F24), (F25) - JOINT CONNECTOR

WEC957

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.

CAUTION:

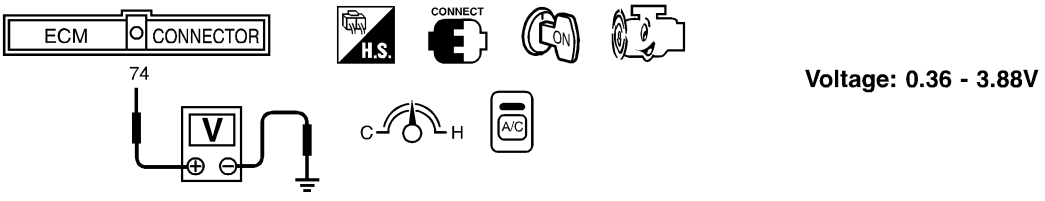
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
58	B	SENSOR'S GROUND	IGN ON	APPROX. 0V
74	R/L	REFRIGERANT PRESSURE SENSOR	ENGINE RUNNING UNDER WARM-UP CONDITION WITH A/C SWITCH AND BLOWER SWITCH ON	0.36 - 3.88V
111	R	SENSOR'S POWER SUPPLY	IGN ON	APPROX. 5V

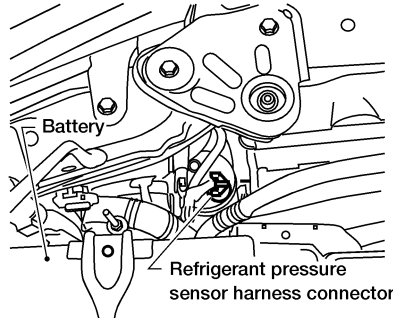
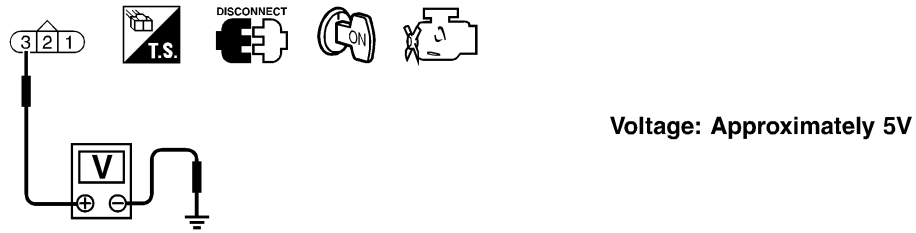
SEF592Y

Diagnostic Procedure

NIEC1159

1	CHECK REFRIGERANT PRESSURE SENSOR OVERALL FUNCTION	
<p>1. Start engine and warm it up to normal operating temperature. 2. Turn A/C switch and fan control switch "ON". 3. Check voltage between ECM terminal 74 and ground with CONSULT-II or tester.</p>		
		
SEF952X		
OK or NG		
OK	▶	INSPECTION END
NG	▶	GO TO 2.

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2	CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT	
<p>1. Turn A/C switch and fan control switch "OFF". 2. Stop engine. 3. Disconnect refrigerant pressure sensor harness connector.</p>		
		
LEC278		
<p>4. Turn ignition switch "ON". 5. Check voltage between refrigerant pressure sensor terminal 3 and ground with CONSULT-II or tester.</p>		
		
SEF953X		
OK or NG		
OK	▶	GO TO 4.
NG	▶	GO TO 3.

REFRIGERANT PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

3	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors E10, F48● Joint connector-2● Harness for open or short between ECM and refrigerant pressure sensor	
	▶ Repair harness or connectors.

4	CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT FOR OPEN AND SHORT
1. Turn ignition switch "OFF". 2. Check harness continuity between refrigerant pressure sensor terminal 1 and engine ground. Refer to "Wiring Diagram", EC-1926. Continuity should exist. 3. Also check harness for short to power.	
OK or NG	
OK	▶ GO TO 6.
NG	▶ GO TO 5.

5	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors E9, F47● Joint connector-3● Harness for open or short between ECM and refrigerant pressure sensor● Harness for open or short between TCM (Transmission Control Module) and refrigerant pressure sensor	
	▶ Repair open circuit or short to power in harness or connectors.

