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When you read wiring diagrams:

- Read GI section, "HOW TO READ WIRING DIAGRAMS".
- See EL section, "POWER SUPPLY ROUTING" for power distribution circuit.

When you perform trouble diagnoses, read GI section, "HOW TO FOLLOW FLOW CHART IN TROUBLE DIAGNOSES" and "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".

Supplemental Restraint System (SRS) “AIR BAG”

The Supplemental Restraint System “Air Bag”, used along with a seat belt, helps to reduce the risk or severity of injury to the driver and front passenger in a frontal collision. The Supplemental Restraint System consists of air bag modules (located in the center of the steering wheel and on the instrument panel on the passenger side), a diagnosis sensor unit, warning lamp, wiring harness and spiral cable. 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.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses are covered with yellow insulation either just before the harness connectors or for the complete harness, for easy identification.**

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

The ECM (ECCS control module) 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 the repair or inspection work. The open/short circuit of the related switches, sensors, solenoid valves, etc. will cause the MIL to light up.**
- **Be sure to connect and lock the connectors securely after the work. The loose (unlocked) connector will cause the MIL to light up due to the open circuit. (Be sure to connect the connector without water, grease, dirt, bent terminals, etc. in it.)**
- **Be sure to route and clamp 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 the work. The misconnected or disconnected rubber tube may cause the MIL to light up due to the malfunction of the EGR system or the fuel injection system, etc.**
- **Be sure to erase the unnecessary (already fixed) malfunction information in the ECM or A/T control unit before returning the vehicle to the customer.**

Engine Fuel & Emission Control System

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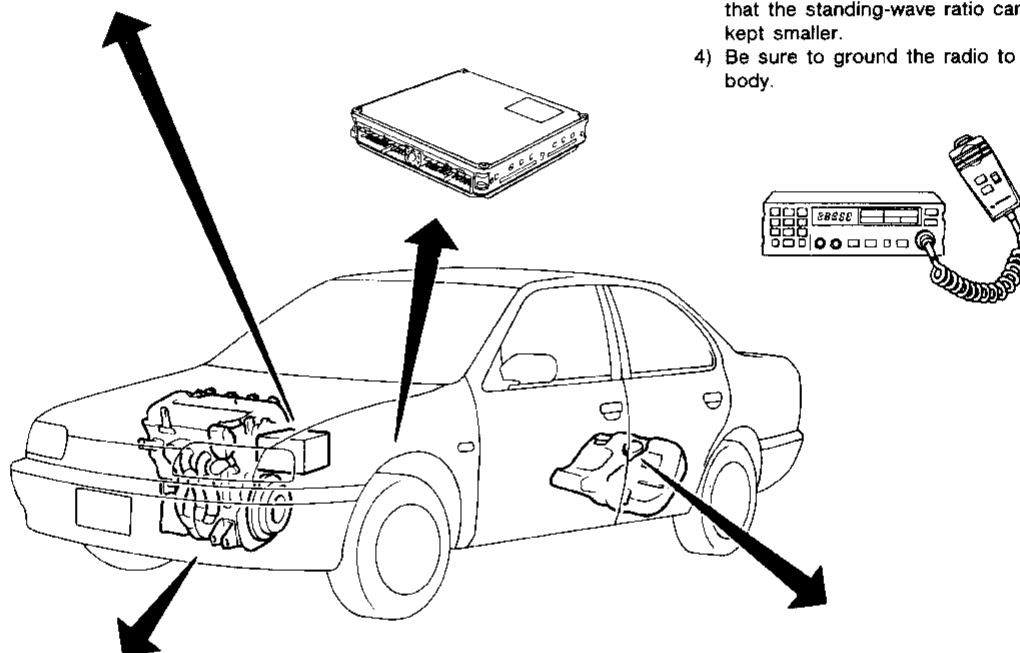
- Always use a 12 volt battery as power source.
- Do not attempt to disconnect battery cables while engine is running.

ECM

- Do not disassemble ECM (ECCS control module).
- Do not turn diagnosis mode selector forcibly.
- 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.

WIRELESS EQUIPMENT

- 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 its installation location.
 - 1) Keep the antenna as far away as possible from the ECM.
 - 2) Keep the antenna feeder line more than 20 cm (7.9 in) away from the harness of electronic controls. Do not let them run parallel for a long distance.
 - 3) Adjust the antenna and feeder line so that the standing-wave ratio can be kept smaller.
 - 4) Be sure to ground the radio to vehicle body.



ECCS PARTS HANDLING

- 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 IACV-AAC valve.
- Even a slight leak in the air intake system can cause serious problems.
- Do not shock or jar the camshaft position sensor or crankshaft position sensor.



WHEN STARTING

- 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.

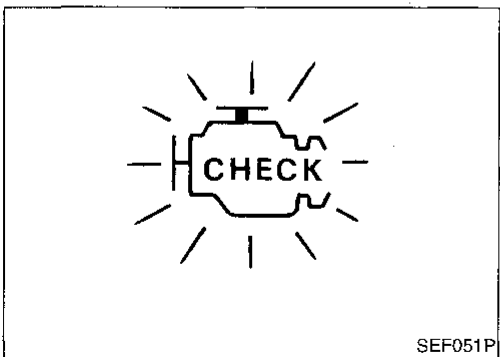
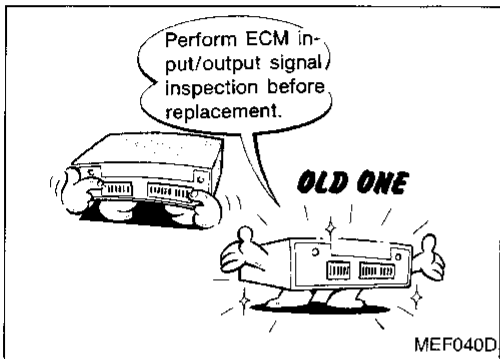
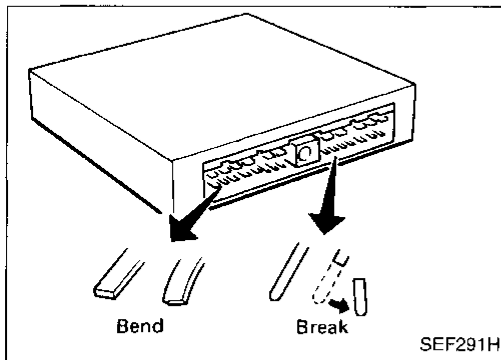
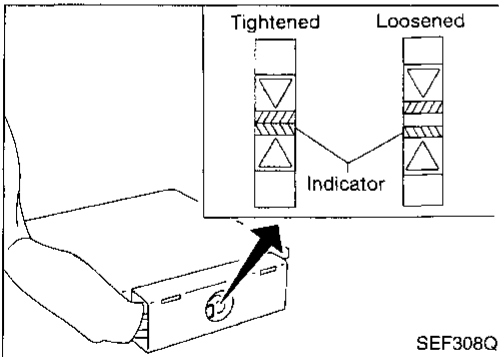
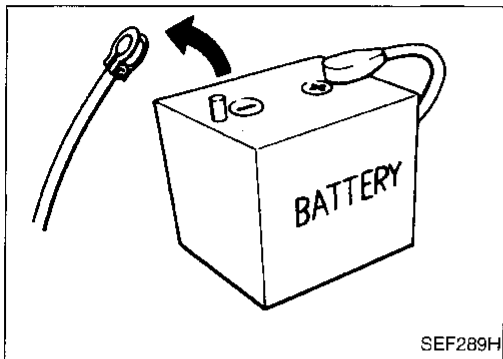
FUEL PUMP

- Do not operate fuel pump when there is no fuel in lines.
- Tighten fuel hose clamps to the specified torque.

ECCS HARNESS HANDLING

- Securely connect ECCS 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 ECCS harness at least 10 cm (3.9 in) away from adjacent harnesses, to prevent an ECCS system malfunction due to receiving external noise, degraded operation of ICs, etc.
- Keep ECCS parts and harnesses dry.
- Before removing parts, turn off ignition switch and then disconnect battery ground cable.

PRECAUTIONS AND PREPARATION



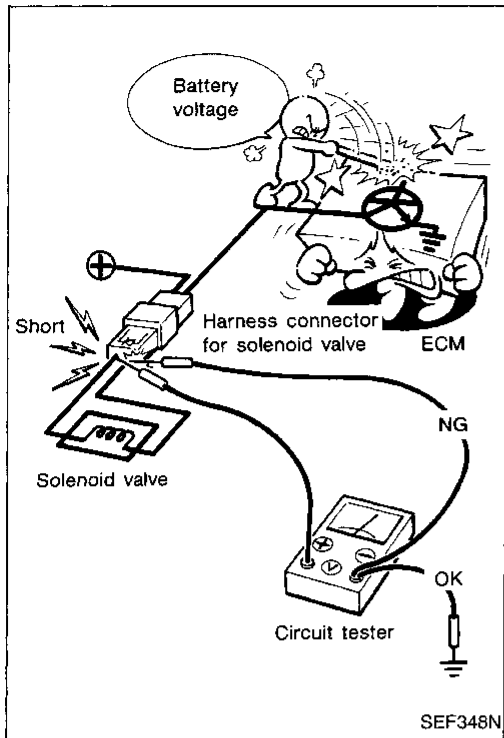
Precautions

- 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.
- When connecting ECM harness connector, tighten securing bolt until the gap between the orange indicators disappears.
- 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 terminal, when connecting pin connectors.
- Before replacing ECM, perform ECM input/output signal inspection and make sure whether ECM functions properly or not. (See page EC-96.)
- After performing each TROUBLE DIAGNOSIS, perform "OVERALL FUNCTION CHECK" or "DTC (Diagnostic Trouble Code) 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.

PRECAUTIONS AND PREPARATION

Precautions (Cont'd)

- When measuring ECM signals with a circuit tester, never bring the two tester probes into contact. Accidental contact of probes will cause a short circuit and damage the ECM power transistor.



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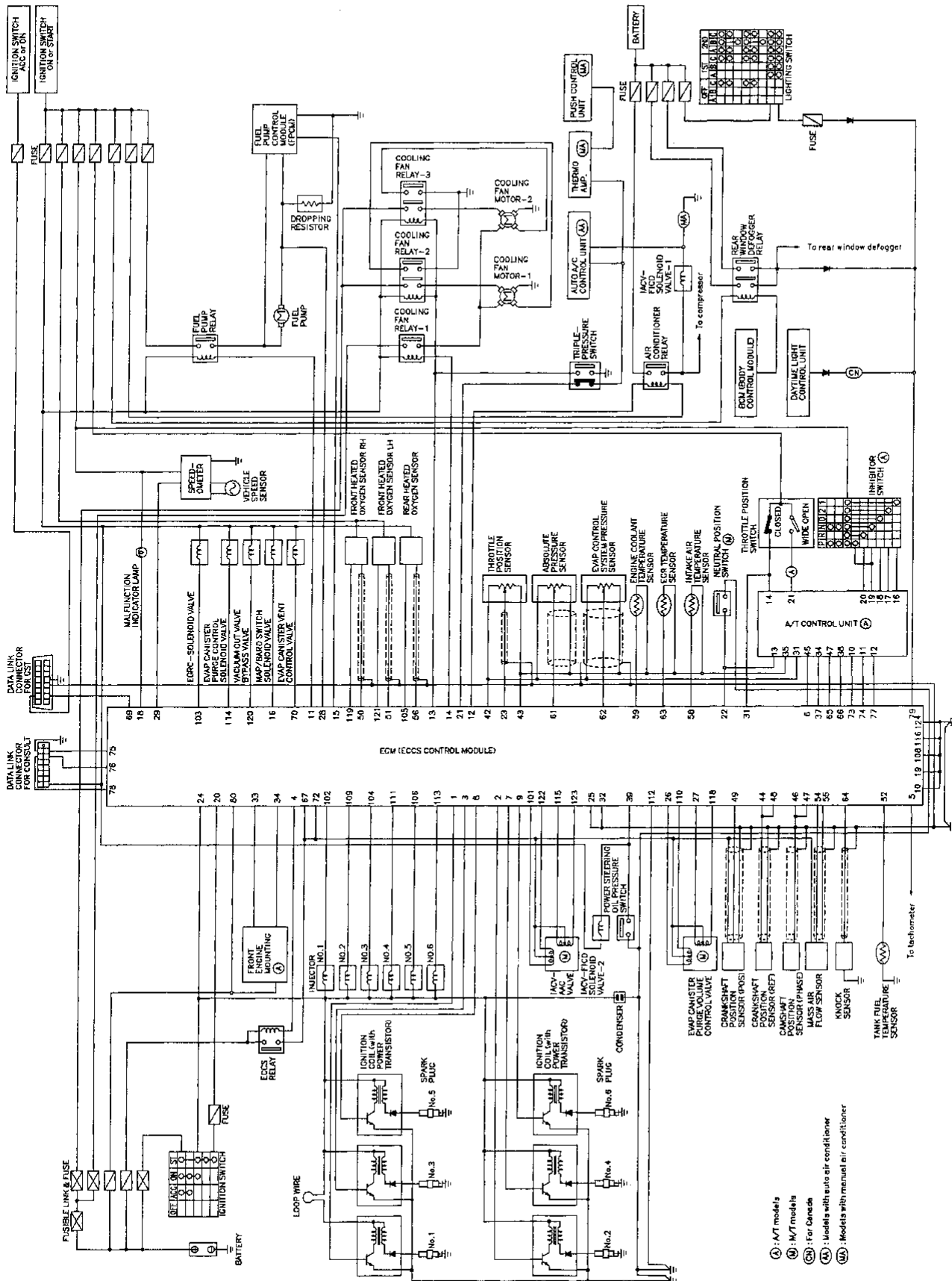
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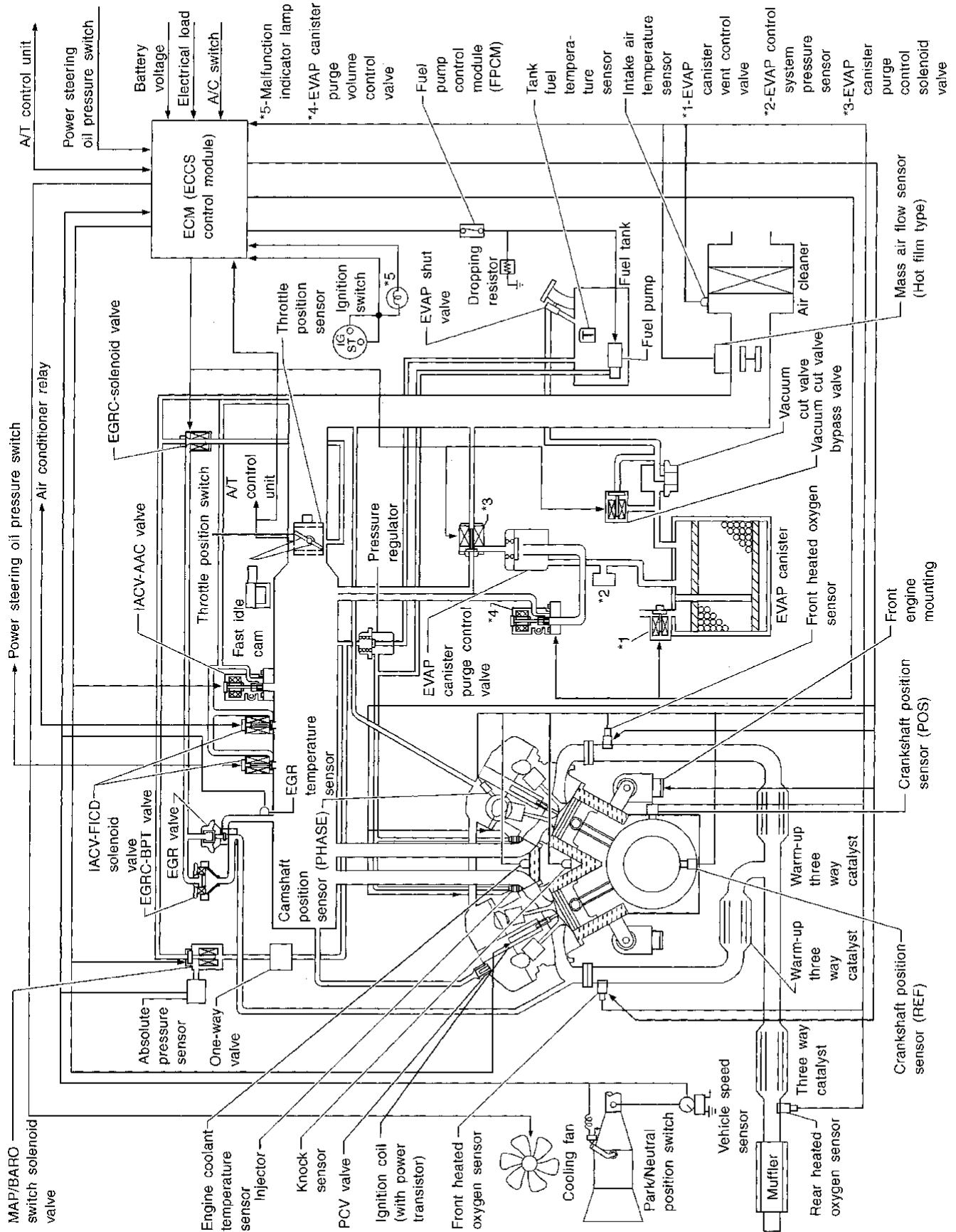
ENGINE AND EMISSION CONTROL OVERALL SYSTEM

Circuit Diagram



ENGINE AND EMISSION CONTROL OVERALL SYSTEM

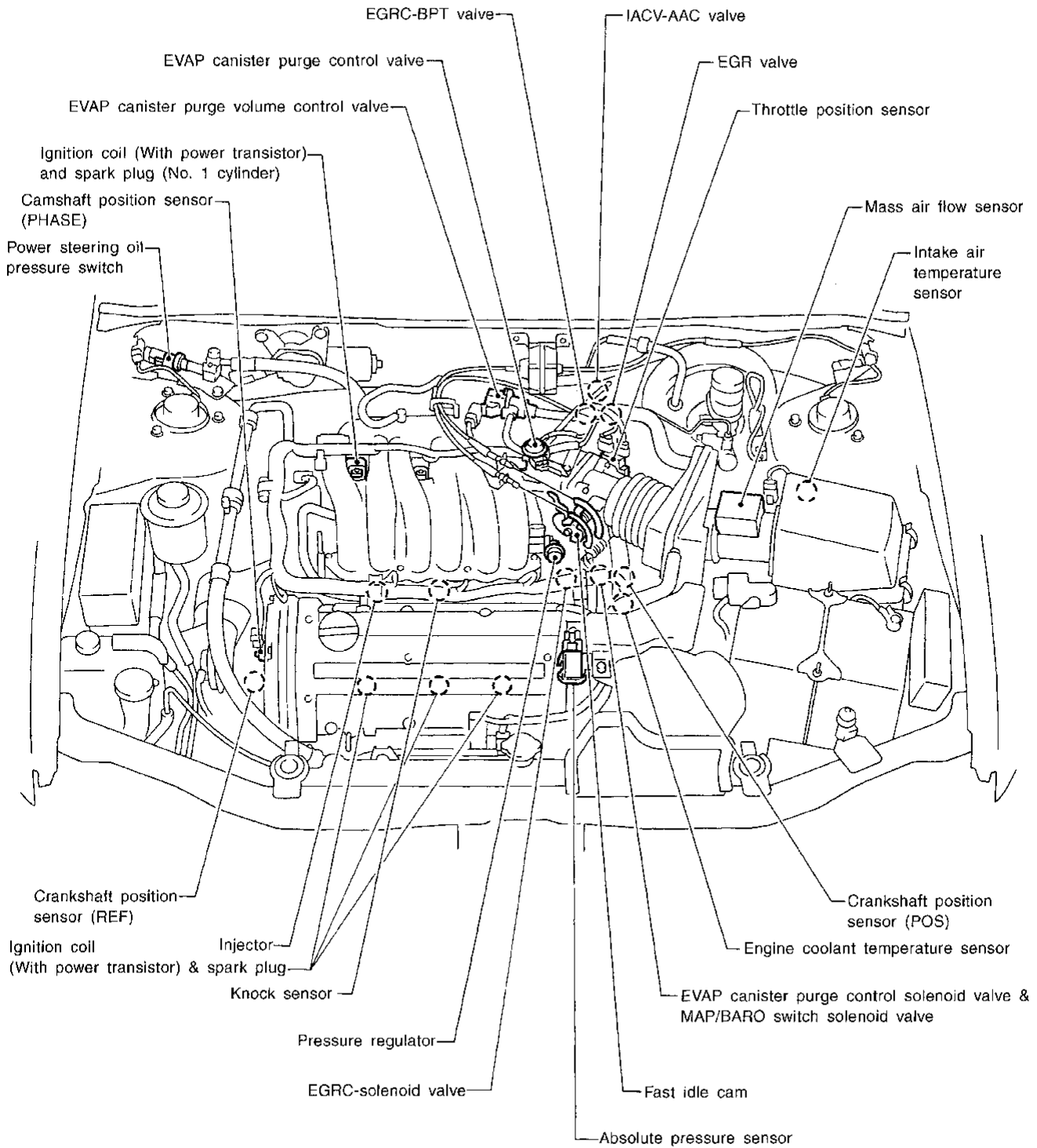
System Diagram



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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