6	CHECK REFRIGERANT PRESSURE SENSOR INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT
1. Disconnect ECM harness connector. 2. Check harness continuity between ECM terminal 74 and refrigerant pressure sensor terminal 2. Refer to "Wiring Diagram", EC-1926. Continuity should exist. 3. Also check harness for short to ground and short to power.	
OK or NG	
OK	▶ GO TO 8.
NG	▶ GO TO 7.

7	DETECT MALFUNCTIONING PART
Check the following. <ul style="list-style-type: none">● Harness connectors E10, F48● Harness for open or short between ECM and refrigerant pressure sensor	
	▶ Repair open circuit or short to ground or short to power in harness or connectors.

8	CHECK REFRIGERANT PRESSURE SENSOR
Refer to HA-14 , "Refrigerant pressure sensor".	
OK or NG	
OK	▶ GO TO 9.
NG	▶ Replace refrigerant pressure sensor.

REFRIGERANT PRESSURE SENSOR

SR20DE

Diagnostic Procedure (Cont'd)

9	CHECK INTERMITTENT INCIDENT
Refer to "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.	
▶	INSPECTION END

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ELECTRICAL LOAD SIGNAL

SR20DE

CONSULT-II Reference Value in Data Monitor Mode

CONSULT-II Reference Value in Data Monitor Mode

NIEC1160

Specification data are reference values.

MONITOR ITEM	CONDITION		SPECIFICATION
LOAD SIGNAL	● Ignition switch: ON	Rear window defogger switch "ON" and/or lighting switch "2ND" position	ON
		Rear window defogger switch and lighting switch "OFF"	OFF
HEATER FAN SW	● Ignition switch: ON	Fan control switch: ON	ON
		Fan control switch: OFF	OFF

ELECTRICAL LOAD SIGNAL

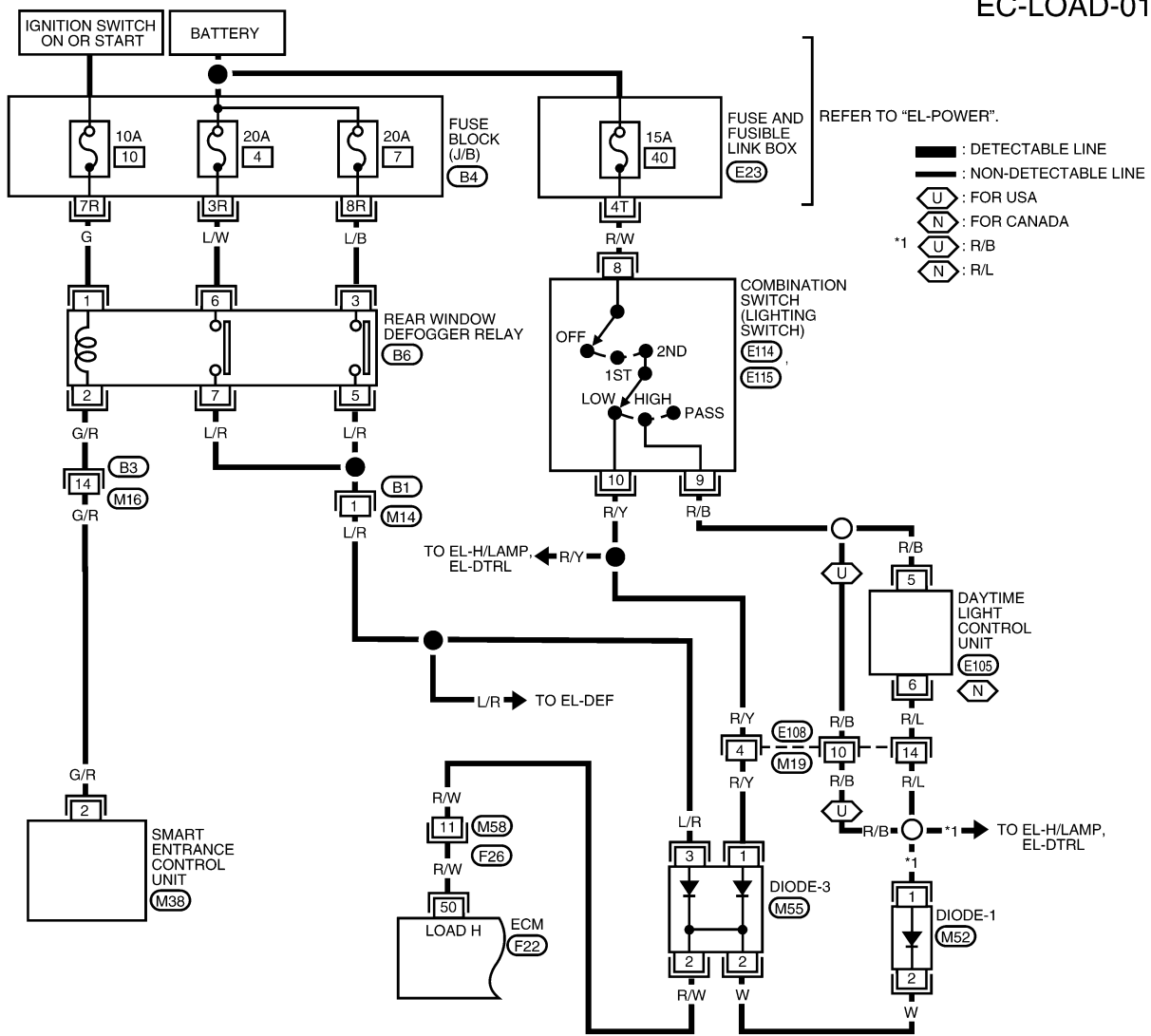
SR20DE

Wiring Diagram

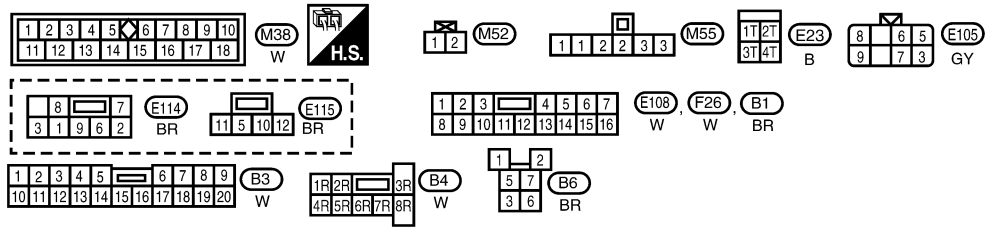
Wiring Diagram

NIEC1161

EC-LOAD-01



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REFER TO THE FOLLOWING.
(F22) - ELECTRICAL UNITS

WEC600

ECM TERMINALS AND REFERENCE VALUE MEASURED BETWEEN EACH TERMINAL AND GROUND.
CAUTION:
DO NOT USE ECM GROUND TERMINALS WHEN MEASURING INPUT/OUTPUT VOLTAGE. DOING SO MAY RESULT IN DAMAGE TO THE ECM'S TRANSISTOR. USE A GROUND OTHER THAN ECM TERMINALS, SUCH AS THE GROUND.

TERMINAL	WIRE COLOR	ITEM	CONDITION	DATA (DC)
50	R	ELECTRICAL LOAD SIGNAL	IGN ON WITH REAR WINDOW DEFOGGER SWITCH ON OR LIGHTING SWITCH 2ND POSITION	BATTERY VOLTAGE
			IGN ON WITH REAR WINDOW DEFOGGER SWITCH AND LIGHTING SWITCH OFF	0V

SEF593Y

Diagnostic Procedure

NIEC1162

1	INSPECTION START	
Do you have CONSULT-II?		
Yes or No		
Yes	▶	GO TO 2.
No	▶	GO TO 6.

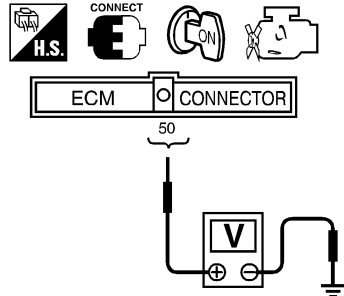
2	CHECK LOAD SIGNAL (REAR WINDOW DEFOGGER) CIRCUIT OVERALL FUNCTION							
<p>Ⓟ With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Rear window defogger switch "ON"	ON	Rear window defogger switch "OFF"	OFF		
Rear window defogger switch "ON"	ON							
Rear window defogger switch "OFF"	OFF							
<small>SEF229Y</small>								
OK or NG								
OK	▶	GO TO 3.						
NG	▶	GO TO 10.						