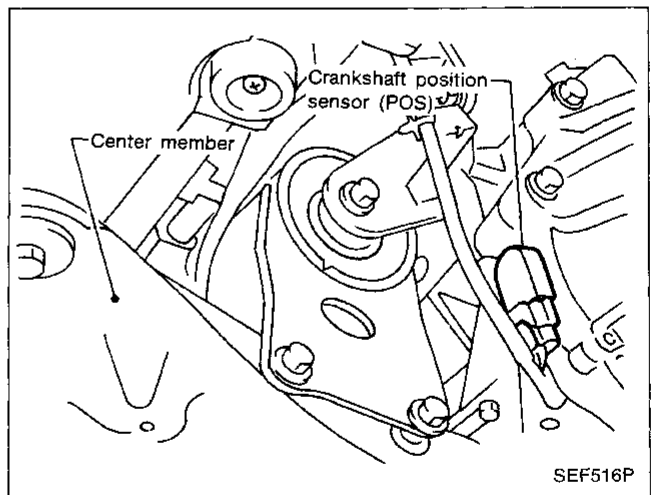
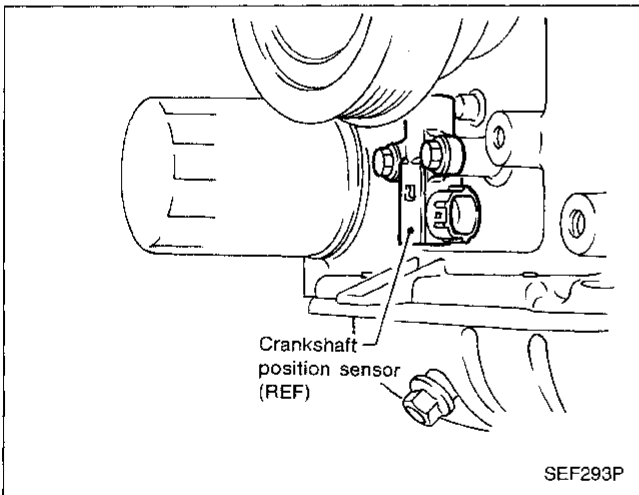
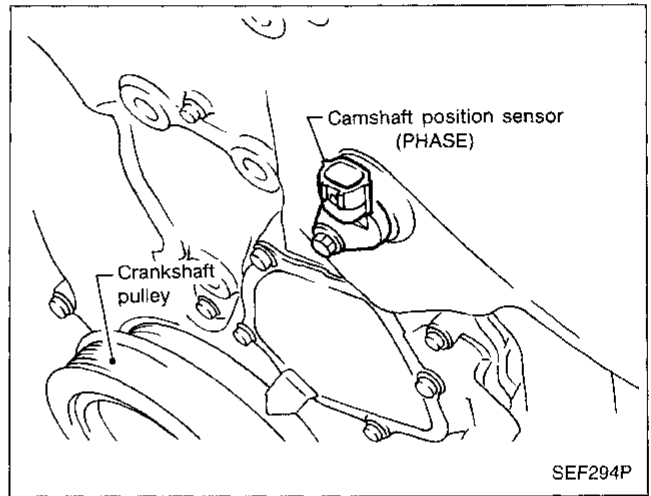
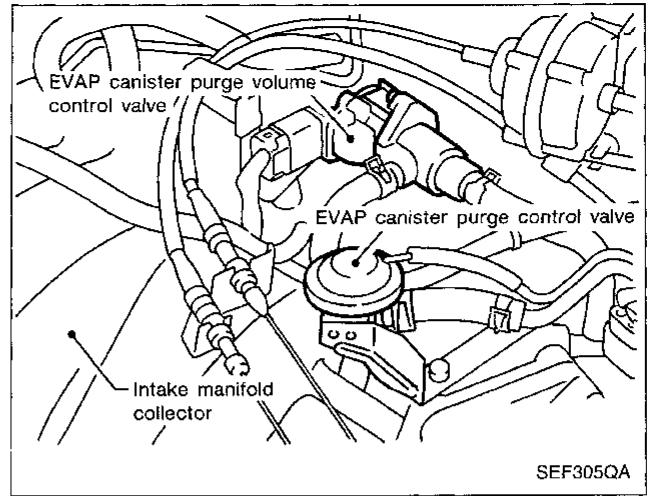
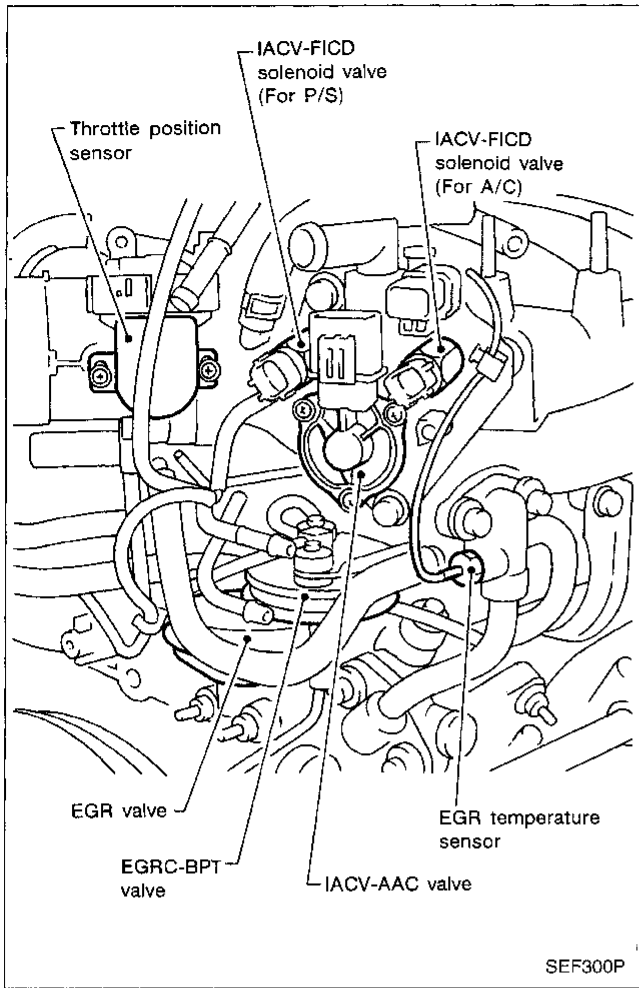
ECCS Component Parts Location



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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

ECCS Component Parts Location (Cont'd)



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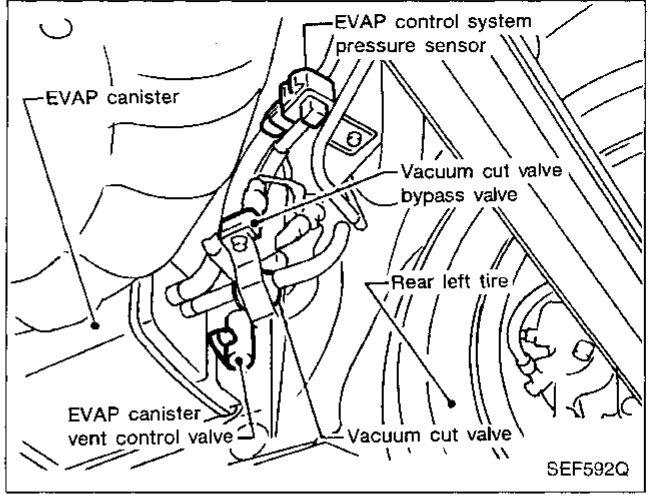
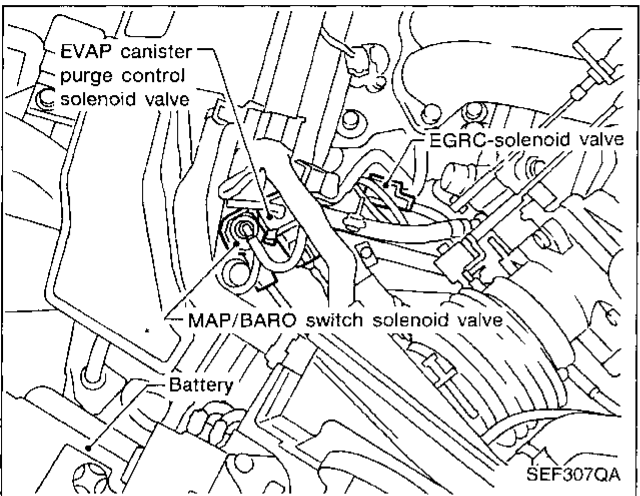
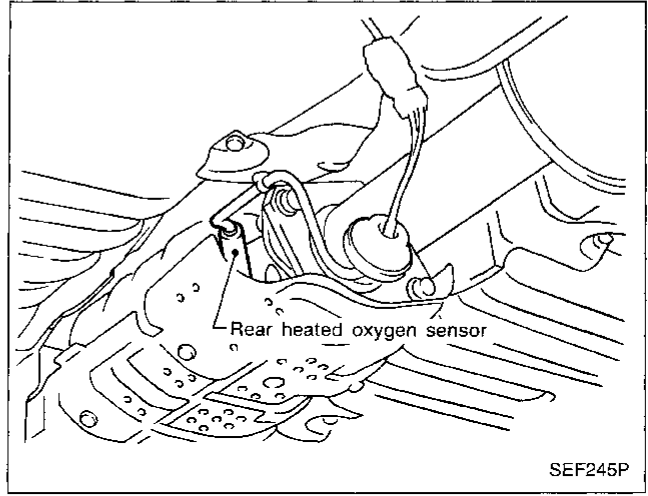
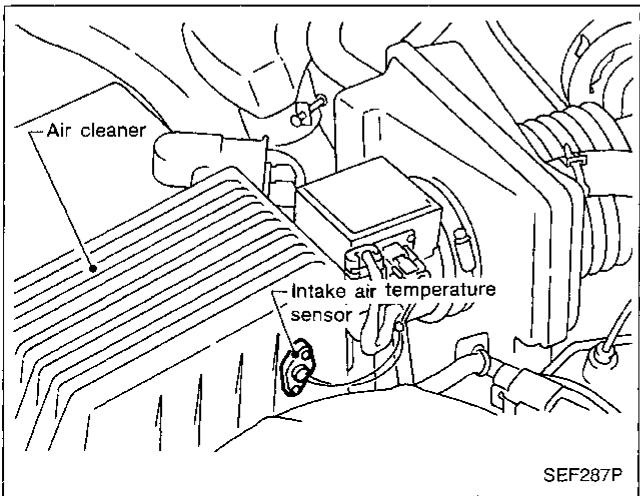
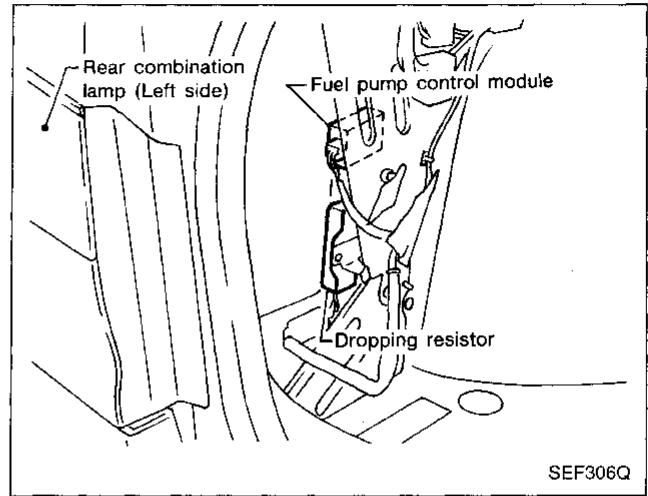
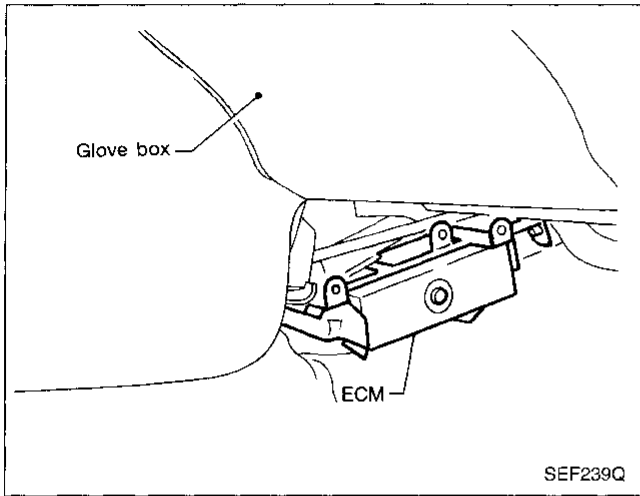
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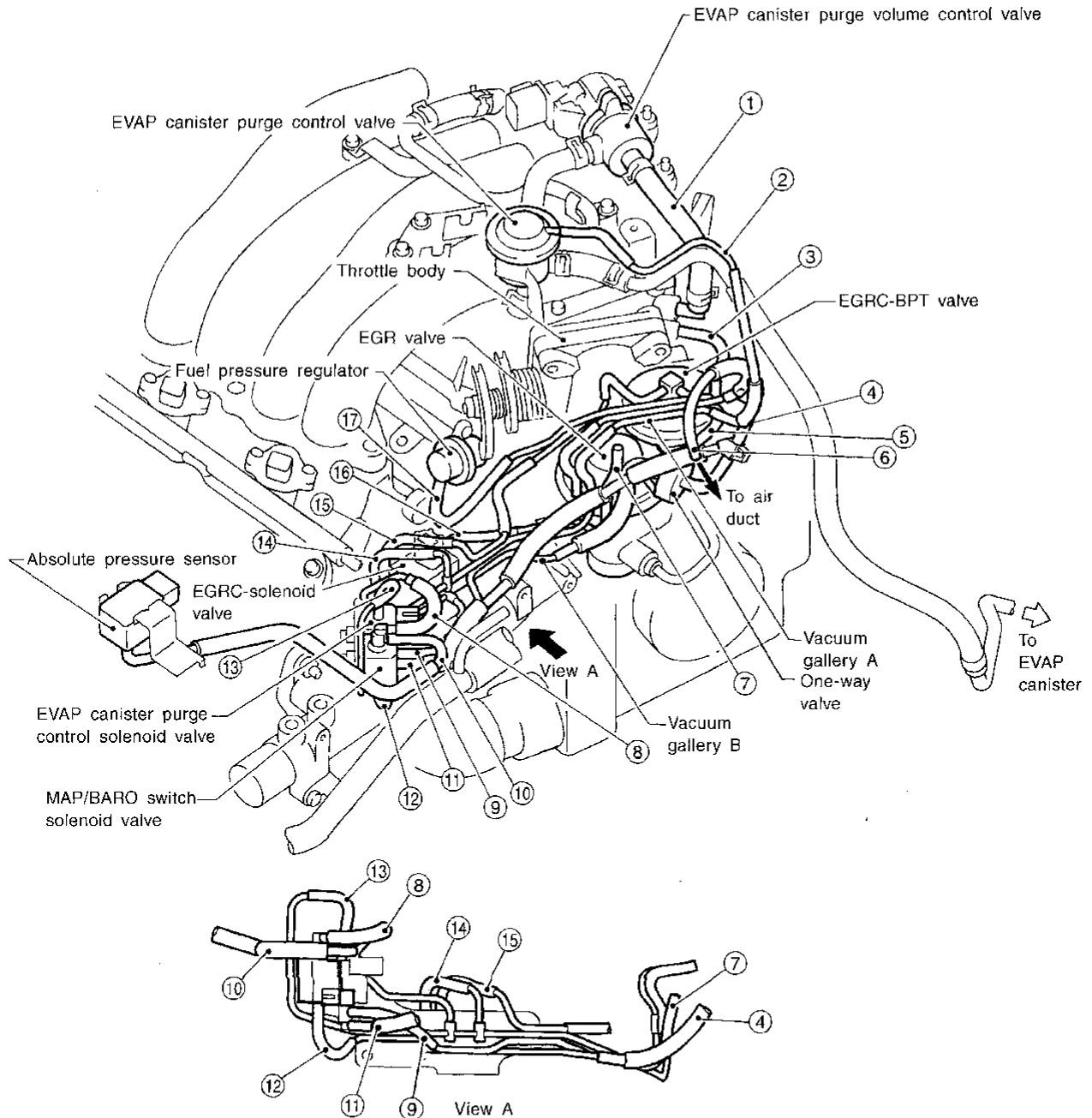
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ENGINE AND EMISSION CONTROL OVERALL SYSTEM

ECCS Component Parts Location (Cont'd)



Vacuum Hose Drawing

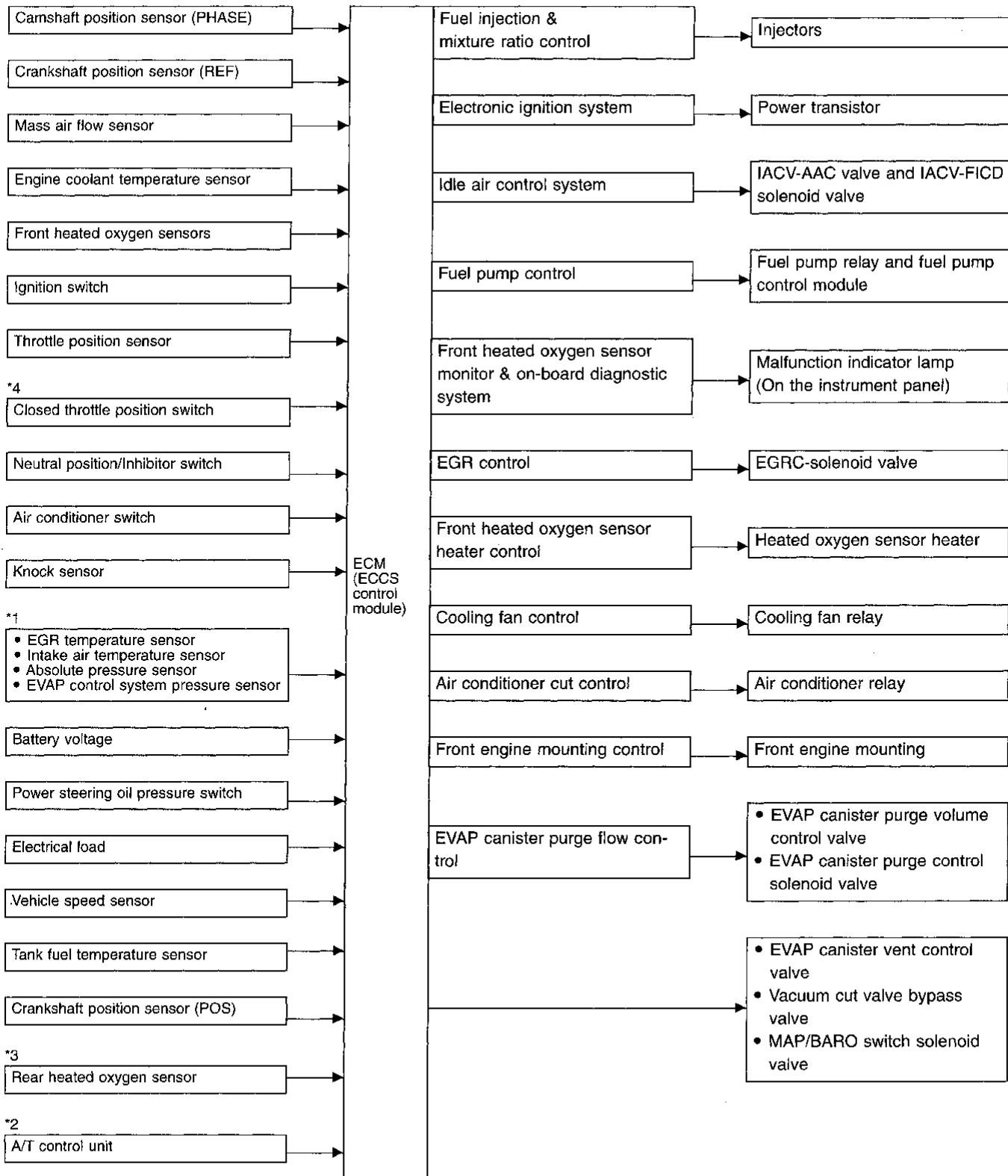


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|-------------------------------------------------------------|------------------------------------------------------------------|------------------------------------------------------------------|
| ① EVAP canister purge volume control valve to Throttle body | ⑧ MAP/BARO switch solenoid valve to Vacuum gallery B | ⑬ EVAP canister purge control solenoid valve to Vacuum gallery B |
| ② EVAP canister purge control valve to Vacuum gallery A | ⑨ EVAP canister purge control solenoid valve to Vacuum gallery B | ⑭ EGRC-solenoid valve to Vacuum gallery B |
| ③ Throttle body to Vacuum gallery A | ⑩ MAP/BARO switch solenoid valve to Absolute pressure sensor | ⑮ EGRC-solenoid valve to Vacuum gallery B |
| ④ Vacuum gallery A to Vacuum gallery B | ⑪ EVAP canister purge control solenoid valve to Vacuum gallery B | ⑯ EGRC-solenoid valve to Vacuum gallery B |
| ⑤ EGR valve to EGRC-BPT valve | ⑫ MAP/BARO switch solenoid valve to Vacuum gallery B | ⑰ Fuel pressure regulator to Vacuum gallery A |
| ⑥ Air duct to Vacuum gallery A | | |
| ⑦ Throttle body to Vacuum gallery B | | |

Refer to "System Diagram" in ENGINE AND EMISSION CONTROL SYSTEM for vacuum control system.

ENGINE AND EMISSION CONTROL OVERALL SYSTEM

System Chart



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

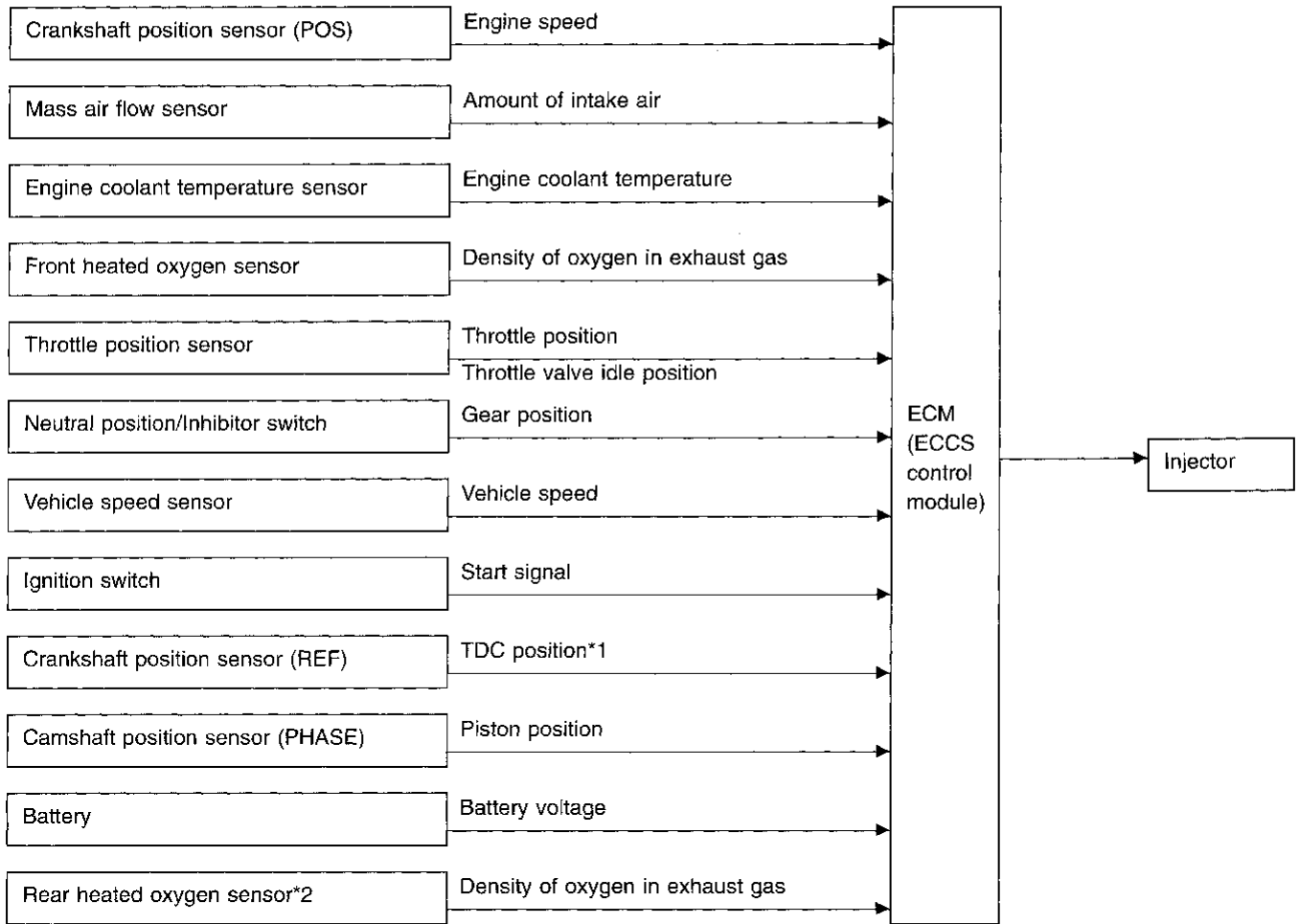
*2: The DTC related to A/T will be sent to ECM.