3	CHECK LOAD SIGNAL (HEADLAMP LOW BEAM) CIRCUIT OVERALL FUNCTION							
<p>Ⓟ With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: auto;"> <thead> <tr> <th>Condition</th> <th>"LOAD SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "2ND" and "LOW" position</td> <td style="text-align: center;">ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td style="text-align: center;">OFF</td> </tr> </tbody> </table>			Condition	"LOAD SIGNAL"	Lighting switch "2ND" and "LOW" position	ON	Lighting switch "OFF"	OFF
Condition	"LOAD SIGNAL"							
Lighting switch "2ND" and "LOW" position	ON							
Lighting switch "OFF"	OFF							
<small>SEF167Z</small>								
OK or NG								
OK	▶	GO TO 4.						
NG	▶	GO TO 14.						

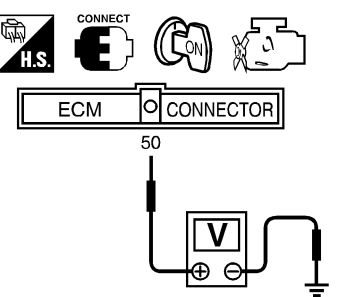
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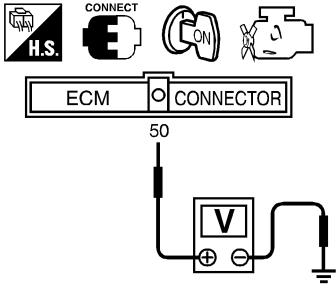
4	CHECK LOAD SIGNAL (HEADLAMP HIGH BEAM) CIRCUIT OVERALL FUNCTION							
<p>Ⓜ With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "LOAD SIGNAL" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
<table border="1" style="margin: 0 auto;"> <thead> <tr> <th colspan="2">DATA MONITOR</th> </tr> <tr> <th>MONITOR</th> <th>NO DTC</th> </tr> </thead> <tbody> <tr> <td>LOAD SIGNAL</td> <td>ON</td> </tr> </tbody> </table>			DATA MONITOR		MONITOR	NO DTC	LOAD SIGNAL	ON
DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: 0 auto;"> <thead> <tr> <th>Condition</th> <th>"LOAD SIGNAL"</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "2ND" and "HIGH" position</td> <td>ON</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>OFF</td> </tr> </tbody> </table>			Condition	"LOAD SIGNAL"	Lighting switch "2ND" and "HIGH" position	ON	Lighting switch "OFF"	OFF
Condition	"LOAD SIGNAL"							
Lighting switch "2ND" and "HIGH" position	ON							
Lighting switch "OFF"	OFF							
SEF168Z								
OK or NG								
OK	▶	GO TO 5.						
NG	▶	GO TO 18.						

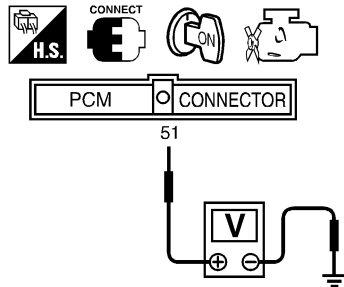
5	CHECK LOAD SIGNAL (FAN CONTROL) CIRCUIT OVERALL FUNCTION							
<p>Ⓜ With CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check "HEATER FAN SW" in "DATA MONITOR" mode with CONSULT-II under the following conditions.</p>								
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DATA MONITOR								
MONITOR	NO DTC							
LOAD SIGNAL	ON							
<table border="1" style="margin: 0 auto;"> <tbody> <tr> <td>Fan control switch "ON"</td> <td>ON</td> </tr> <tr> <td>Fan control switch "OFF"</td> <td>OFF</td> </tr> </tbody> </table>			Fan control switch "ON"	ON	Fan control switch "OFF"	OFF		
Fan control switch "ON"	ON							
Fan control switch "OFF"	OFF							
SEF165Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 25.						