*3: This sensor is not used to control the engine system under normal conditions.

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

Multiport Fuel Injection (MFI) System

INPUT/OUTPUT SIGNAL LINE



*1: Top Dead Center

*2: This sensor is not used to control the engine system under normal conditions.

BASIC MULTIPOINT FUEL INJECTION SYSTEM

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

The amount of fuel injected is compensated for to improve engine performance. This will be made under various operating conditions as listed below.

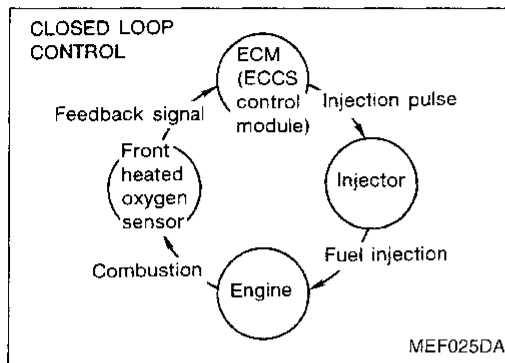
(Fuel increase)

- During warm-up
- When starting the engine
- During acceleration
- Hot-engine operation
- High-load, high-speed operation

(Fuel decrease)

- During deceleration
- During high speed operation

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION



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

MIXTURE RATIO FEEDBACK CONTROL

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 front heated oxygen sensor in the exhaust manifold to monitor if the engine is rich or lean. The ECM adjusts the injection pulse width according to the sensor voltage signal. For more information about front heated oxygen sensor, refer to pages EC-139, 154. 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.

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

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
- Engine idling
- Malfunction of front heated oxygen sensor or its circuit
- Insufficient activation of front heated oxygen sensor at low engine coolant temperature
- High-engine coolant temperature
- During warm-up
- After shifting from "N" to "D"
- When starting the engine

MIXTURE RATIO SELF-LEARNING CONTROL

The mixture ratio feedback control system monitors the mixture ratio signal transmitted from the front heated oxygen sensor. 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 front heated oxygen sensor 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

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

FUEL INJECTION SYSTEM

Two types of systems are used.

Sequential multiport fuel injection system

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

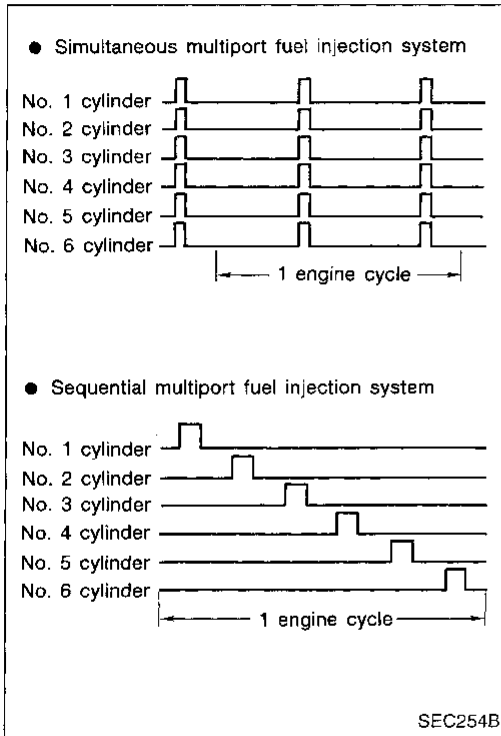
Fuel is injected simultaneously into all six cylinders twice each engine cycle. In other words, pulse signals of the same width are simultaneously transmitted from the ECM.

The six 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 mode (CPU) or crankshaft position sensor (REF) is operating.

FUEL SHUT-OFF

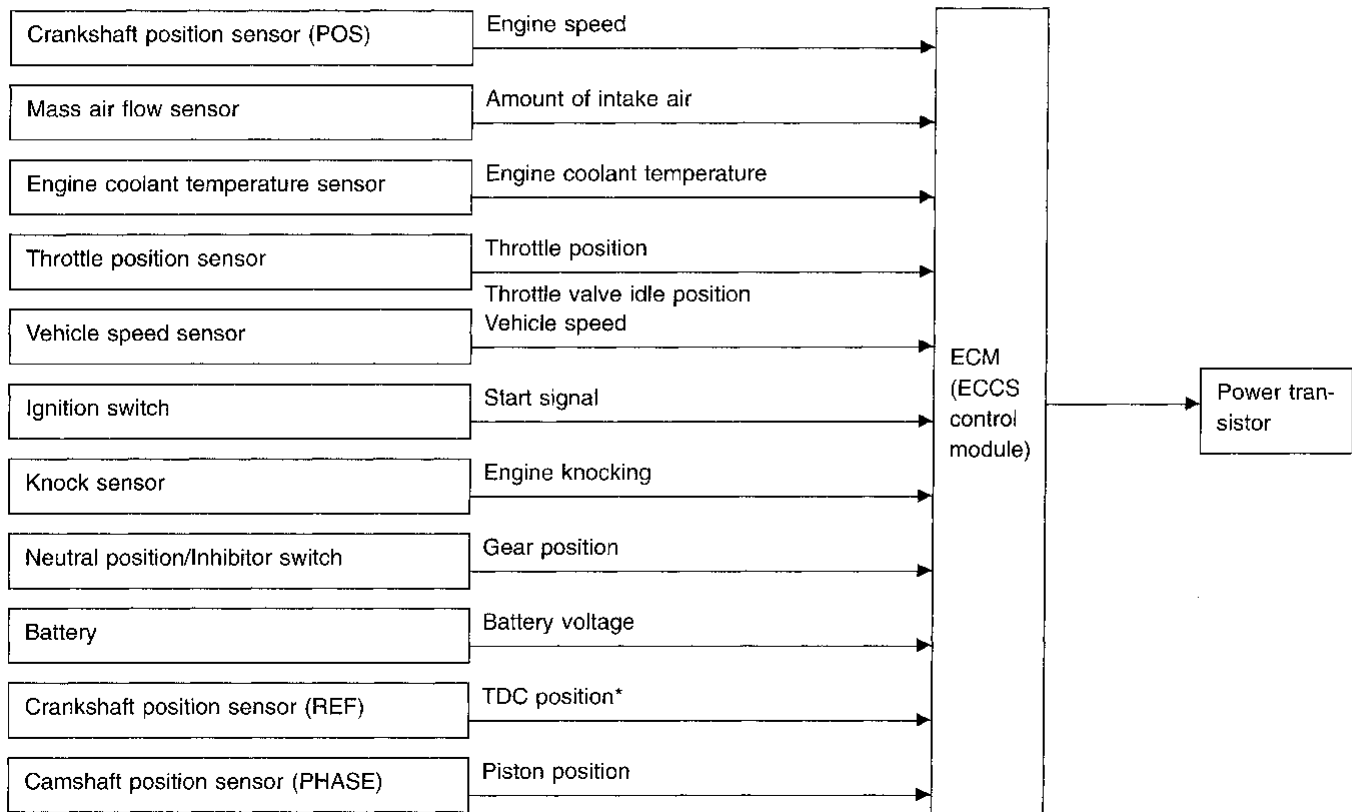
Fuel to each cylinder is cut off during deceleration or operation of the engine at excessively high speeds.



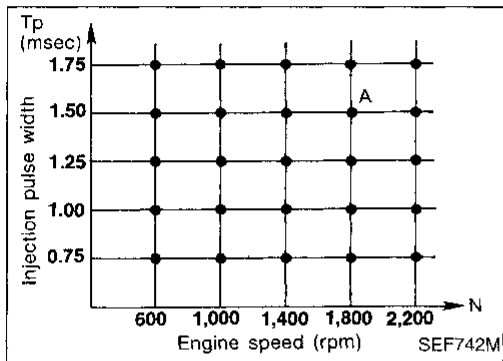
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Electronic Ignition (EI) System

INPUT/OUTPUT SIGNAL LINE



*: Top Dead Center



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 below.

The ECM detects information such as the injection pulse width and camshaft position sensor signal. Responding to 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.

- 1 At starting
- 2 During warm-up
- 3 At idle
- 4 Hot engine operation
- 5 At 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.

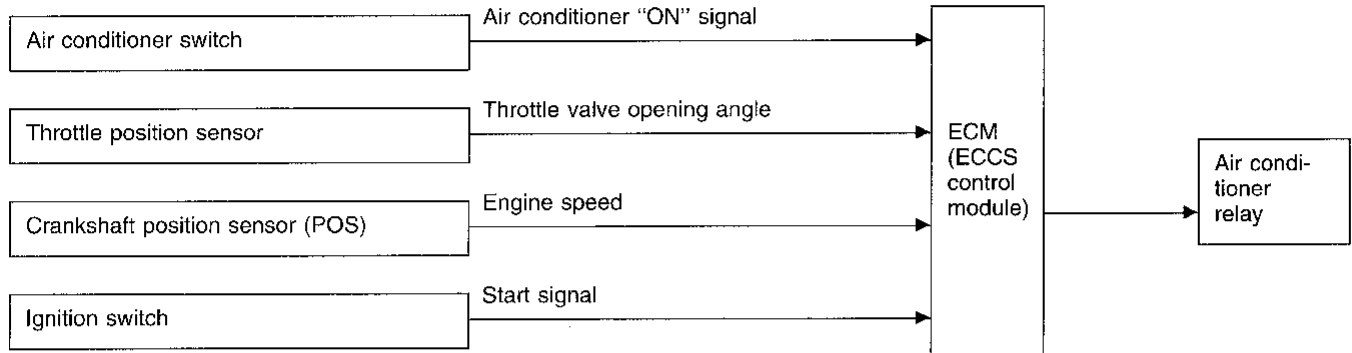
ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

Electronic Ignition (EI) System (Cont'd)

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

Air Conditioning Cut Control

INPUT/OUTPUT SIGNAL LINE



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.

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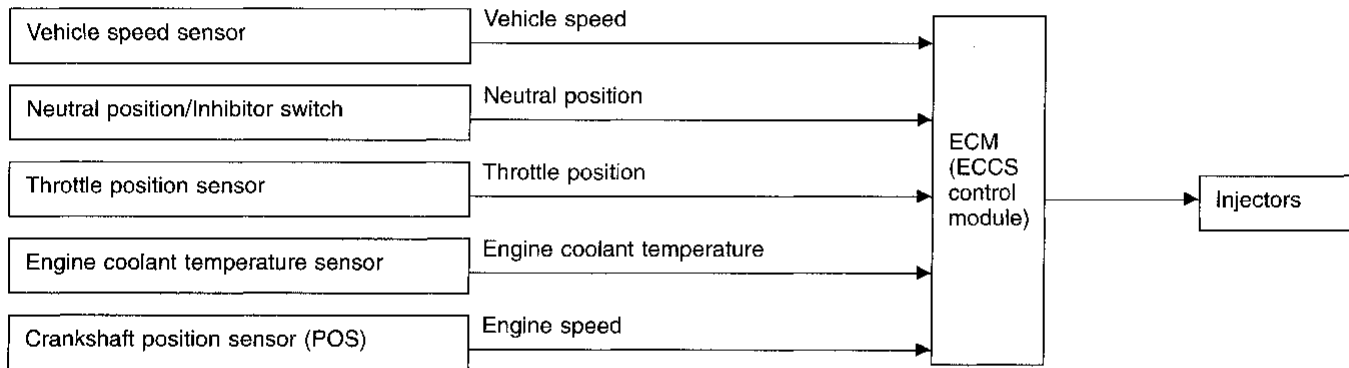
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Fuel Cut Control (at no load & high engine speed)

INPUT/OUTPUT SIGNAL LINE



If the engine speed is above 2,700 rpm with no load (for example, in neutral and engine speed over 2,700 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 2,200 rpm, then fuel cut is cancelled.

NOTE:

This function is different than deceleration control listed under multiport fuel injection on EC-15.

ENGINE AND EMISSION BASIC CONTROL SYSTEM DESCRIPTION

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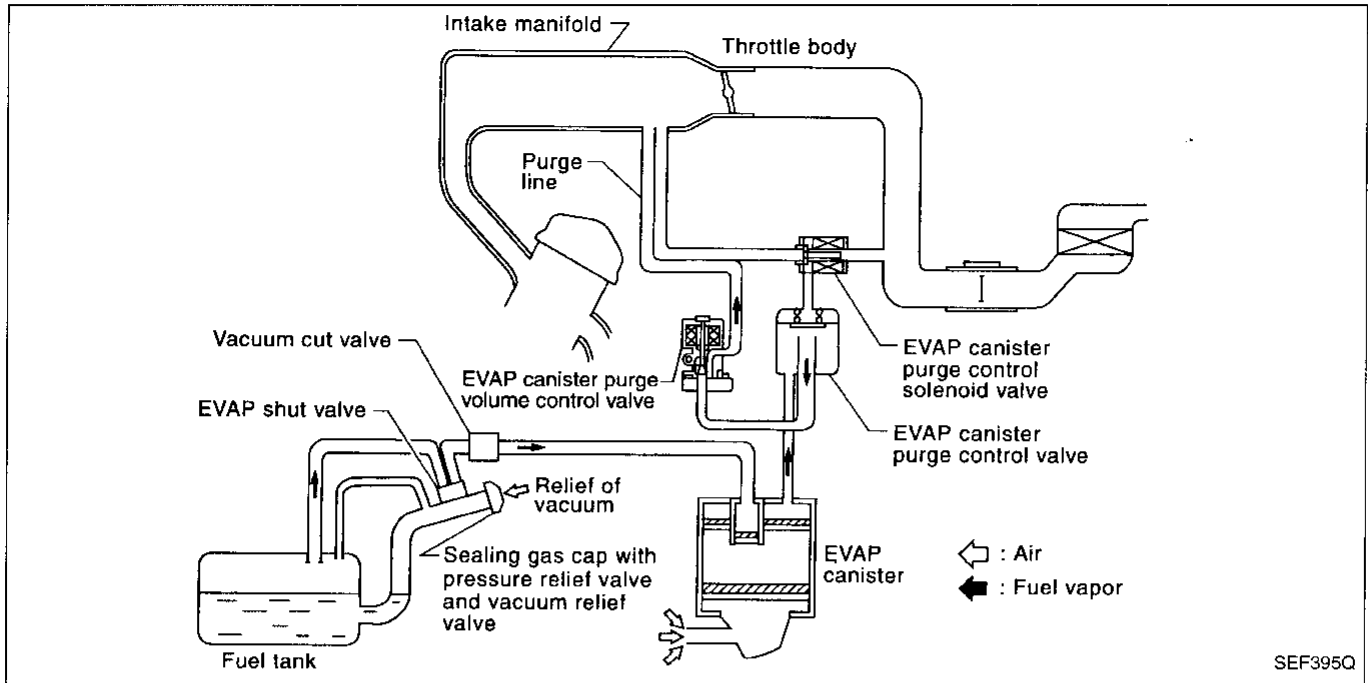
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EVAPORATIVE EMISSION SYSTEM

Description



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.

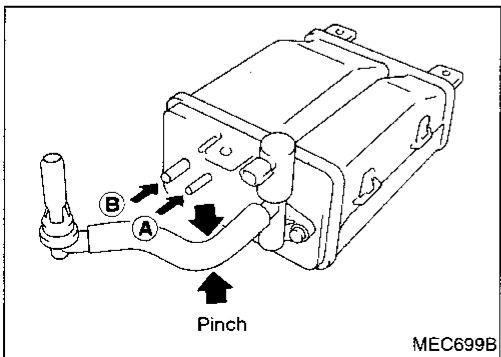
The fuel vapor in the sealed fuel tank is led into the EVAP canister which contains activated carbon and the vapor is stored there when the engine is not operating.

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 valve is controlled by engine control module. When the engine operates, the flow rate of vapor controlled by EVAP canister purge volume control valve is proportionally regulated as the air flow increases.

EVAP canister purge control valve shuts off the vapor purge line during decelerating and idling, and under normal operating conditions the valve is usually open.

EVAP shut valve shuts off the vapor charge line when fuel is being supplied to the fuel tank.



Inspection

EVAP CANISTER

Check EVAP canister as follows:

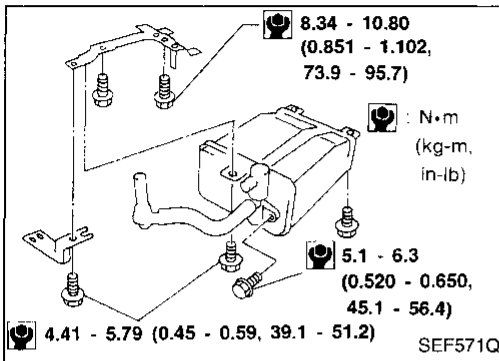
1. Pinch the fresh air vent hose.
2. Blow air in port (A) and check that it flows freely out of port (B).

EVAPORATIVE EMISSION SYSTEM

Inspection (Cont'd)

TIGHTENING TORQUE

Tighten EVAP canister as shown in the figure.



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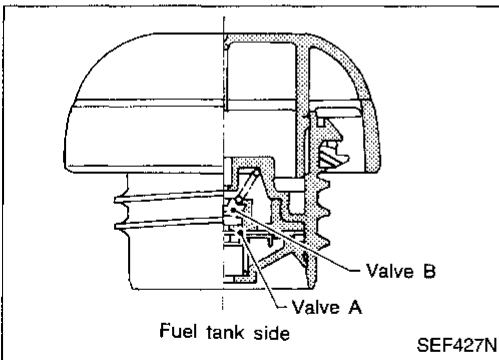
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FUEL TANK VACUUM RELIEF VALVE

1. Wipe clean valve housing.
2. Suck air through the cap. A slight resistance accompanied by valve clicks indicates that valve A is in good mechanical condition. Note also that, by further sucking air, the resistance should disappear with valve clicks.
3. Blow air on fuel tank side and ensure that continuity of air passage exists through valve B.
4. If valve is clogged or if no resistance is felt, replace cap as an assembly.

CAUTION:

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

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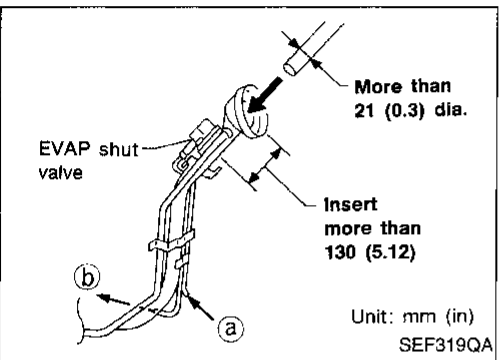
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EVAPORATIVE EMISSION (EVAP) SHUT VALVE

- When pushing down the shutter inside the fuel filler opening, the EVAP shut valve is closed.
 - When releasing the shutter, the valve is open.
1. Insert steel tube as shown in the figure.
 2. Blow air from one side of the EVAP shut valve tube (a) or (b) and check that there is no air flow.

EVAP CANISTER PURGE CONTROL VALVE

Refer to EC-225.

VACUUM CUT VALVE

Refer to EC-304.

EVAPORATIVE EMISSION (EVAP) CANISTER PURGE VOLUME CONTROL VALVE

Refer to EC-305.

EVAPORATIVE EMISSION (EVAP) CANISTER PURGE CONTROL SOLENOID VALVE

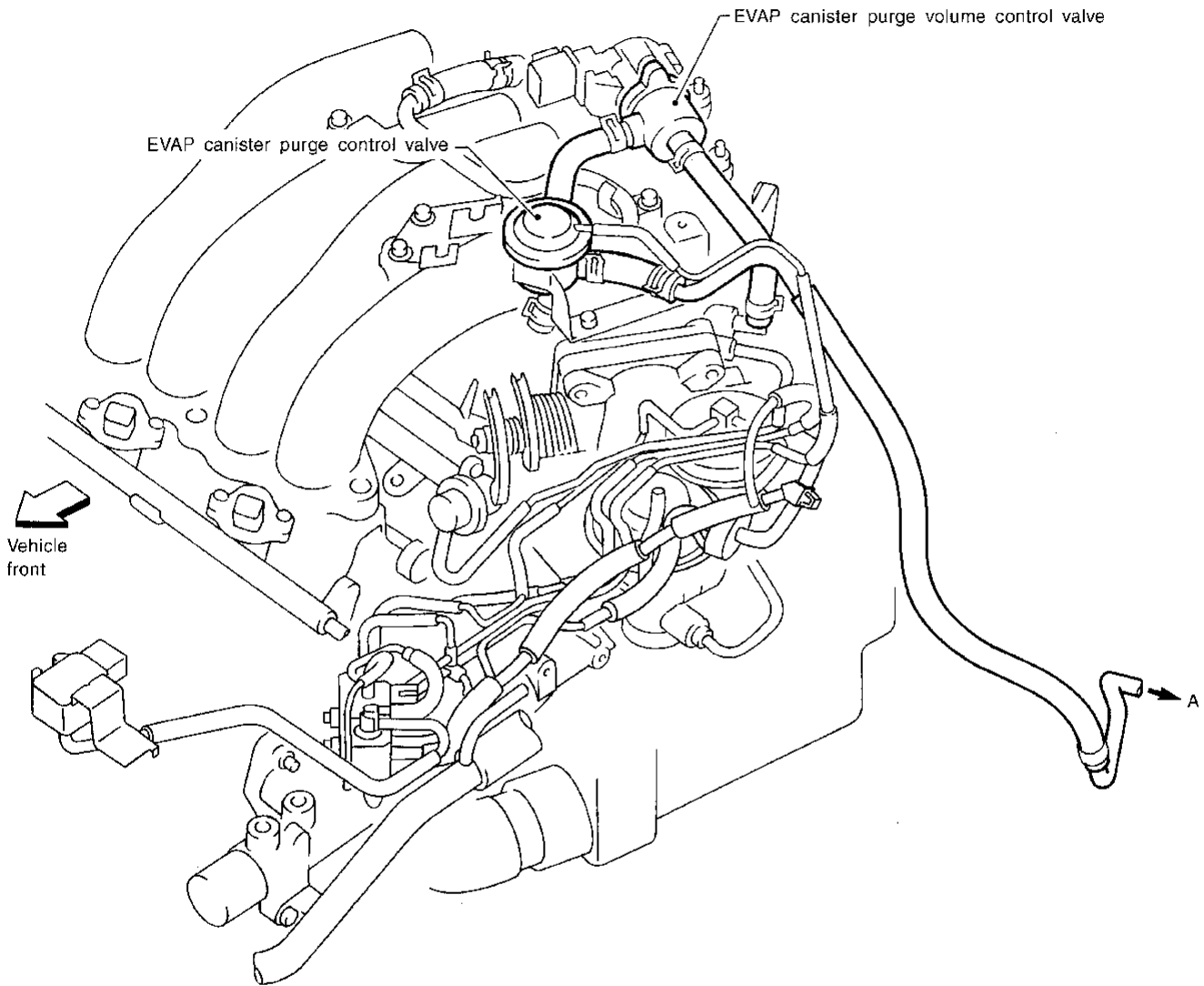
Refer to EC-225.

TANK FUEL TEMPERATURE SENSOR

Refer to EC-182.

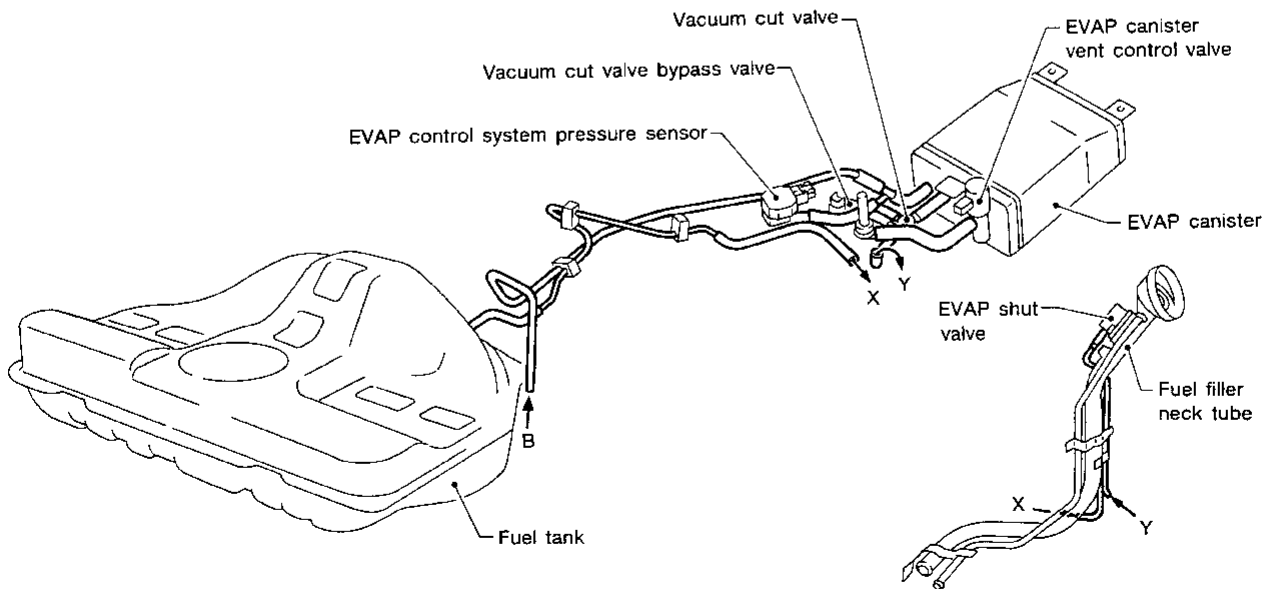
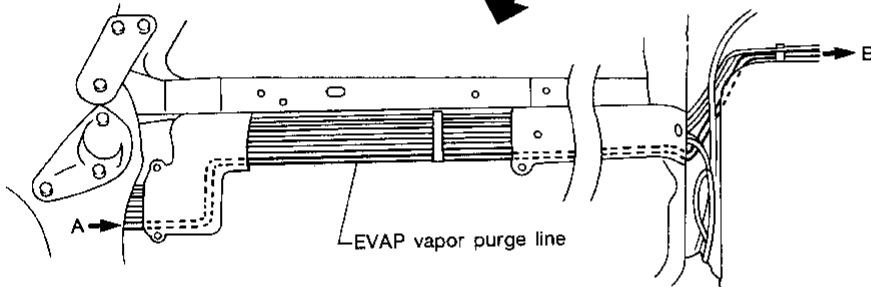
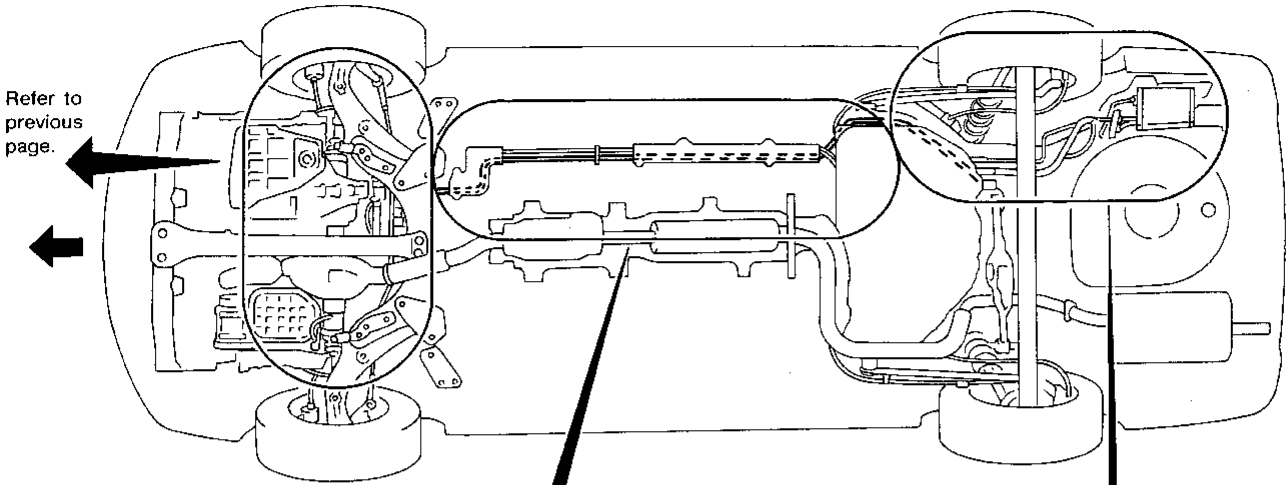
EVAPORATIVE EMISSION SYSTEM

Evaporative Emission Line Drawing



EVAPORATIVE EMISSION SYSTEM

Evaporative Emission Line Drawing (Cont'd)



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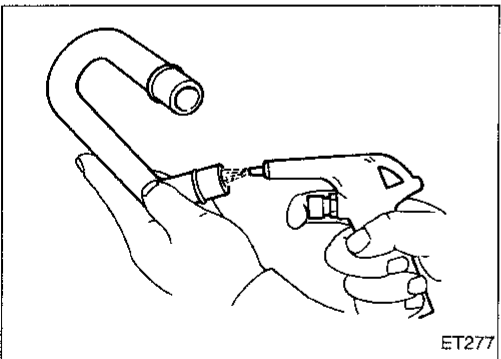
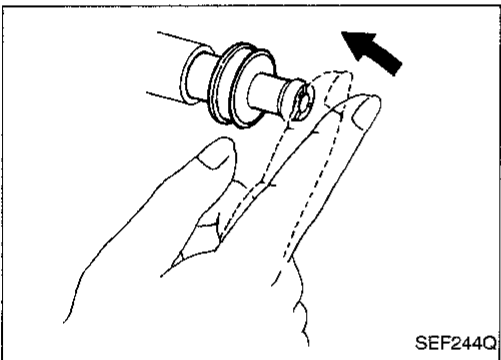
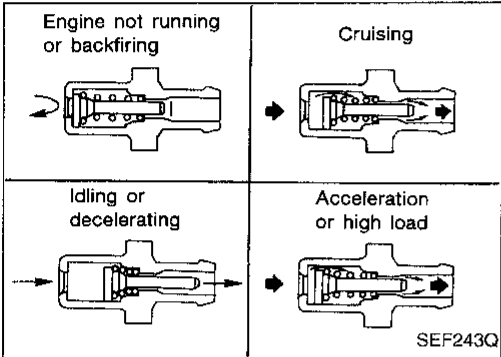
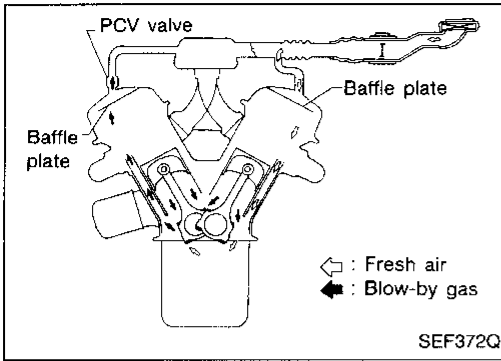
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POSITIVE CRANKCASE VENTILATION



Description

This system returns blow-by gas to both the intake manifold and air cleaner.

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 cleaner, through the hose connecting air cleaner to rocker cover, into the crankcase.

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

On vehicles with an excessively high blow-by some of the flow will go through the hose connection to the air cleaner under all conditions.

Inspection

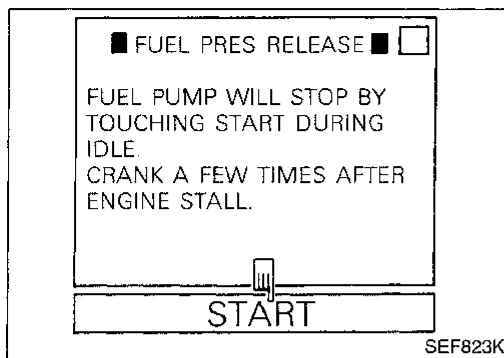
PCV (Positive Crankcase Ventilation)

With engine running at idle, remove ventilation hose from PCV valve; if valve is working properly, a hissing noise will be heard as air passes through it and a strong vacuum should be felt immediately when a finger is placed over valve inlet.

VENTILATION HOSE

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.

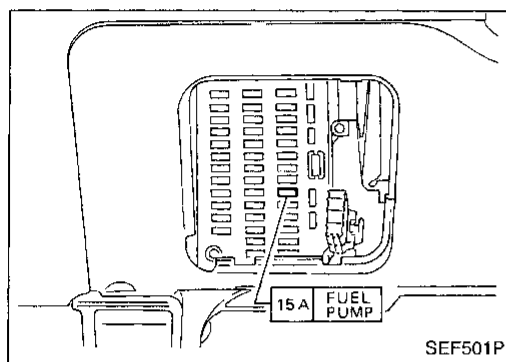
BASIC SERVICE PROCEDURE



Fuel Pressure Release

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

1. Start engine.
2. Perform "FUEL PRESSURE RELEASE" in "WORK SUPPORT" mode with CONSULT. (Touch "START" and after engine stalls, crank it two or three times to release all fuel pressure.)
3. Turn ignition switch off.



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

- 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.

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

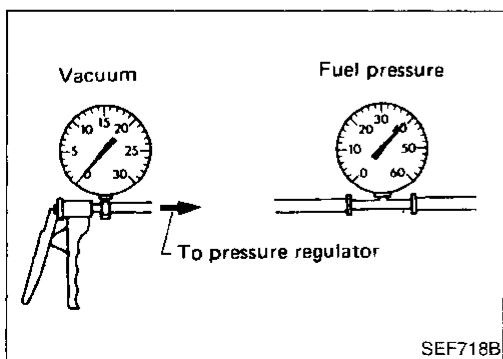
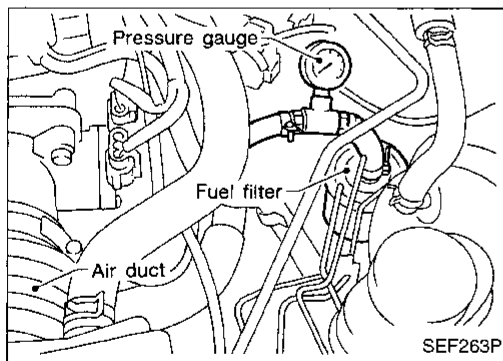
At idling:

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

A few seconds after ignition switch is turned OFF to ON:

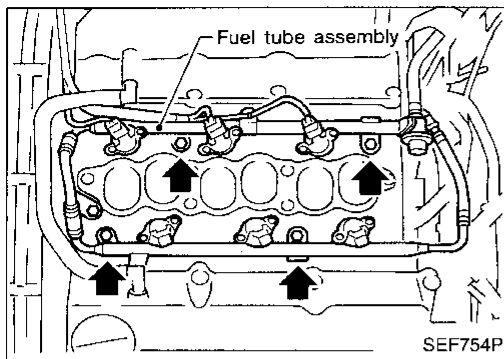
Approximately 294 kPa (3.0 kg/cm², 43 psi)

6. Stop engine and disconnect fuel pressure regulator vacuum hose from intake manifold.
7. Plug intake manifold with a rubber cap.
8. Connect variable vacuum source to fuel pressure regulator.



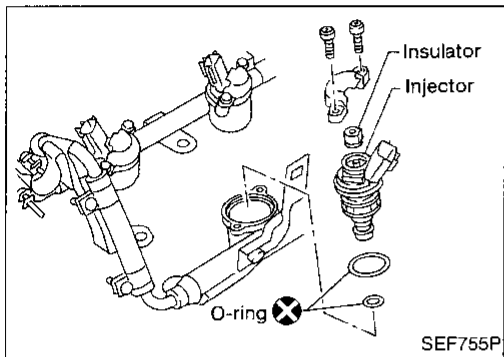
9. Start engine and read indication of fuel pressure gauge as vacuum is changed.

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

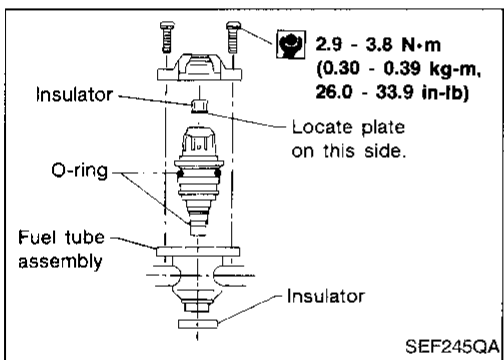


Injector Removal and Installation

1. Release fuel pressure to zero.
2. Remove intake manifold collector (Refer to TIMING CHAIN in EM section).
3. Disconnect vacuum hose from pressure regulator.
4. Disconnect fuel hoses from fuel tube assembly.
5. Disconnect injector harness connectors.
6. Remove injectors with fuel tube assembly.

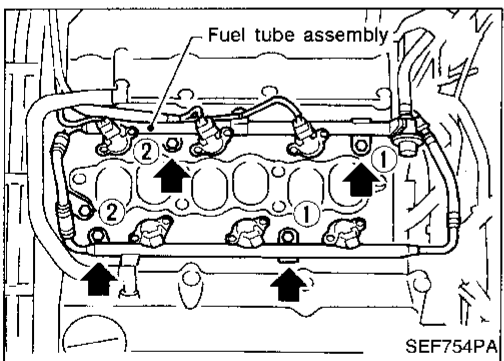


7. Push out any malfunctioning injector from fuel tube assembly. **Do not extract injector by pinching connector.**
8. Replace or clean injector as necessary.



9. Install injector to fuel tube assembly.

Always replace O-rings and insulators with new ones. Lubricate O-rings with a smear of engine oil.



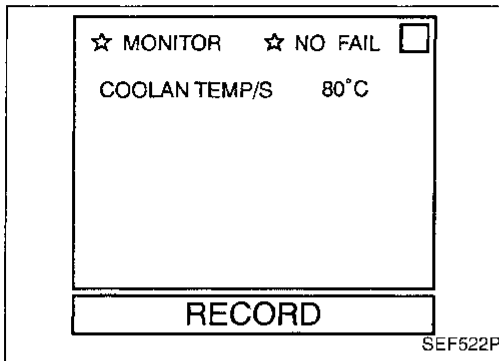
10. Install injectors with fuel tube assembly to intake manifold.

Tighten in numerical order shown in the figure.

- a) First, tighten all bolts to 9.3 to 10.8 N·m (0.95 to 1.1 kg-m, 82.5 to 95.5 in-lb).
- b) Then, tighten all bolts to 21 to 26 N·m (2.1 to 2.7 kg-m, 15 to 20 ft-lb).
11. Install fuel hoses to fuel tube assembly.
12. Reinstall any parts removed in reverse order of removal.

CAUTION:

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



Fast Idle Cam (FIC) Inspection and Adjustment

1. Turn ignition switch "ON".
2. See "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT.
3. Start engine and warm it up.
When engine temperature is $80\pm 5^{\circ}\text{C}$ ($176\pm 9^{\circ}\text{F}$), make sure that the center of mark (A) is aligned with mark (B) as shown in the figure.

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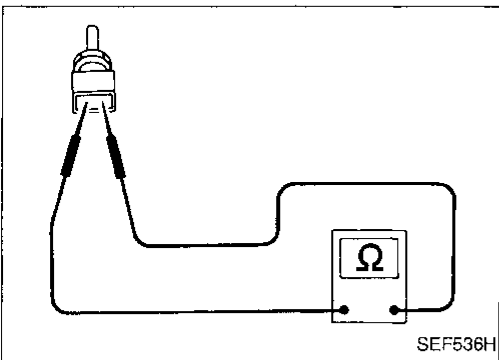
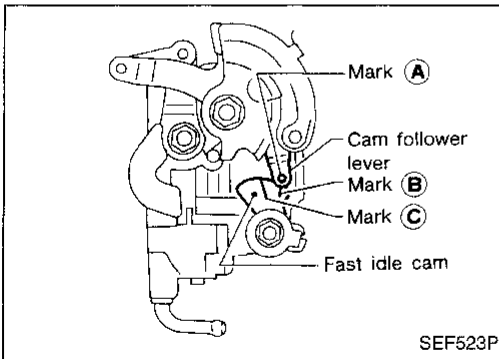
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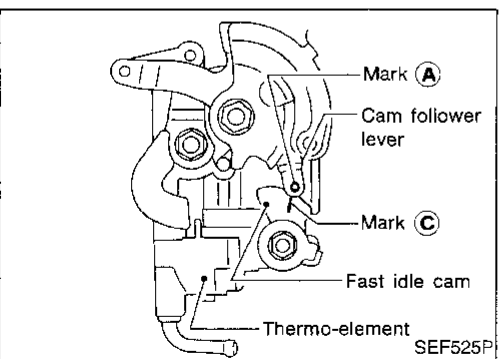
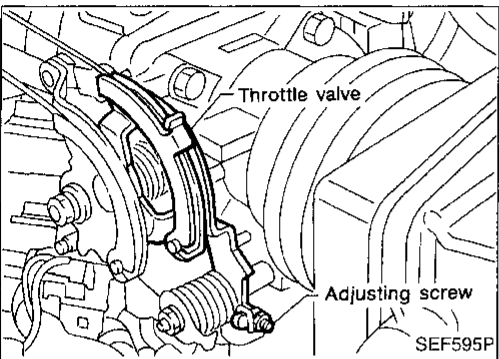
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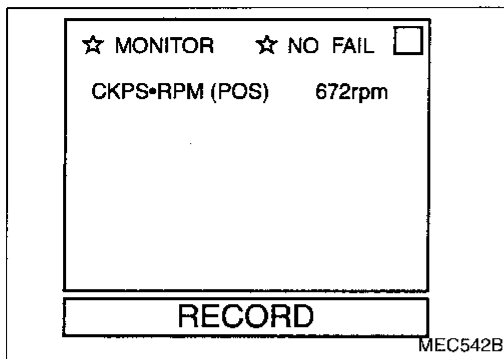
1. Turn ignition switch "OFF".
 2. Disconnect engine temperature sensor harness connector and check resistance as shown in the figure.
 3. Start engine and warm it up.
When the resistance of engine temperature sensor is 0.26 to 0.39 kΩ, make sure that the center of mark (A) is aligned with mark (B) as shown in the figure.
- If NG, adjust by turning adjusting screw.

Adjusting screw tightening torque:

0.98 - 1.96 N·m (10 - 20 kg-cm, 8.7 - 17.4 in-lb)



4. Stop engine.
 5. Turn ignition switch "ON" and see "COOLAN TEMP/S" in "DATA MONITOR" mode with CONSULT.
 6. When engine temperature is $25\pm 5^{\circ}\text{C}$ ($77\pm 9^{\circ}\text{F}$), make sure that the center of mark (A) is aligned with mark (C) as shown in the figure.
 5. When the resistance of engine temperature sensor is 1.65 to 2.40 kΩ, make sure that the center of mark (A) is aligned with mark (C) as shown in the figure.
- If NG, replace thermo-element and perform the above inspection and adjustment again.



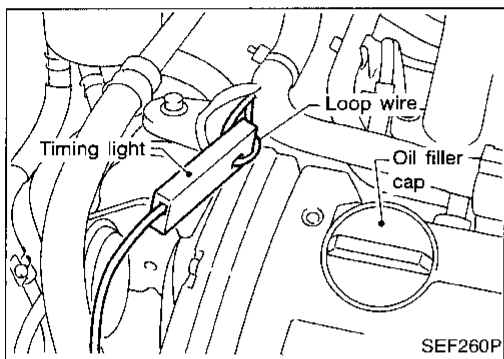
Direct Ignition System — How to Check Idle Speed and Ignition Timing

When adjusting idle speed and ignition timing, refer to “Basic Inspection” or “Idle Speed Adjustment” (Refer to EC-70, 32).

IDLE SPEED

- Using **CONSULT**

Check idle speed in “DATA MONITOR” mode with CONSULT.

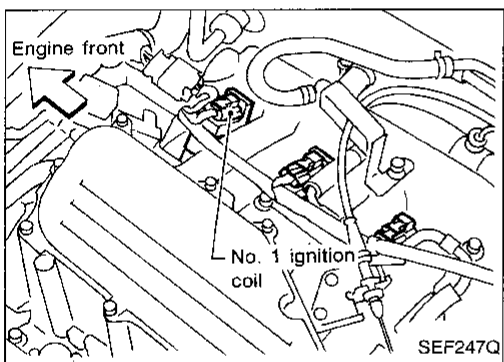


IGNITION TIMING

Any of following two methods may be used.