6	CHECK LOAD SIGNAL (REAR WINDOW DEFOGGER) CIRCUIT OVERALL FUNCTION							
<p>⊗ Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Rear window defogger switch "ON"</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Rear window defogger switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Rear window defogger switch "ON"	BATTERY VOLTAGE	Rear window defogger switch "OFF"	0V
Condition	Voltage							
Rear window defogger switch "ON"	BATTERY VOLTAGE							
Rear window defogger switch "OFF"	0V							
SEF956X								
OK or NG								
OK	▶	GO TO 7.						
NG	▶	GO TO 10.						

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7	CHECK LOAD SIGNAL (HEADLAMP LOW BEAM) CIRCUIT OVERALL FUNCTION							
<p>⊗ Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
								
<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 60%;">Condition</th> <th>Voltage</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "2ND" and "LOW" position</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Lighting switch "2ND" and "LOW" position	BATTERY VOLTAGE	Lighting switch "OFF"	0V
Condition	Voltage							
Lighting switch "2ND" and "LOW" position	BATTERY VOLTAGE							
Lighting switch "OFF"	0V							
SEF183Z								
OK or NG								
OK	▶	GO TO 8.						
NG	▶	GO TO 14.						

8	CHECK LOAD SIGNAL (HEADLAMP HIGH BEAM) CIRCUIT OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 50 and ground under the following conditions.</p>								
								
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Lighting switch "2ND" and "HIGH" position</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Lighting switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Lighting switch "2ND" and "HIGH" position	BATTERY VOLTAGE	Lighting switch "OFF"	0V
Condition	Voltage							
Lighting switch "2ND" and "HIGH" position	BATTERY VOLTAGE							
Lighting switch "OFF"	0V							
SEF184Z								
OK or NG								
OK	▶	GO TO 9.						
NG	▶	GO TO 18.						

9	CHECK LOAD SIGNAL (FAN CONTROL) CIRCUIT OVERALL FUNCTION							
<p> Without CONSULT-II</p> <p>1. Turn ignition switch "ON".</p> <p>2. Check voltage between ECM terminal 51 and ground under the following conditions.</p>								
								
<table border="1" style="border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Voltage</th> </tr> </thead> <tbody> <tr> <td>Fan control switch "ON"</td> <td>BATTERY VOLTAGE</td> </tr> <tr> <td>Fan control switch "OFF"</td> <td>0V</td> </tr> </tbody> </table>			Condition	Voltage	Fan control switch "ON"	BATTERY VOLTAGE	Fan control switch "OFF"	0V
Condition	Voltage							
Fan control switch "ON"	BATTERY VOLTAGE							
Fan control switch "OFF"	0V							
SEF166Z								
OK or NG								
OK	▶	INSPECTION END						
NG	▶	GO TO 25.						

10	CHECK REAR WINDOW DEFOGGER FUNCTION	
<p>1. Start engine.</p> <p>2. Turn "ON" the rear window defogger switch.</p> <p>3. Check the rear windshield. Is the rear windshield heated up?</p>		
Yes or No		
Yes	▶	GO TO 11.
No	▶	Refer to EL-143 , "Rear Window Defogger".

11	CHECK REAR WINDOW DEFOGGER INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect rear window defogger relay. 4. Check harness continuity between ECM terminal 50 and rear window defogger relay terminals 5, 7.</p>								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 15%;">CONDITION</th> <th style="width: 85%;">CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table>	CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
<p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 13.						
NG	▶	GO TO 12.						

SEF560Y

12	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors B1, M14 ● Harness connectors M58, F26 ● Diode-3 ● Harness for open and short between ECM and rear window defogger relay 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

13	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
		▶ INSPECTION END

14	CHECK HEADLAMP (LOW BEAM) FUNCTION	
<p>1. Start engine. 2. Turn the lighting switch to "2ND" and "LOW" positions. 3. Check that headlamp low beams are illuminated.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 15.
NG	▶	Refer to EL-35 , "HEADLAMP (FOR USA)" or " EL-40 , "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

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15	CHECK HEADLAMP (LOW BEAM) INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT							
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connector. 4. Check harness continuity between ECM terminal 50 and lighting switch terminal 10 under the following conditions. 								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
		<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="width: 10%;">CONDITION</th> <th style="width: 90%;">CONTINUITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Should exist.</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Should not exist.</td> </tr> </tbody> </table>	CONDITION	CONTINUITY	1	Should exist.	2	Should not exist.
CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
SEF199Z								
<ol style="list-style-type: none"> 5. Also check harness for short to ground and short to power. 								
OK or NG								
OK	▶	GO TO 17.						
NG	▶	GO TO 16.						