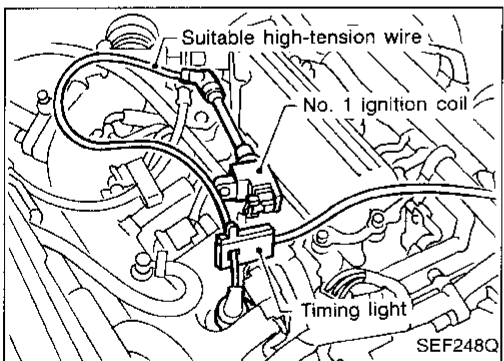
- **Method A**

1. Attach timing light to loop wire as shown.
2. Check ignition timing.



- **Method B**

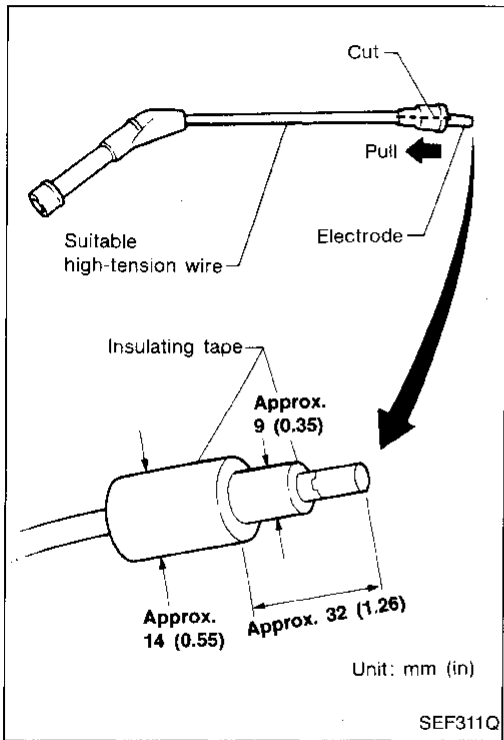
1. Remove No. 1 ignition coil.



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.

BASIC SERVICE PROCEDURE

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



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Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment

PREPARATION

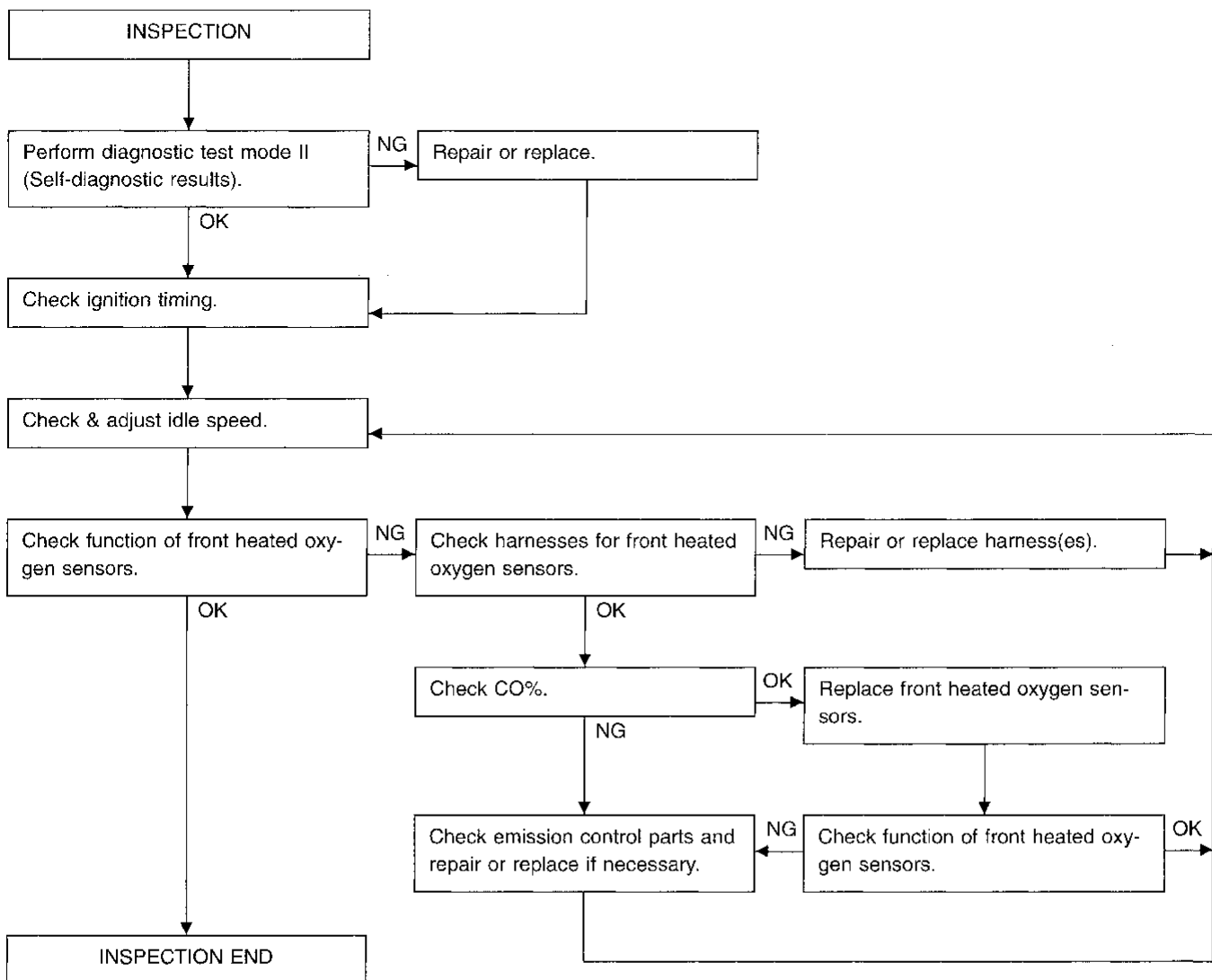
- Make sure that the following parts are in good order.

- (1) Battery
- (2) Ignition system
- (3) Engine oil and coolant levels
- (4) Fuses
- (5) ECM harness connector
- (6) Vacuum hoses
- (7) Air intake system
(Oil filler cap, oil level gauge, etc.)
- (8) Fuel pressure
- (9) Engine compression
- (10) EGR valve operation
- (11) Throttle valve

- (12) Evaporative emission (EVAP) canister purge control valve

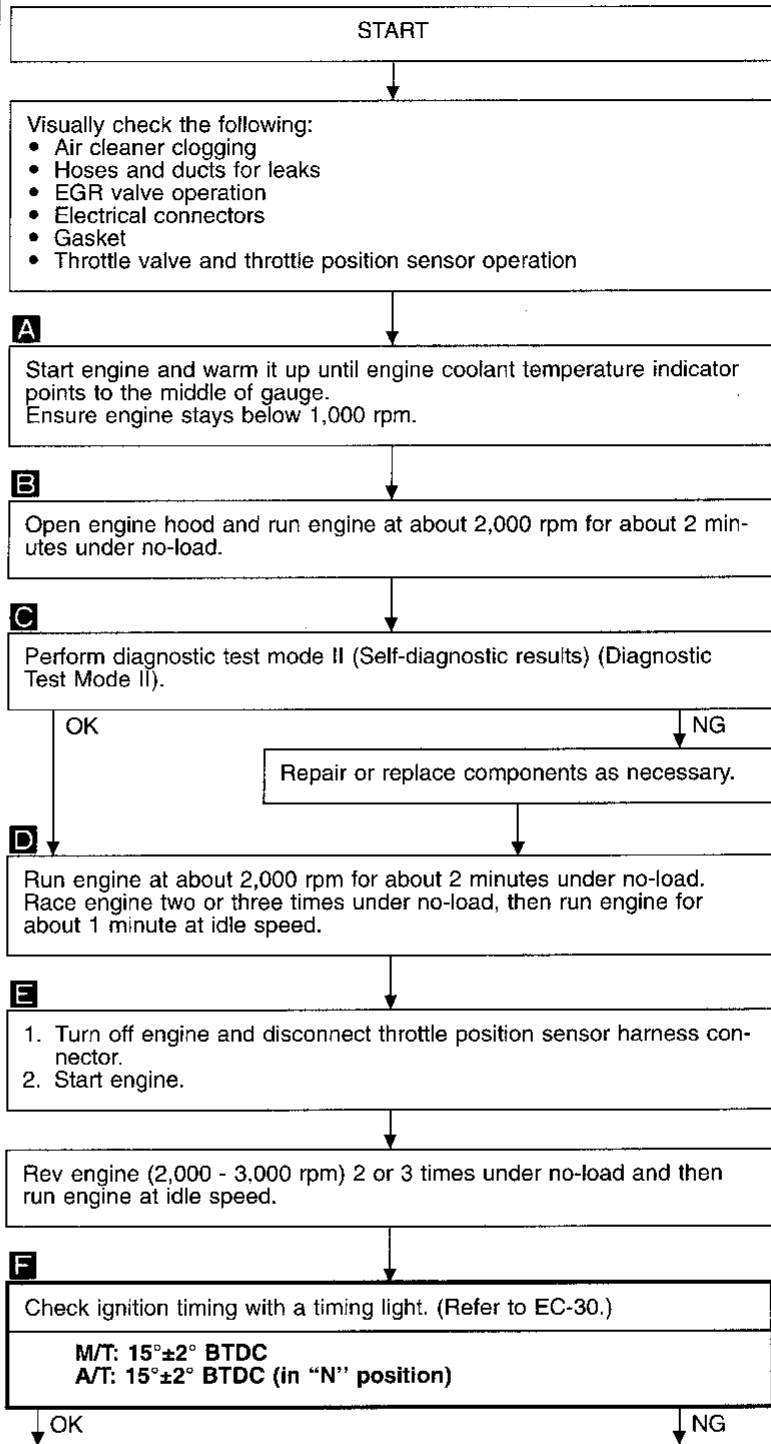
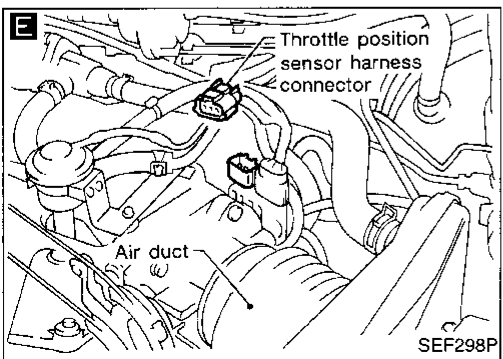
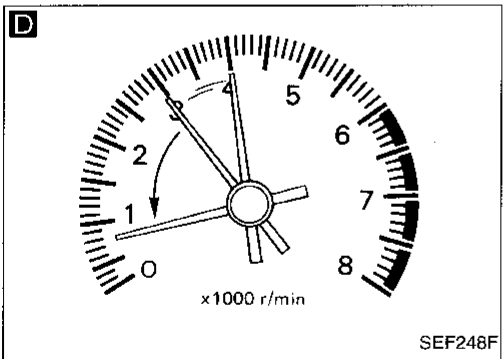
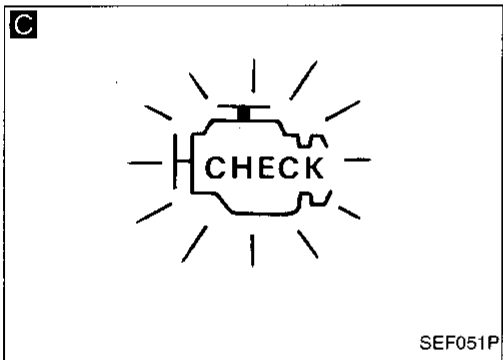
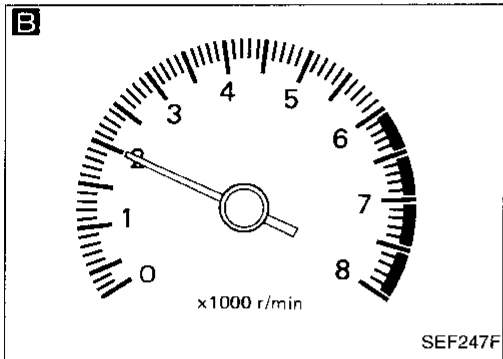
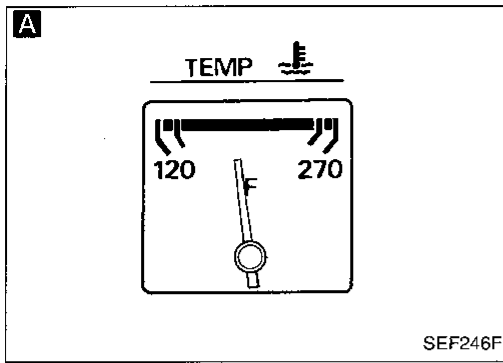
- On air conditioner equipped models, checks should be carried out while the air conditioner is "OFF".
- When checking idle speed, ignition timing and mixture ratio of A/T models, shift lever to "N" position.
- When measuring "CO" percentage, insert probe more than 40 cm (15.7 in) into tail pipe.
- Turn off headlamps, heater blower, rear defogger.
- Keep front wheels pointed straight ahead.
- Make the check after the cooling fan has stopped.

Overall inspection sequence



BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)



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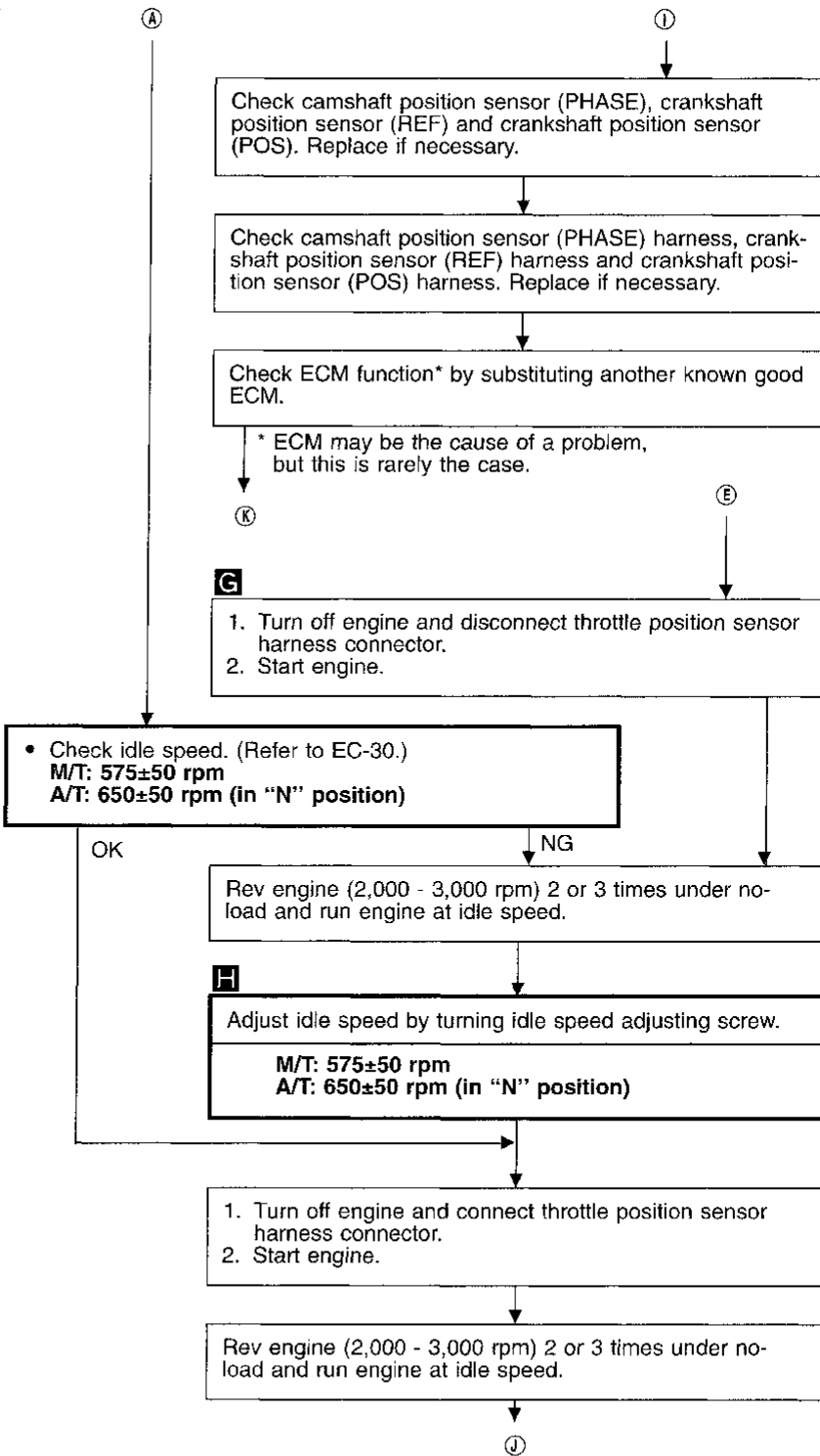
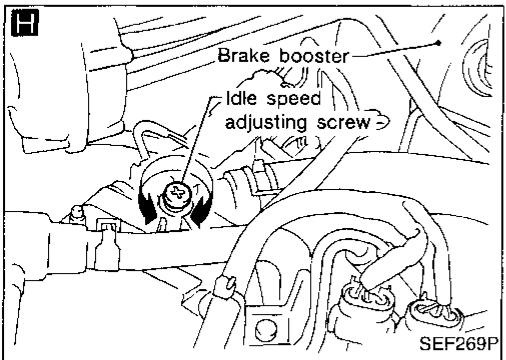
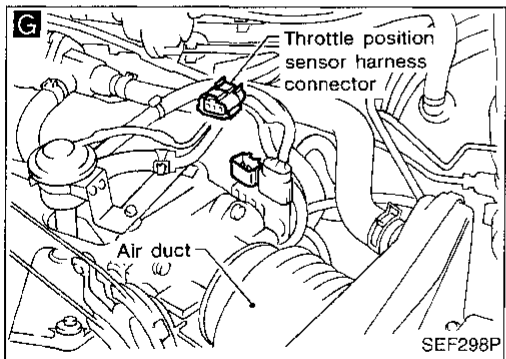
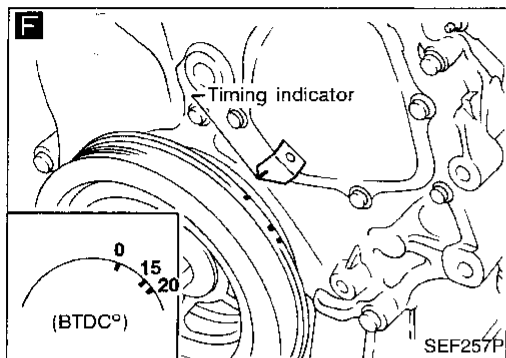
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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)



BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)

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☆ MONITOR ☆ NO FAIL

CKPS•RPM (POS) 672rpm

RECORD

SEF588Q

J

☆ MONITOR ☆ NO FAIL

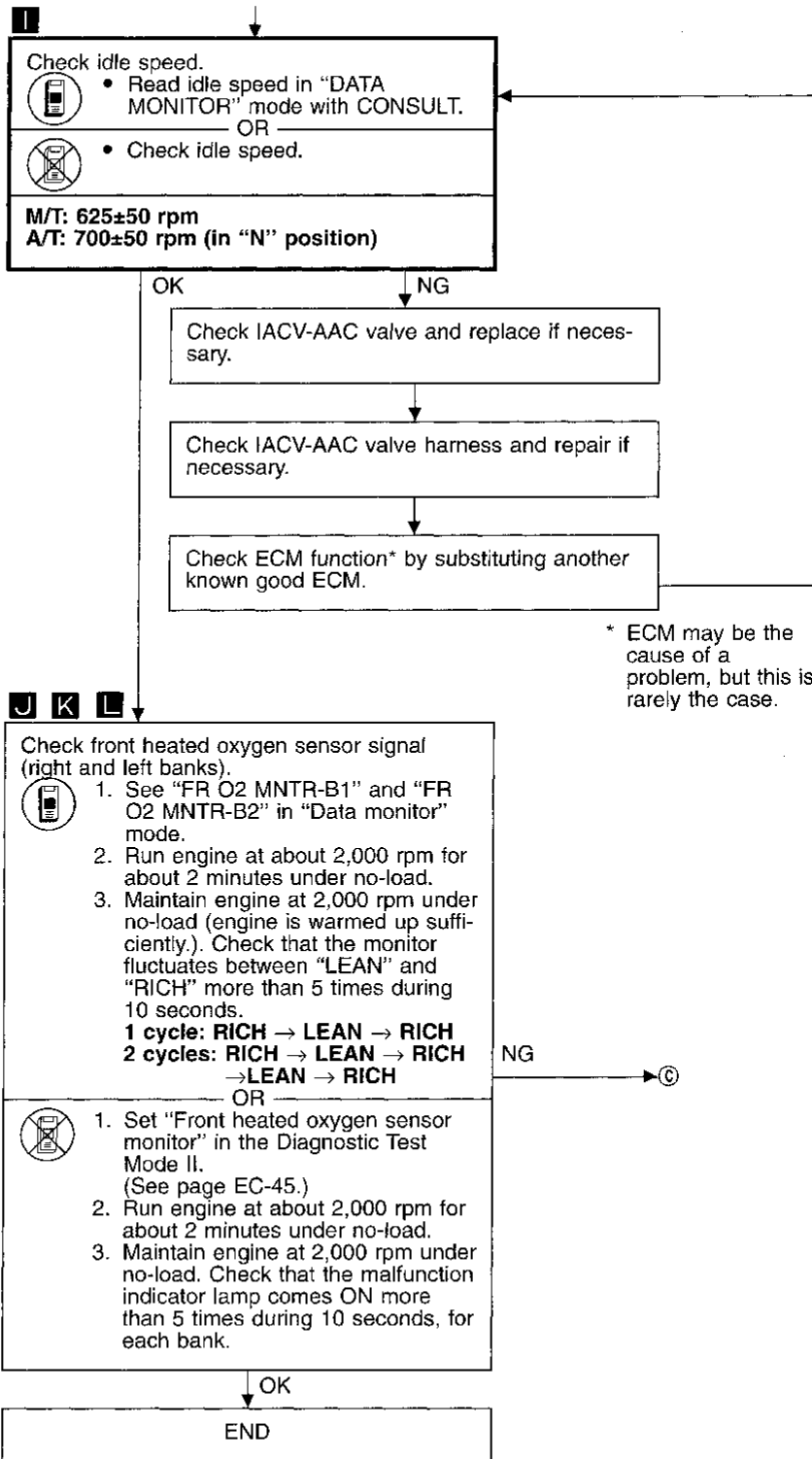
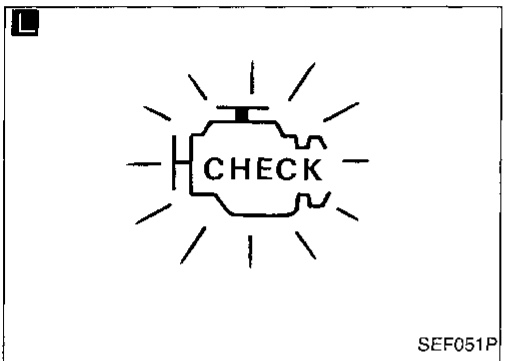
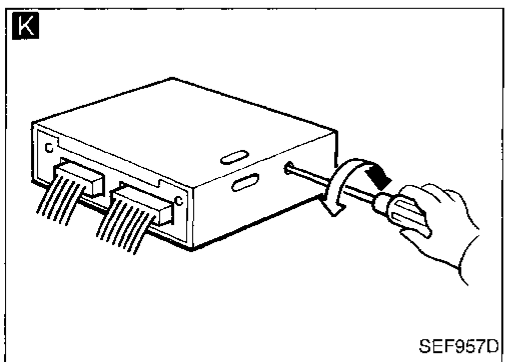
CKPS•RPM (POS) 2000rpm

FR O2 MNTR-B1 RICH

FR O2 MNTR-B2 RICH

RECORD

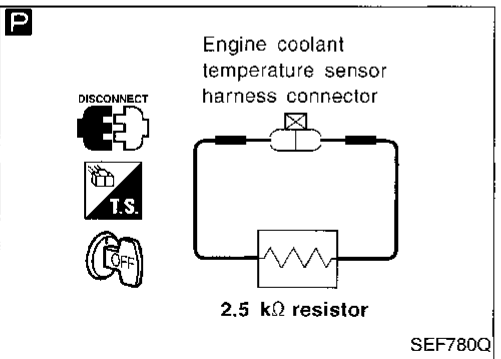
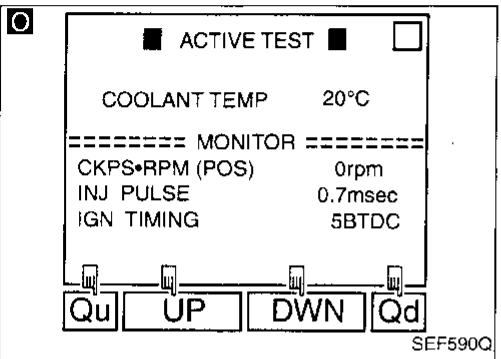
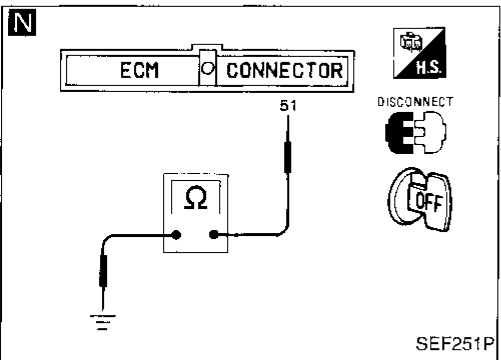
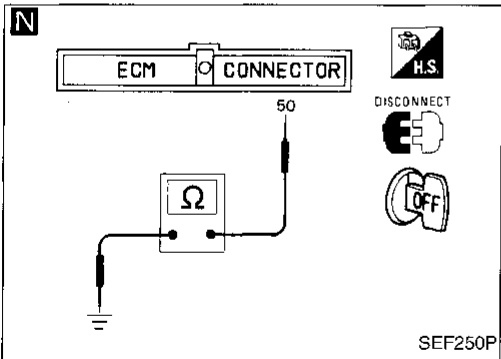
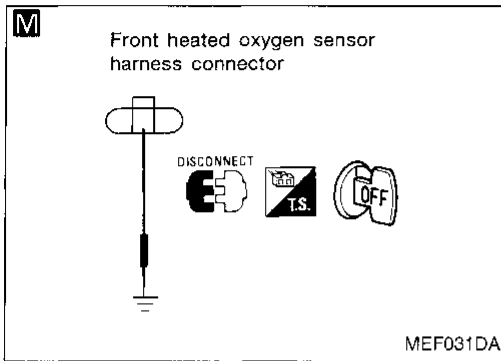
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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)



- M N**
- Check front heated oxygen sensor harnesses:
1. Turn off engine and disconnect battery ground cable.
 2. Disconnect ECM SMJ harness connector from ECM.
 3. Disconnect front heated oxygen sensor harness connectors. Then connect harness side terminals for front heated oxygen sensor to ground with a jumper wire.
 4. Check for continuity between terminal No. 50 of ECM SMJ harness connector and body ground.
 5. Check for continuity between terminal No. 51 of ECM connector and body ground.

Continuity existsOK
 Continuity does not exist.....NG

OK → Connect ECM SMJ harness connector to ECM.
 NG → Repair or replace harness. → **E**

- O P**
1. Connect battery ground cable.
 2. Select "ENG COOLANT TEMP" in "ACTIVE TEST" mode.
 3. Set "COOLANT TEMP" to 20°C (68°F) by touching "Qu" and "Qd" and "UP", "DOWN".
- OR
1. Disconnect engine coolant temperature sensor harness connector.
 2. Connect a resistor (2.5 kΩ) between terminals of engine coolant temperature sensor harness connector.
 3. Connect battery ground cable.

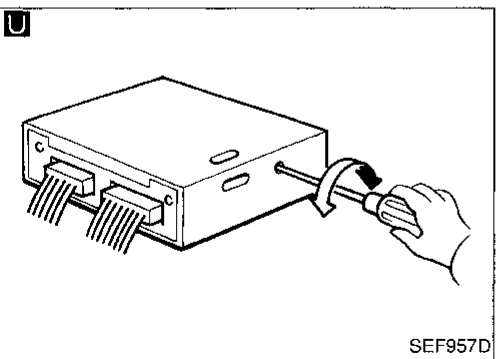
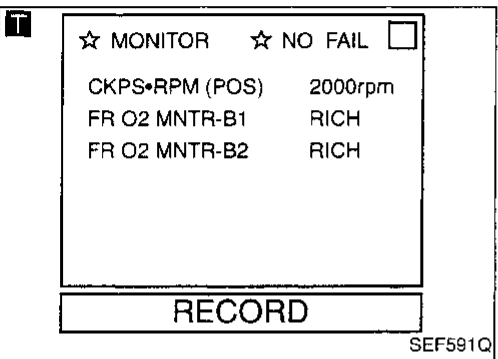
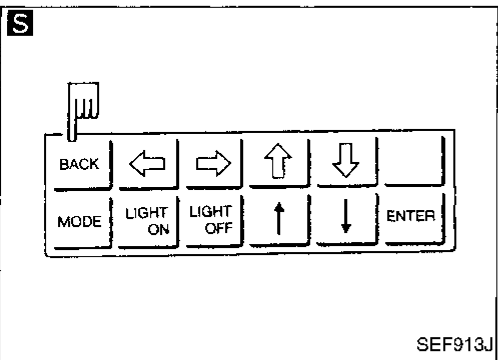
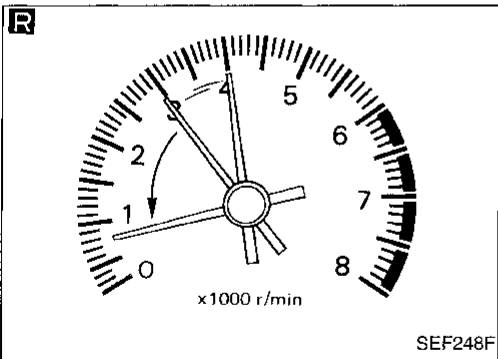
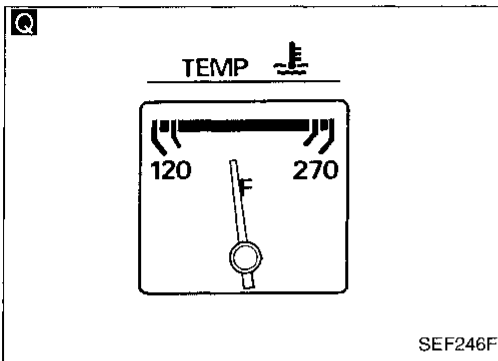
Q

Start engine and warm it up until engine coolant temperature indicator points to middle of gauge. (Be sure to start engine after installing 2.5 kΩ resistor.)

D

BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)



R Race engine two or three times under no-load, then run engine at idle speed.

S Check "CO"%.

Idle CO: Less than 10% (with engine running smoothly)

After checking CO%,
 Touch "BACK".

1. Disconnect the resistor from terminals of engine coolant temperature sensor harness connector.
 2. Connect engine coolant temperature sensor harness connector to engine coolant temperature sensor.

NG OK

Replace front heated oxygen sensor.

T U V

1. See "FR O2 MNTR-B1" and "FR O2 MNTR-B2" in "Data monitor" mode.
 2. Maintain engine at 2,000 rpm under no-load (engine is warmed up sufficiently). Check that the monitor fluctuates between "LEAN" and "RICH" more than 5 times during 10 seconds.
1 cycle: RICH → LEAN → RICH
2 cycles: RICH → LEAN → RICH
 OR

1. Set "Front heated oxygen sensor monitor" in the Diagnostic Test Mode II. (See page EC-45.)
 2. Maintain engine at 2,000 rpm under no-load. Check that the malfunction indicator lamp comes ON more than 5 times during 10 seconds.

NG OK

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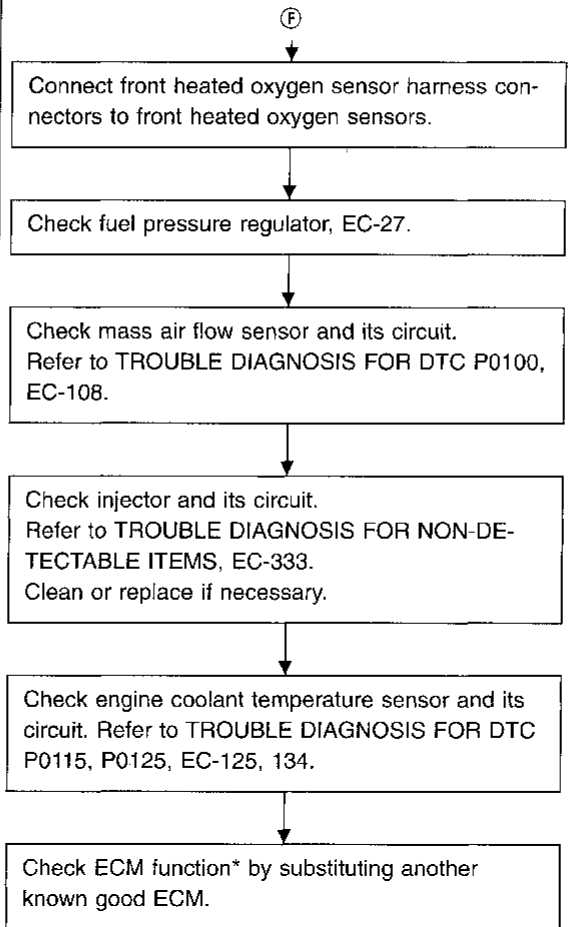
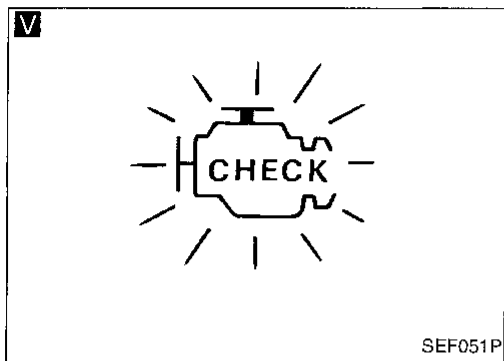
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BASIC SERVICE PROCEDURE

Idle Speed/Ignition Timing/Idle Mixture Ratio Adjustment (Cont'd)



*: ECM may be the cause of a problem, but this is rarely the case.

Ⓖ

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Introduction

The ECM (ECSS control module) has an on-board diagnostic system, which detects engine system malfunctions related to sensors or actuators. 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).

Two Trip Detection Logic

When a malfunction is detected for the first time, the malfunction (DTC and freeze frame data) is stored in the ECM memory. (1st trip) The malfunction indicator lamp will not light up at this stage.

If the same malfunction is detected again during next drive, this second detection causes the malfunction indicator lamp to light up. (2nd trip) (See page EC-46.)

The "trip" in the "Two Trip Detection Logic" means performing of the "DTC CONFIRMATION PROCEDURE". Specific on-board diagnostic items will light up or blink the MIL even in the 1st trip as below.

Items	MIL		
	1st trip		2nd trip lighting up
	Blinking	Lighting up	
Misfire (Possible three way catalyst damage) — DTC: P0306 - P0300 (0603 - 0701) is being detected	X		
Misfire (Possible three way catalyst damage) — DTC: P0306 - P0300 (0603 - 0701) has been detected		X	
Three way catalyst function — DTC: P0420 (0702), P0430 (0703)		X	
Closed loop control — DTC: P0130 (0307), P0150 (0308)		X	
Except above			X

Diagnostic Trouble Code (DTC)

HOW TO READ DTC

The diagnostic trouble code can be read by the following methods.

(Either code for the 1st trip or the 2nd trip can be read.)

1. The number of blinks of the malfunction indicator lamp in the Diagnostic Test Mode II (Self-Diagnostic Results) Examples: 0101, 0201, 1003, 1104, etc.
These DTCs are controlled by NISSAN.
 2. CONSULT or GST (Generic Scan Tool) Examples: P0340, P1320, P0705, P0750, etc.
These DTCs are prescribed by SAE J2012.
(CONSULT also displays the malfunctioning component or system.)
- **Output of the trouble code indicates that the indicated circuit has a malfunction. However, in case of the Mode II and GST they do not indicate whether the malfunction is still occurring or occurred in the past and returned to normal. CONSULT can identify them. Therefore, using CONSULT (if available) is recommended.**

HOW TO ERASE DTC

The diagnostic trouble code can be erased by the following methods.

1. Changing the diagnostic test mode from Diagnostic Test Mode II to Mode I by turning the mode selector on the ECM (Refer to page EC-43.)
 2. Selecting "ERASE" in the "SELF-DIAG RESULTS" mode with CONSULT
 3. Selecting Mode 4 with GST (Generic Scan Tool)
- **If the battery terminal is disconnected, the diagnostic trouble code will be lost within 24 hours.**
 - **When you erase the DTC, using CONSULT or GST is easier and quicker than switching the mode selector on the ECM.**

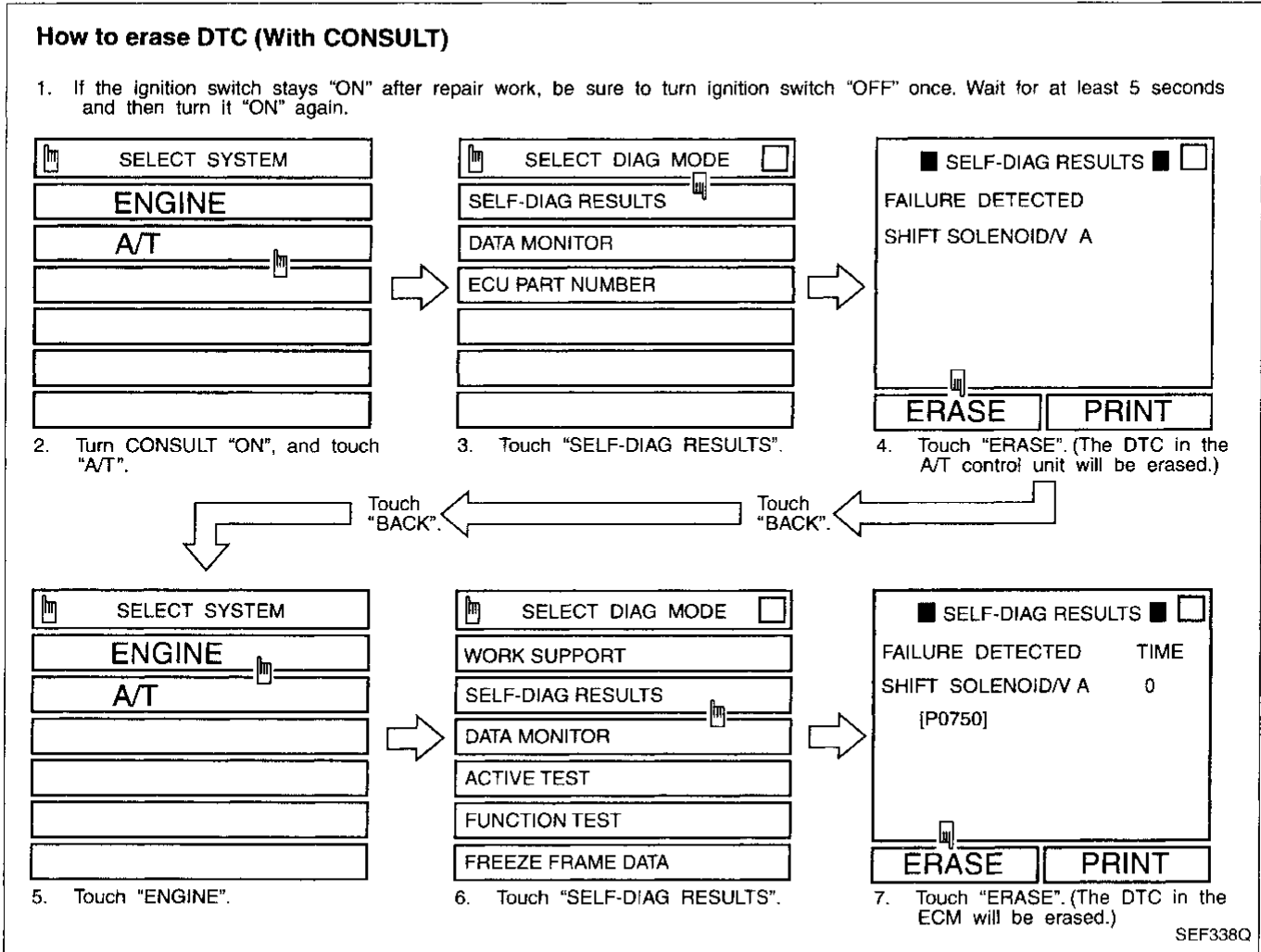
ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Diagnostic Trouble Code (DTC) (Cont'd)

HOW TO ERASE DTC (With CONSULT)

Note: If the diagnostic trouble code is not for A/T related items (see page EC-84), skip steps 2 through 4.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait for at least 5 seconds and then turn it "ON" again.
 2. Turn CONSULT "ON" and touch "A/T".
 3. Touch "SELF-DIAG RESULTS".
 4. Touch "ERASE". (The DTC in the A/T control unit will be erased.) And 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 A/T control unit, they need to be erased individually for both ECM and A/T control unit.



HOW TO ERASE DTC (Without CONSULT)

Note: If the diagnostic trouble code is not for A/T related items (see page EC-84), skip step 2.

1. If the ignition switch stays "ON" after repair work, be sure to turn ignition switch "OFF" once. Wait for at least 5 seconds and then turn it "ON" again.
2. Perform "SELF-DIAGNOSTIC PROCEDURE (Without CONSULT)" 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. Change the diagnostic test mode from Mode II to Mode I by turning the mode selector on the ECM. (See page EC-43.)

Freeze Frame Data

The ECM has a memory function, which stores the driving condition such as fuel system status, calculated load value, engine coolant temperature, short fuel trim, long fuel trim, engine speed, vehicle speed at the moment the ECM detects a malfunction.

Stored data is called Freeze Frame Data.

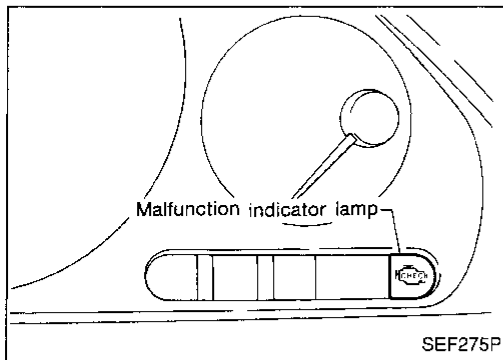
This data is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

This data can be utilized to duplicate the malfunction and to diagnose the trouble.

This data will be erased at the same time with the diagnostic trouble code by the above mentioned methods. The data can be stored only at the 1st trip. It can not be renewed even at the 2nd trip. The freeze frame data can be stored for only one item. Therefore, the ECM has the following priorities to update the data.

Priority	Detected items
1	Misfires — DTC: P0306-P0300 (0603-0701) Fuel Injection System Function — DTC: P0171 (0115), P0172 (0114), P0174 (0210), P0175 (0209)
2	Except the above items (includes A/T items)

For example, the EGR malfunction (Priority: 2) was detected and the freeze frame data was stored in the 1st trip. After that when the misfire (Priority: 1) is detected in another trip, the freeze frame data will be updated from the EGR malfunction for the misfire.



Malfunction Indicator Lamp (MIL)

1. The malfunction indicator lamp will light up when the ignition switch is turned ON without the engine running. This is for checking the blown lamp.
 - If the malfunction indicator lamp does not light up, see the **WARNING LAMPS AND CHIME (BUZZER)** in the EL section. (Or see EC-357.)
2. When the engine is started, the malfunction indicator lamp should go off. If the lamp remains on, the on-board diagnostic system has detected an engine system malfunction.

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION




Malfunction Indicator Lamp (MIL) (Cont'd)

ON-BOARD DIAGNOSTIC SYSTEM FUNCTION

The on-board diagnostic system has the following four functions.