16	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness connectors E108, M19 ● Diode-3 M55 ● Harness for open and short between ECM and lighting switch 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

17	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
		▶ INSPECTION END

18	CHECK HEADLAMP HIGH BEAM FUNCTION	
<ol style="list-style-type: none"> 1. Start engine. 2. Turn the lighting switch to the "2ND" and "HIGH" positions. 3. Check that headlamp high beams are illuminated. 		
OK or NG		
OK (for USA)	▶	GO TO 19.
OK (for Canada)	▶	GO TO 22.
NG	▶	Refer to EL-35 , "HEADLAMP (FOR USA)" or EL-40 , "HEADLAMP (FOR CANADA) — DAYTIME LIGHT SYSTEM".

19	CHECK HEAD LAMP HIGH BEAM INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT (FOR USA)						
<p>1. Stop engine. 2. Disconnect ECM harness connector. 3. Disconnect lighting switch harness connector. 4. Check harness continuity between ECM terminal 50 and lighting switch terminal 9 under the following conditions.</p>							
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>							
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CONDITION	CONTINUITY						
1	Should exist.						
2	Should not exist.						
<p>5. Also check harness connector for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>							
OK	▶ GO TO 21.						
NG	▶ GO TO 20.						

20	DETECT MALFUNCTIONING PART
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness connectors E108, M19 ● Diode-1 M52 ● Diode-3 M55 ● Harness for open and short between ECM and lighting switch 	
▶	Repair open circuit or short to ground or short to power in harness or connectors.

21	CHECK INTERMITTENT INCIDENT
<p>Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.</p>	
▶	INSPECTION END

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22	CHECK HEADLAMP HIGH BEAM INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT (FOR CANADA)							
<ol style="list-style-type: none"> 1. Stop engine. 2. Disconnect ECM harness connector 3. Disconnect daytime light control unit harness connector. 4. Check harness continuity between ECM terminal 50 and daytime light control unit terminal 6 under the following conditions. 								
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;"> <p>CONDITION 1</p> </div> <div style="text-align: center;"> <p>CONDITION 2</p> </div> </div>								
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CONDITION	CONTINUITY							
1	Should exist.							
2	Should not exist.							
<p>5. Also check harness connector for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>								
OK	▶	GO TO 24.						
NG	▶	GO TO 23.						

SEF202Z

23	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M58, F26 ● Harness connectors E108, M19 ● Diode-1 M52 ● Diode-3 M55 ● Harness for open and short between ECM and daytime light control unit 		
		▶ Repair open circuit or short to ground or short to power in harness or connectors.

24	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
		▶ INSPECTION END

25	CHECK FAN CONTROL SWITCH	
<ol style="list-style-type: none"> 1. Start engine. 2. Turn "ON" the fan control switch. 3. Check the blower fan motor. Does the blower fan motor activate? 		
Yes or No		
Yes	▶	GO TO 26.
No	▶	Refer to HA-36 , "Blower Motor".

ELECTRICAL LOAD SIGNAL

SR20DE

Diagnostic Procedure (Cont'd)

26	CHECK FAN CONTROL INPUT SIGNAL CIRCUIT FOR OPEN OR SHORT	
<p>1. Stop engine.</p> <p>2. Disconnect ECM harness connector.</p> <p>3. Disconnect fan control switch harness connector.</p> <p>4. Check harness continuity between ECM terminal 51 and fan control switch terminal 6. Refer to "Wiring Diagram", EC-1931</p> <p style="text-align: center; color: blue;">Continuity should exist.</p> <p>5. Also check harness for short to ground and short to power.</p> <p style="text-align: center;">OK or NG</p>		
OK	▶	GO TO 28.
NG	▶	GO TO 27.