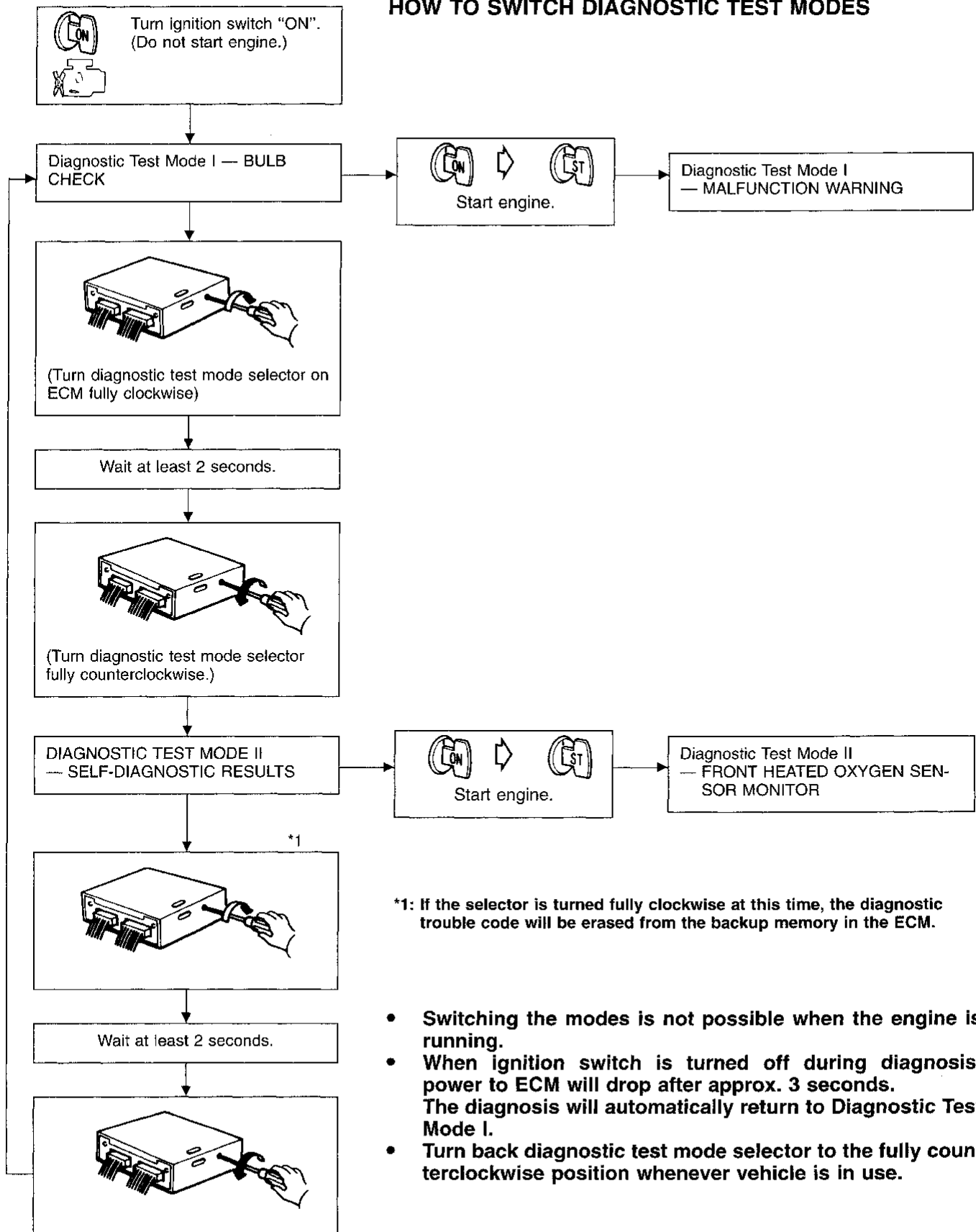
1. **BULB CHECK** : This function checks the bulb for damage (blown, open circuit, etc.) of the malfunction indicator lamp.
2. **MALFUNCTION WARNING** : This is a usual driving condition. When a malfunction is detected twice (2 trip detection logic), the malfunction indicator lamp will light up to inform the driver that a malfunction has been detected.
Only the following malfunctions will light up or blink the MIL even in the 1st trip.
 - "Misfire (possible three way catalyst damage)"
 - "Three way catalyst function"
 - "Closed loop control"
3. **SELF-DIAGNOSTIC RESULTS** : By using this function, the diagnostic trouble codes can be read.
4. **FRONT HEATED OXYGEN SENSOR MONITOR** : In this mode, the fuel mixture condition (lean or rich) monitored by front heated oxygen sensor can be read.

How to switch the diagnostic test (function) modes and details of the above functions are described later. (See page EC-43.)

Condition		Diagnostic Test Mode I	Diagnostic Test Mode II
Ignition switch in "ON" position 	Engine stopped 	BULB CHECK	SELF-DIAGNOSTIC RESULTS
	Engine running 	MALFUNCTION WARNING	FRONT HEATED OXYGEN SENSOR MONITOR

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd) HOW TO SWITCH DIAGNOSTIC TEST MODES



*1: If the selector is turned fully clockwise at this time, the diagnostic trouble code will be erased from the backup memory in the ECM.

- Switching the modes is not possible when the engine is running.
- When ignition switch is turned off during diagnosis, power to ECM will drop after approx. 3 seconds. The diagnosis will automatically return to Diagnostic Test Mode I.
- Turn back diagnostic test mode selector to the fully counterclockwise position whenever vehicle is in use.

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ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

DIAGNOSTIC TEST MODE I—BULB CHECK

In this mode, the MALFUNCTION INDICATOR LAMP on the instrument panel should stay ON. If it remains OFF, check the bulb. (See the WARNING LAMPS AND CHIME in the EL section. Or see EC-357.)

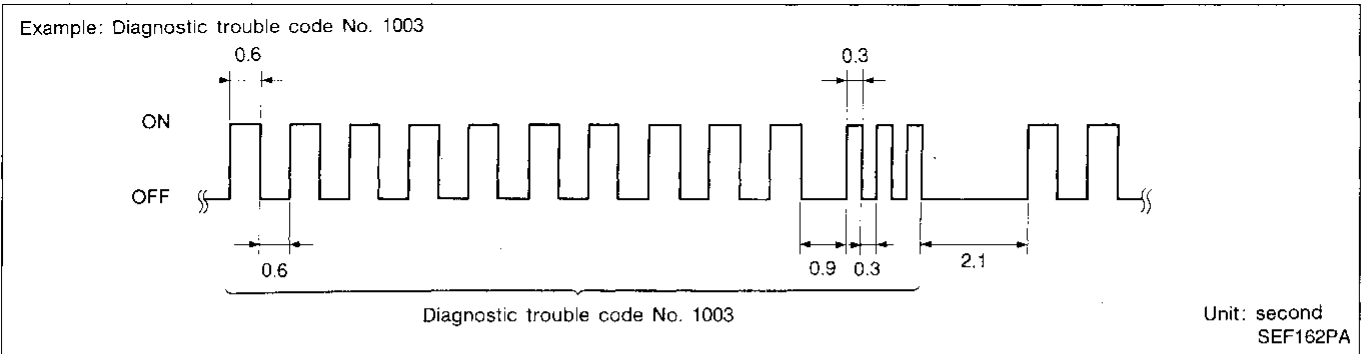
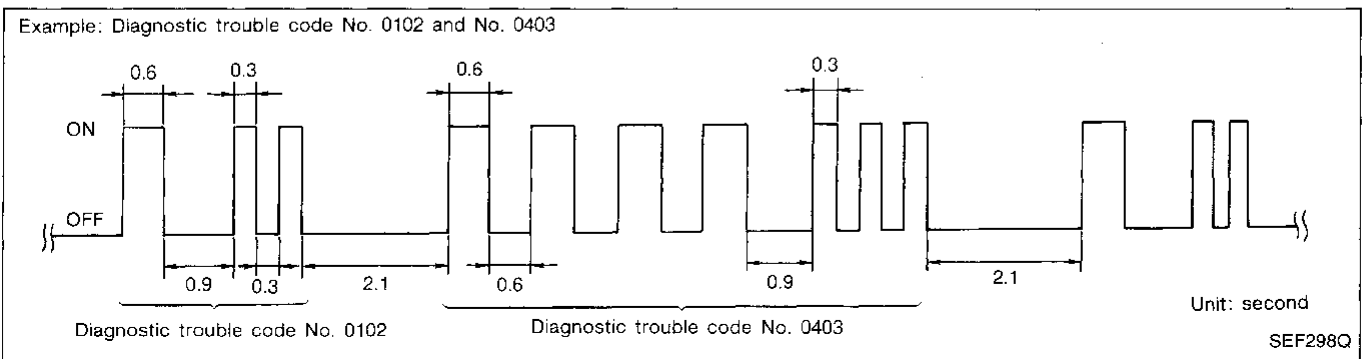
DIAGNOSTIC TEST MODE I—MALFUNCTION WARNING

MALFUNCTION INDICATOR LAMP	Condition
ON	When the malfunction (The "1 trip" or "2 trip" is shown in the "MIL Illumination" of the "DTC Chart". See page EC-72.) is detected or the ECM's CPU is malfunctioning.
OFF	No malfunction

- These Diagnostic Trouble Code Numbers are clarified in Diagnostic Test Mode II (SELF-DIAGNOSTIC RESULTS).

DIAGNOSTIC TEST MODE II—SELF-DIAGNOSTIC RESULTS

In this mode, a diagnostic trouble code is indicated by the number of blinks of the MALFUNCTION INDICATOR LAMP as shown below.



Long (0.6 second) blinking indicates the two LH digits of number and short (0.3 second) blinking indicates the two RH digits of number. For example, the malfunction indicator lamp blinks 10 times for 6 seconds (0.6 sec x 10 times) and then it blinks three times for about 1 second (0.3 sec x 3 times). This indicates the DTC "1003" and refers to the malfunction of the park/neutral position switch.

In this way, all the detected malfunctions are classified by their diagnostic trouble code numbers. The DTC "0505" refers to no malfunction. (See DIAGNOSTIC TROUBLE CODE CHART, refer to page EC-72.)

HOW TO ERASE DIAGNOSTIC TEST MODE II (Self-diagnostic results)

The diagnostic trouble code can be erased from the backup memory in the ECM when the diagnostic test mode is changed from Diagnostic Test Mode II to Diagnostic Test Mode I. (Refer to "HOW TO SWITCH DIAGNOSTIC TEST MODES".)

- If the battery terminal is disconnected, the diagnostic trouble code will be lost from the backup memory within 24 hours.
- Be careful not to erase the stored memory before starting trouble diagnoses.

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

Malfunction Indicator Lamp (MIL) (Cont'd)

DIAGNOSTIC TEST MODE II—FRONT HEATED OXYGEN SENSOR MONITOR

In this mode, the MALFUNCTION INDICATOR LAMP displays the condition of the fuel mixture (lean or rich) which is monitored by the front heated oxygen sensor.

MALFUNCTION INDICATOR LAMP	Fuel mixture condition in the exhaust gas	Air fuel ratio feedback control condition
ON	Lean	Closed loop control
OFF	Rich	
*Remains ON or OFF	Any condition	Open loop control

*: Maintains conditions just before switching to open loop.

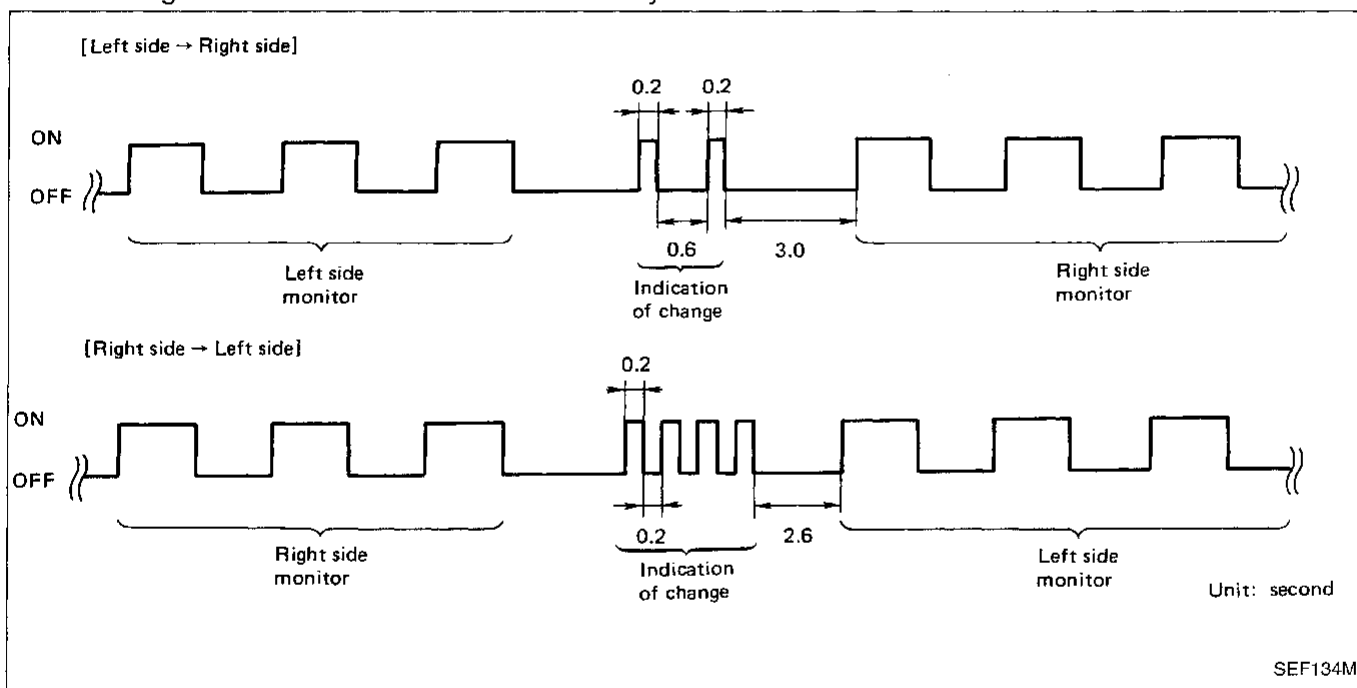
To check the front heated oxygen sensor function, start engine in the Diagnostic Test Mode II and warm it up until engine coolant temperature indicator points to the middle of the gauge.

Next run engine at about 2,000 rpm for about 2 minutes under no-load conditions. Then make sure that the MALFUNCTION INDICATOR LAMP comes ON more than 5 times every 10 seconds when measured at 2,000 rpm under no-load.

How to switch monitored sensor from left bank to right bank or vice versa

• The following procedure should be performed while the engine is running.

1. Turn diagnostic test mode selector on ECM fully clockwise.
2. Wait at least 2 seconds.
3. Turn diagnostic test mode selector on ECM fully counterclockwise.



ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart

RELATIONSHIP BETWEEN MIL, DTC, CONSULT AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the DTC and the freeze frame data are stored in the ECM memory.
- When the same malfunction is detected in two consecutive trips, the MIL will come on. For details, refer to "Two Trip Detection Logic" on EC-39.
- 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 MIL will remain on until the vehicle is driven (in the recorded driving pattern) 3 times with no malfunction.
- The DTC and the freeze frame data can be displayed until the vehicle is driven 40 times (except for Misfire and Fuel Injection System). For Misfire and Fuel Injection System, the DTC and freeze frame data can be displayed until the vehicle is driven 80 times. The "TIME" IN "SELF-DIAGNOSTIC RESULTS" mode of CONSULT will count in response to the number of times the vehicle is driven.

SUMMARY CHART

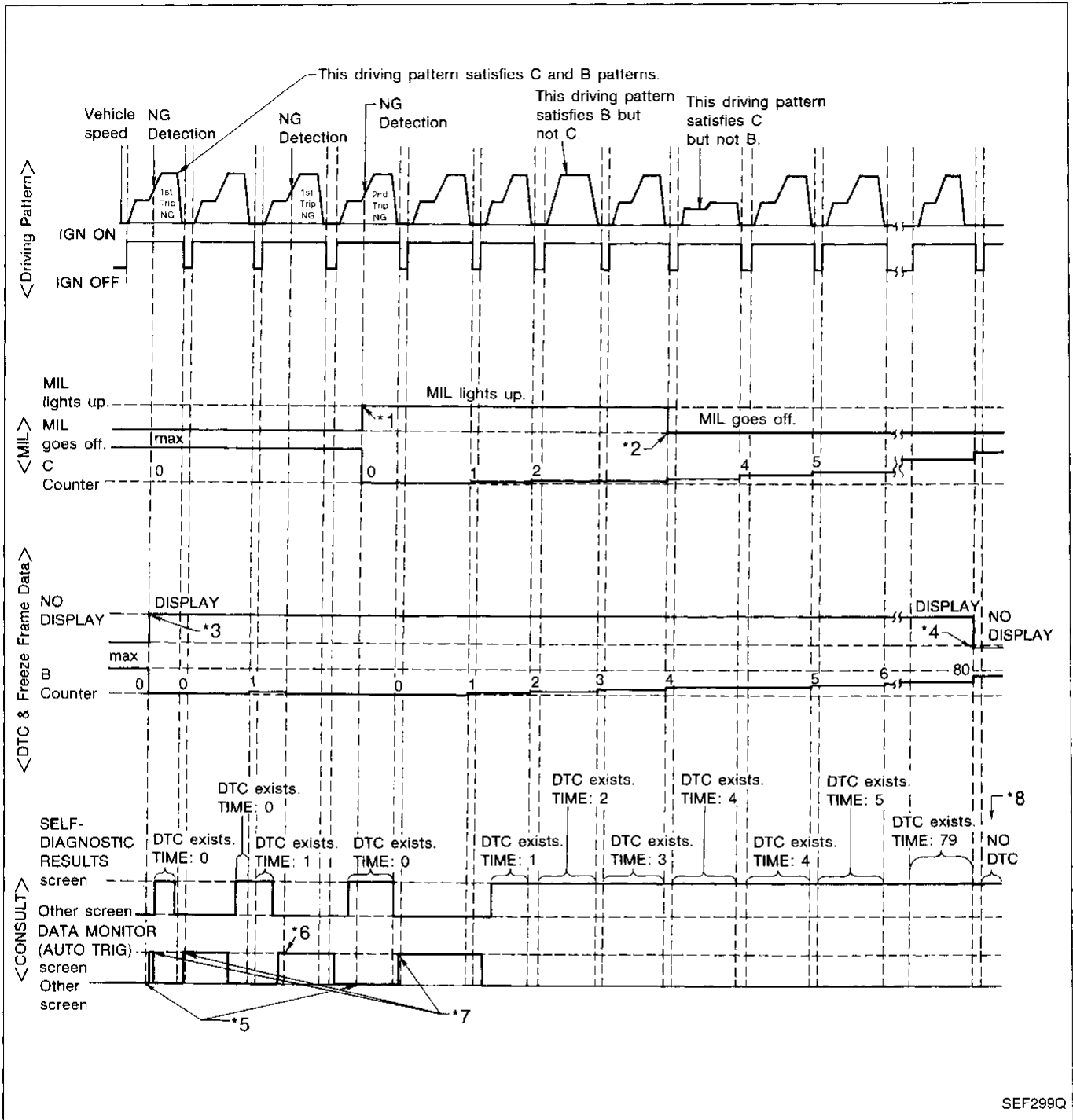
Items	MIL (goes off)	DTC, Freeze Frame Data (no display)
Fuel Injection System	3 (pattern C)	80 (pattern B)
Misfire	3 (pattern C)	80 (pattern B)
Except the aboves	3 (pattern B)	40 (pattern A)

Details about patterns "A", "B", and "C" are on EC-48.

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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



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- *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 C) without any malfunctions.
- *3: When a malfunction is detected for the first time, 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 B) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)
- *5: Other screen except DATA MONITOR (AUTO TRIG) can not display the malfunction.

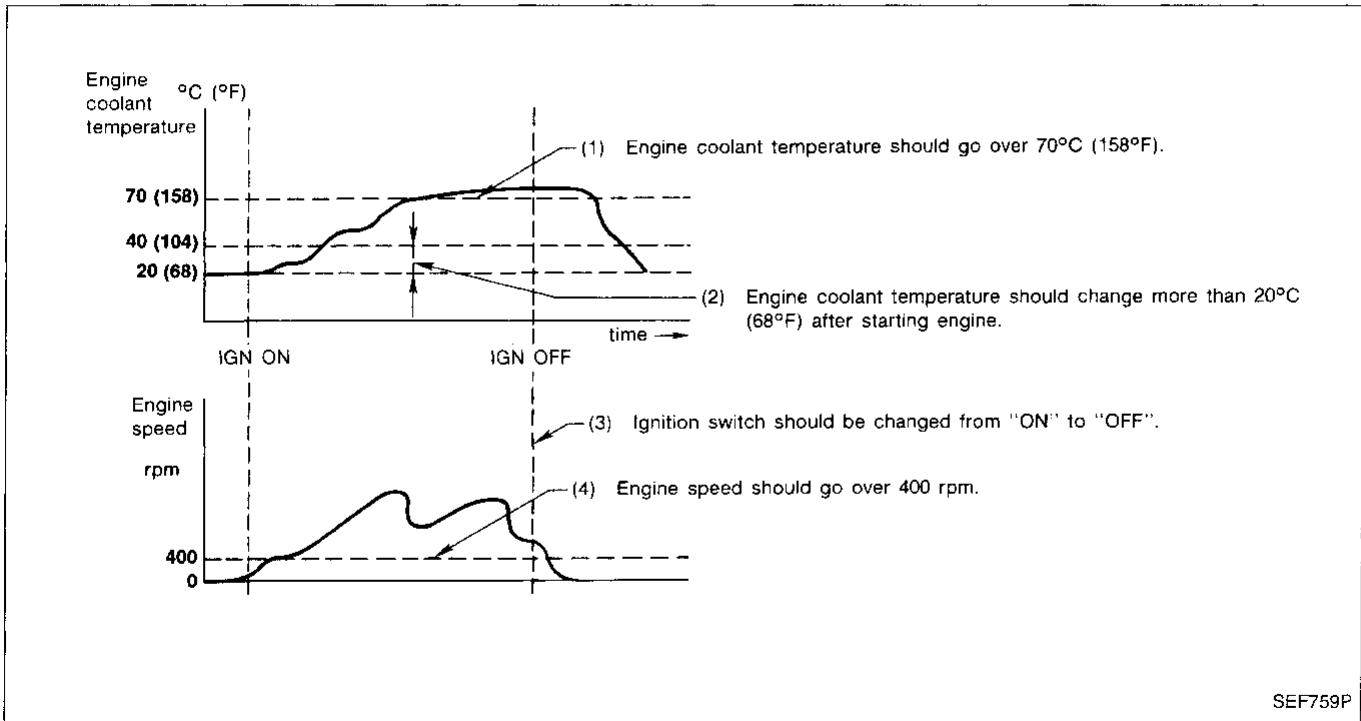
- *6: DATA MONITOR (AUTO TRIG) can display the malfunction at the moment it is detected.
- *7: The malfunction can not be displayed because the timing to set DATA MONITOR (AUTO TRIG) screen was missed against the NG detection.
- *8: The DTC and the freeze frame data will not be displayed any longer after vehicle is driven 80 times (pattern B) without the same malfunction. (The DTC and the freeze frame data still remain in ECM.)

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

<Driving pattern A>



<Driving pattern B>

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 reset when the malfunction is detected twice regardless of the driving pattern.
- The B counter will count the number of times driving pattern B is satisfied without the malfunction.
- The DTC will not be displayed after the B counter reaches 80.

<Driving pattern C>

Driving pattern C means the vehicle operation as follows:

(1) Driving pattern A should be satisfied.