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27	DETECT MALFUNCTIONING PART	
<p>Check the following.</p> <ul style="list-style-type: none"> ● Harness connectors M59, F27 ● Harness for open and short between ECM and fan control switch 		
▶		Repair open circuit or short to ground or short to power in harness or connectors.

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28	CHECK INTERMITTENT INCIDENT	
Perform "TROUBLE DIAGNOSIS FOR INTERMITTENT INCIDENT", EC-1499.		
▶		INSPECTION END

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IDX

Fuel Pressure Regulator

NIEC1164

Fuel pressure at idling kPa (kg/cm ² , psi)	Vacuum hose is connected	Approximately 235 (2.4, 34)
	Vacuum hose is disconnected	Approximately 294 (3.0, 43)

Idle Speed and Ignition Timing

NIEC1165

Target idle speed*1 rpm	No-load*3 (in "P" or "N" position)	800±50
Air conditioner: ON rpm	In "P" or "N" position	850 or more
Ignition timing*2	In "P" or "N" position	15°±2° BTDC
Throttle position sensor idle position V		0.15 - 0.85

*1: Throttle position sensor harness connector connected

*2: Throttle position sensor harness connector disconnected

*3: Under the following conditions:

- Air conditioner switch: OFF
- Electrical load: OFF (Lights & rear window defogger)
- Steering wheel: Kept in straight-ahead position

Ignition Coil

NIEC1166

Primary voltage V	Battery voltage (11 - 14)
Primary resistance [at 25°C (77°F)] Ω	Approximately 0.8
Secondary resistance [at 25°C (77°F)] kΩ	Approximately 16

Mass Air Flow Sensor

NIEC1167

Supply voltage V	Battery voltage (11 - 14)
Output voltage V	1.3 - 1.7*
Mass air flow (Using CONSULT-II or GST) g·m/sec	2.5 - 5.0 at idle* 7.1 - 12.5 at 2,500 rpm*

*: Engine is warmed up to normal operating temperature and idling under no-load.

Engine Coolant Temperature Sensor

NIEC1168

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

EGR Volume Control Valve

NIEC1194

Resistance [at 20°C (68°F)] Ω Between terminals 1-2, 2-3, 4-5 and 5-6	20.9 - 23.1
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EGR Temperature Sensor

NIEC1169

EGR temperature °C (°F)	Voltage V	Resistance MΩ
0 (32)	4.56	0.73 - 0.89
50 (122)	2.25	0.074 - 0.082
100 (212)	0.59	0.012 - 0.014

Fuel Pump

Fuel Pump

NIEC1170

Resistance [at 25°C (77°F)] Ω	0.2 - 5.0
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IACV-AAC Valve

NIEC1171

Resistance [at 20°C (68°F)] Ω	20 - 24
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Injector

NIEC1172

Resistance [at 20°C (68°F)] Ω	13.5 - 17.5
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Resistor

NIEC1173

Resistance [at 25°C (77°F)] kΩ	4 - 8
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Throttle Position Sensor

NIEC1174

Throttle valve conditions	Voltage (at normal operating temperature, engine off, ignition switch ON, throttle opener disengaged)
Completely closed (a)	0.15 - 0.85V
Partially open	Between (a) and (b)
Completely open (b)	3.5 - 4.7V

Heated Oxygen Sensor 1 Heater (Front)

NIEC1175

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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Calculated Load Value

NIEC1176

	Calculated load value % (Using CONSULT-II or GST)
At idle	20.0 - 35.5
At 2,500 rpm	17.0 - 30.0

Intake Air Temperature Sensor

NIEC1177

Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38

EVAP Canister Purge Volume Control Valve

NIEC1178

Resistance [at 20°C (68°F)] Ω	22 - 26
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Heated Oxygen Sensor 2 Heater (Rear)

NIEC1179

Resistance [at 25°C (77°F)] Ω	2.3 - 4.3
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Crankshaft Position Sensor (OBD)

NIEC1180

Resistance [at 20°C (68°F)] Ω	166 - 204
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SERVICE DATA AND SPECIFICATIONS (SDS)

SR20DE

Fuel Tank Temperature Sensor

Fuel Tank Temperature Sensor

=NIEC1181

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

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NOTES