(2) 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:

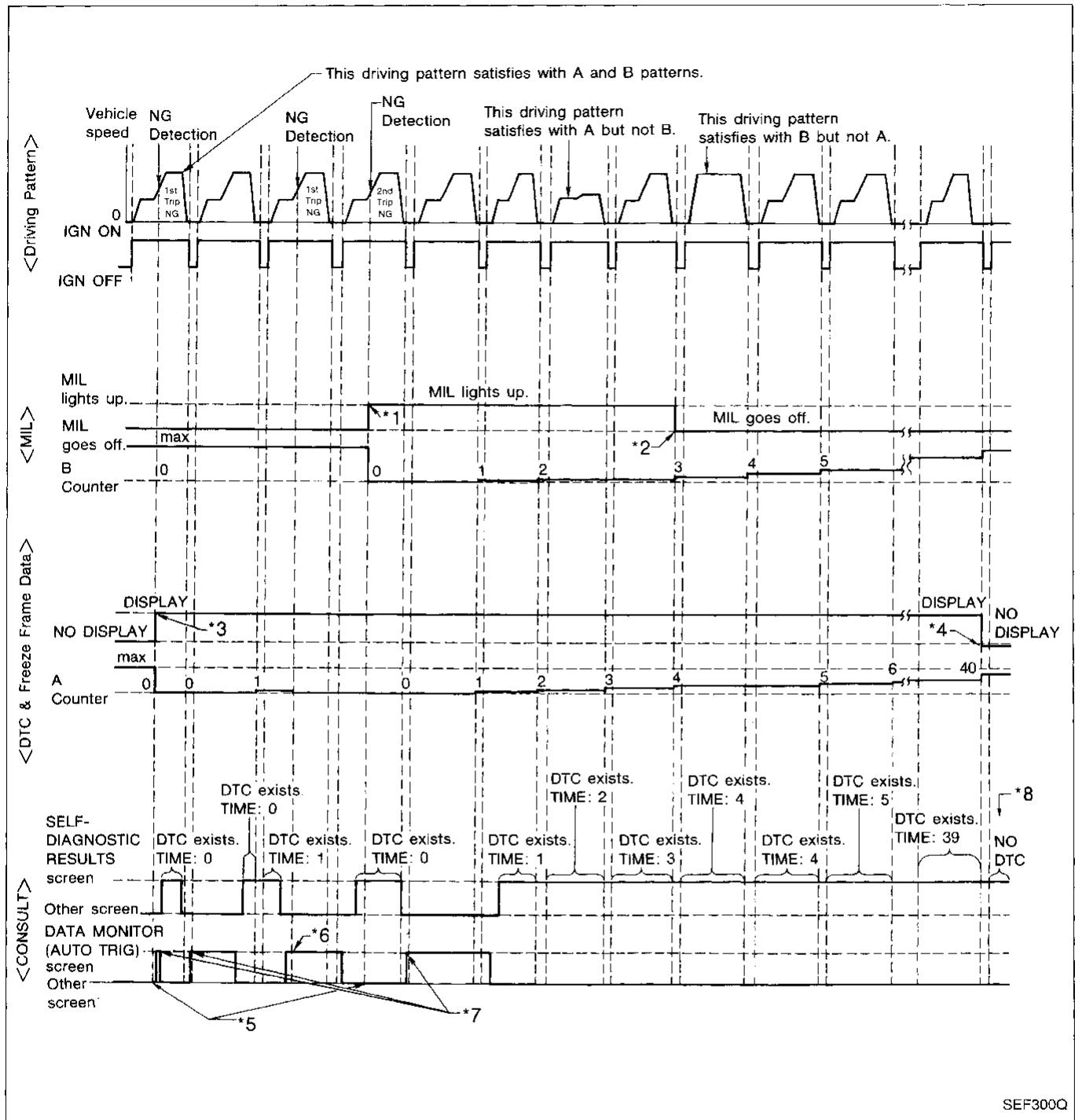
Engine speed: 475 - 1,225 rpm, Calculated load value: 27 - 33%, Engine coolant temperature: more than 70°C (158°F)

- The C counter will be cleared when the malfunction is detected regardless of (1), (2). (*1 in "OBD SYSTEM OPERATION CHART")
- The C counter will be counted up when (1), (2) are satisfied without the same malfunction.
- The MIL will go off when the C counter reaches 3. (*2 in "OBD SYSTEM OPERATION CHART")

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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



- *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 a malfunction is detected for the first time, 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: Other screen except DATA MONITOR (AUTO TRIG) can not display the malfunction.

- *6: DATA MONITOR (AUTO TRIG) can display the malfunction at the moment it is detected.
- *7: The malfunction can not be displayed because the timing to set DATA MONITOR (AUTO TRIG) screen was missed against the NG detection.
- *8: 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.)

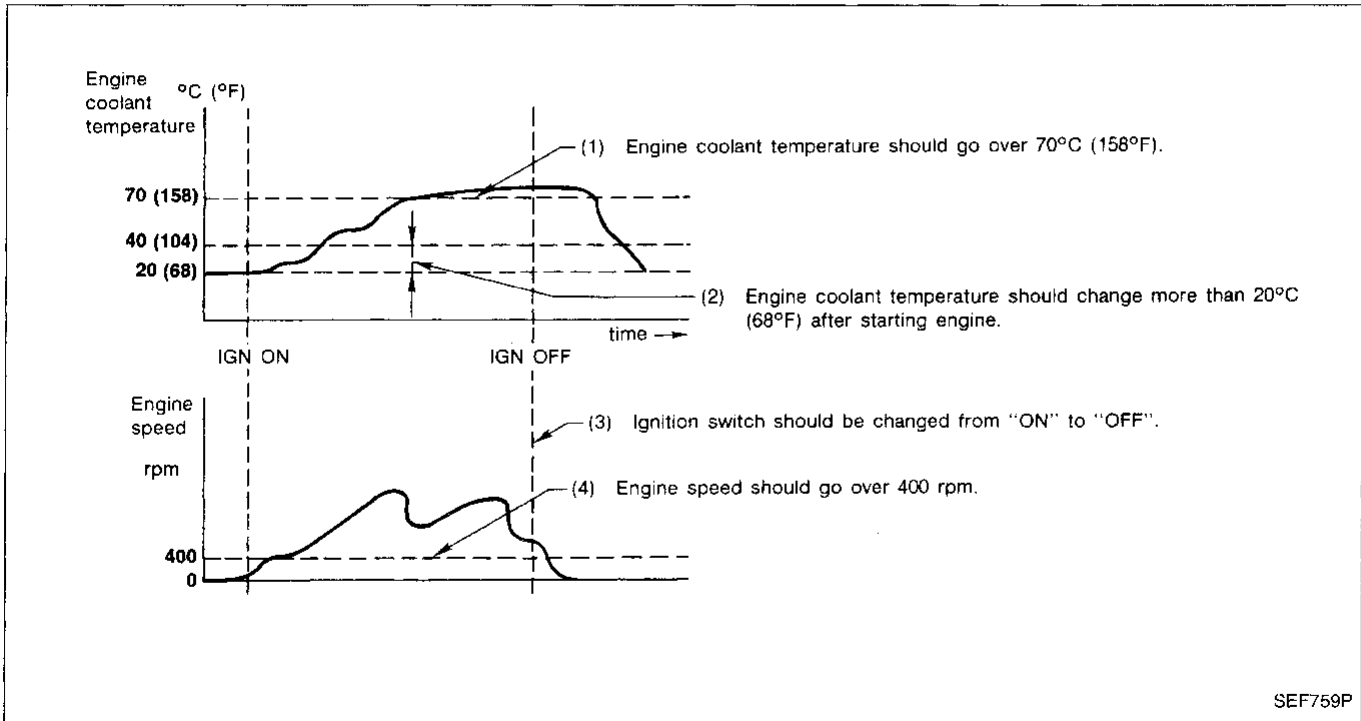
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ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

OBD System Operation Chart (Cont'd)

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

<Driving pattern A>



- 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.

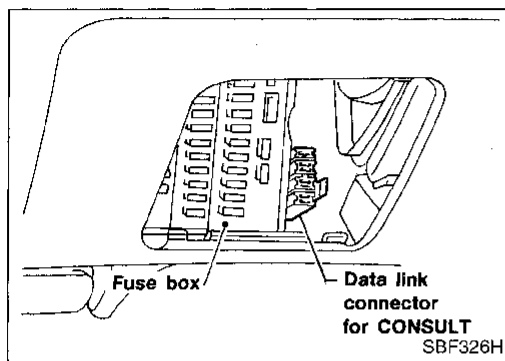
<Driving pattern B>

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 twice regardless of the driving pattern (*1 in "OBD SYSTEM OPERATION CHART").
- 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").

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION



CONSULT

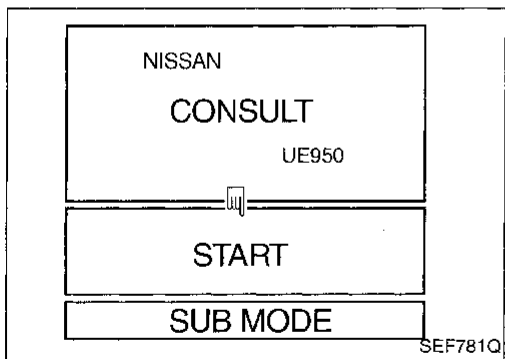
CONSULT INSPECTION PROCEDURE

1. Turn off ignition switch.
2. Connect "CONSULT" to data link connector for CONSULT. (Data link connector for CONSULT is located behind the fuse box cover.)

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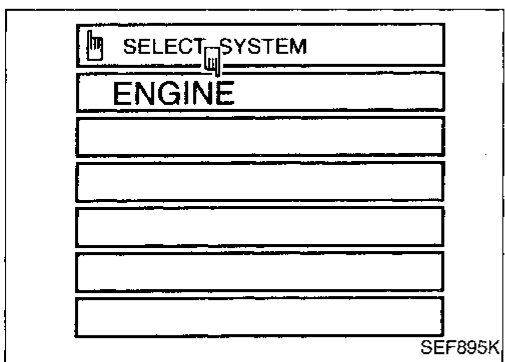
EM



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

LC

EC



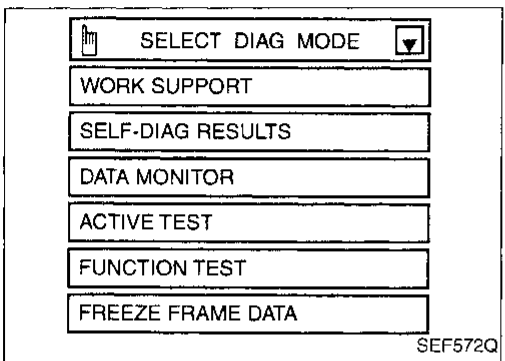
5. Touch "ENGINE".

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

BR

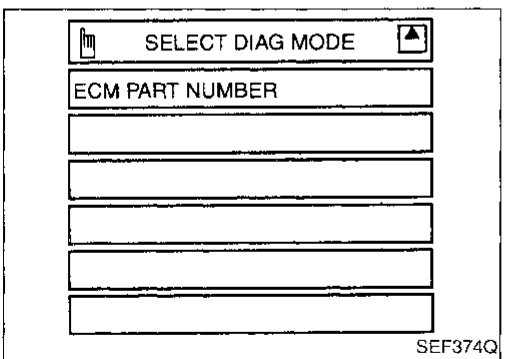
For further information, see the CONSULT Operation Manual.

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ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

ECCS COMPONENT PARTS/CONTROL SYSTEMS APPLICATION

		Item	DIAGNOSTIC TEST MODE					
			WORK SUP-PORT	SELF-DIAG-NOSTIC RESULTS	DATA MONITOR	ACTIVE TEST	FUNC-TION TEST	FREEZE FRAME DATA*
ECCS COMPONENT PARTS	INPUT	Camshaft position sensor (PHASE)		X				
		Crankshaft position sensor (REF)		X	X			
		Crankshaft position sensor (POS)		X	X			X
		Mass air flow sensor		X	X			
		Engine coolant temperature sensor		X	X	X		X
		Front heated oxygen sensors		X	X		X	
		Rear heated oxygen sensor		X	X			
		Vehicle speed sensor		X	X		X	X
		Throttle position sensor	X	X	X		X	
		Tank fuel temperature sensor		X	X	X		
		EVAP control system pressure sensor		X	X			
		Absolute pressure sensor		X	X			
		EGR temperature sensor		X	X			
		Intake air temperature sensor		X	X			
		Knock sensor		X				
		Ignition switch (start signal)			X			X
		Closed throttle position switch		X				
		Closed throttle position (throttle position sensor signal)			X			X
		Air conditioner switch			X			
		Park/Neutral position switch		X	X			X
	Power steering oil pressure switch			X			X	
	Electrical load			X				
	Air conditioner pressure switch			X				
	Battery voltage			X				
	OUTPUT	Injectors			X	X	X	
		Power transistor (Ignition timing)		X (Ignition signal)	X	X	X	
		IACV-AAC valve	X	X	X	X	X	
		Front engine mounting			X	X		
		EVAP canister purge volume control valve		X	X	X		
		Air conditioner relay			X			
		Fuel pump relay	X		X	X	X	
		Cooling fan		X	X	X	X	
EGRC-solenoid valve			X	X	X	X		
Front heated oxygen sensor heaters			X	X				
EVAP canister purge control solenoid valve			X	X	X			
EVAP canister vent control valve			X	X				
Vacuum cut valve bypass valve		X	X					
MAP/BARO switch solenoid valve		X	X	X				
FPCM		X	X	X				
Calculated load value			X			X		

X: Applicable

*: The items appear on CONSULT screen in FREEZE FRAME DATA mode only if a diagnostic trouble code (DTC) is detected. For details, refer to EC-62.

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (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 unit.
Self-diagnostic results	Self-diagnostic results can be read and erased quickly.
Data monitor	Input/Output data in the ECM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from the ECMs and also shifts some parameters in a specified range.
Function test	Conducted by CONSULT instead of a technician to determine whether each system is "OK" or "NG".
Freeze frame data	ECM stores the driving condition at the moment a malfunction is detected, and the stored data can be read. [Regarding the details, refer to "Freeze Frame Data" (EC-41).]
ECM part numbers	ECM part numbers can be read.

WORK SUPPORT MODE

WORK ITEM	CONDITION	USAGE
THRTL POS SEN ADJ	CHECK THE THROTTLE POSITION SENSOR SIGNAL. ADJUST IT TO THE SPECIFIED VALUE BY ROTATING THE SENSOR BODY UNDER THE FOLLOWING CONDITIONS. <ul style="list-style-type: none"> • IGN SW "ON" • ENG NOT RUNNING • ACC PEDAL NOT PRESSED 	When adjusting throttle position sensor initial position
IACV-AAC VALVE ADJ	SET ENGINE SPEED AT THE SPECIFIED VALUE UNDER THE FOLLOWING CONDITIONS. <ul style="list-style-type: none"> • ENGINE WARMED UP • NO-LOAD 	—
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

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ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

SELF-DIAGNOSTIC MODE

Regarding items detected in "SELF-DIAG RESULTS" mode, refer to "Diagnostic Trouble Code (DTC) chart" (See page EC-72.)

DATA MONITOR MODE

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
CKPS●RPM (POS) [rpm]	○	○	<ul style="list-style-type: none"> Indicates the engine speed computed from the POS signal (1° signal) of the crankshaft position sensor (POS). 	
CKPS●RPM (REF) [rpm]	○		<ul style="list-style-type: none"> Indicates the engine speed computed from the REF signal (120° signal) of the crankshaft position sensor (REF). 	<ul style="list-style-type: none"> The accuracy of detection becomes poor if engine speed drops below the idle rpm. If the signal is interrupted while the engine is running, an abnormal value may be indicated.
POS COUNT	○	○	<ul style="list-style-type: none"> Indicates the number of signal plate (fly-wheel) cogs (tooth) during engine 1 revolution. 	
MAS AIR/FL SE [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.
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.
FR O2 SEN-B2 [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the front heated oxygen sensor is displayed. 	
FR O2 SEN-B1 [V]	○			
RR O2 SENSOR [V]	○	○	<ul style="list-style-type: none"> The signal voltage of the rear heated oxygen sensor is displayed. 	
FR O2 MNTR-B2 [RICH/LEAN]	○	○	<ul style="list-style-type: none"> Display of front heated oxygen sensor 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.
FR O2 MNTR-B1 [RICH/LEAN]	○	○		
RR O2 MNTR [RICH/LEAN]	○		<ul style="list-style-type: none"> Display of rear heated oxygen sensor signal: RICH ... means the amount of oxygen after three way catalyst is relatively large. LEAN ... means the amount of oxygen after three way catalyst is relatively small. 	<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. 	

NOTE:

Any monitored item that does not match the vehicle being diagnosed is deleted from the display automatically. Regarding A32 model, "B1" indicates right bank and "B2" indicates left bank.

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks	
BATTERY VOLT [V]	○	○	<ul style="list-style-type: none"> The power supply voltage of ECM is displayed. 		GI
THRTL POS SEN [V]	○	○	<ul style="list-style-type: none"> The throttle position sensor signal voltage is displayed. 		MA
TANK F/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. 		EM
EGR TEMP SEN [V]	○		<ul style="list-style-type: none"> The signal voltage of the EGR temperature sensor is displayed. 		LC
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. 		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/P SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the throttle position sensor signal. 		CL
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. 		MT
P/N POSI SW [ON/OFF]	○	○	<ul style="list-style-type: none"> Indicates [ON/OFF] condition from the park/neutral position switch signal. 		AT
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. 		FA
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. 		RA
IGNITION SW [ON/OFF]	○		<ul style="list-style-type: none"> Indicates [ON/OFF] condition from ignition switch. 		BR
INJ PULSE-B2 [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. 	ST
INJ PULSE-B1 [msec]					RS
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. 		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
IACV-AAC/V [step]		○	<ul style="list-style-type: none"> Indicates the idle air control valve (AAC valve) control value computed by ECM according to the input signals. 		EL
PURG VOL C/V [step]			<ul style="list-style-type: none"> Indicates the EVAP canister purge volume control valve computed by the engine control module according to the input signals. The opening becomes larger as the value increases. 		IDX
ENGINE MOUNT [IDLE/TRVL]		○	<ul style="list-style-type: none"> The control condition of the front engine mounting (computed by the engine control module according to the input signals) is indicated. IDLE ... Idle condition TRVL ... Driving condition 		
A/F ALPHA-B2 [%]			<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. 	
A/F ALPHA-B1 [%]				<ul style="list-style-type: none"> This data also includes the data for the air-fuel ratio learning control. 	

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
EVAP SYS PRES [V]			<ul style="list-style-type: none"> The signal voltage of EVAP control system pressure sensor is displayed. 	
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. 	
COOLING FAN [HI/LOW/OFF]			<ul style="list-style-type: none"> The control condition of the cooling fan (determined by ECM according to the input signal) is indicated. HI ... High speed operation LOW ... Low speed operation OFF ... Stop 	
EGRC SOL/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EGRC-sole-noid valve (determined by ECM according to the input signal) is indicated. ON ... EGR operation is cut-off OFF ... EGR is operational 	
VENT CONT/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canis-ter vent control valve (determined by ECM according to the input signal) is indicated. ON ... Closed OFF ... Open 	
O2 SEN HTR-B1 [ON/OFF]			<ul style="list-style-type: none"> Indicates [ON/OFF] condition of front heated oxygen sensor's heater deter-mined by ECM according to the input signals. 	
O2 SEN HTR-B2 [ON/OFF]				
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 indi-cated. ON ... Open OFF ... Closed 	
PURG CONT S/V [ON/OFF]			<ul style="list-style-type: none"> The control condition of the EVAP canis-ter purge control solenoid valve (com-puted by the engine control module according to the input signals) is indi-cated. ON ... Canister purge is operational OFF ... Canister purge operation is cut-off 	
CAL/LD VALUE [%]			<ul style="list-style-type: none"> "Calculated load value" indicates the value of the current airflow divided by peak airflow. 	
ABSOL TH●P/S [%]			<ul style="list-style-type: none"> "Absolute throttle position sensor" indi-cates the throttle opening computed by ECM according to the signal voltage of the throttle position sensor. 	
MASS AIRFLOW [gm/s]			<ul style="list-style-type: none"> Indicates the mass airflow computed by ECM according to the signal voltage of the mass airflow sensor. 	

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

Monitored item [Unit]	ECM input signals	Main signals	Description	Remarks
FPCM DR VOLT [V]			<ul style="list-style-type: none"> The voltage between fuel pump and dropping resistor is displayed. 	
FPCM [HI/LOW]			<ul style="list-style-type: none"> The control condition of the fuel pump control module (FPCM) (determined by ECM according to the input signal) is indicated. HI ... High amount of fuel flow LOW ... Low amount of fuel flow 	GI MA
MAP/BARO SW/V [MAP/BARO]			<ul style="list-style-type: none"> The control condition of the MAP/BARO switch solenoid valve (determined by ECM according to the input signal) is indicated. MAP ... Intake manifold absolute pressure BARO ... Barometric pressure 	EM LC
ABSOL PRES/SE [V]			<ul style="list-style-type: none"> The signal voltage of the absolute pressure sensor is displayed. 	EC
VOLTAGE [V]			<ul style="list-style-type: none"> Voltage measured by the voltage probe. 	FE
PULSE [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.
				CL
				MT
				AT
				FA
				RA
				BR
				ST
				RS
				BT
				HA
				EL
				IDX

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

ACTIVE TEST MODE

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. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Fuel injectors Front heated oxygen sensor
IACV-AAC/V OPENING	<ul style="list-style-type: none"> Engine: After warming up, idle the engine. Change the IACV-AAC valve opening step using CONSULT. 	Engine speed changes according to the opening step.	<ul style="list-style-type: none"> Harness and connector IACV-AAC valve
ENG COOLANT TEMP	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Change the engine coolant temperature using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Harness and connector Engine coolant temperature sensor Fuel injectors
IGNITION TIMING	<ul style="list-style-type: none"> Engine: Return to the original trouble condition Timing light: Set Retard the ignition timing using CONSULT. 	If trouble symptom disappears, see CHECK ITEM.	<ul style="list-style-type: none"> Camshaft position sensor (PHASE) Crankshaft position sensor (REF) Crankshaft position sensor (POS)
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. 	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. 	Cooling fan moves and stops.	<ul style="list-style-type: none"> Harness and connector Cooling fan motor
FUEL PUMP RELAY	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the fuel pump relay "ON" and "OFF" using CONSULT and listen to operating sound. 	Fuel pump relay makes the operating sound.	<ul style="list-style-type: none"> Harness and connector Fuel pump relay
EGRC SOLENOID VALVE	<ul style="list-style-type: none"> Ignition switch: ON Turn solenoid valve "ON" and "OFF" with the CONSULT and listen to operating sound. 	Solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connector Solenoid valve
SELF-LEARNING CONT	<ul style="list-style-type: none"> In this test, the coefficient of self-learning control mixture ratio returns to the original coefficient by touching "CLEAR" on the screen. 		
ENGINE MOUNTING	<ul style="list-style-type: none"> Engine: After warming up, run engine at idle speed. Gear position: "D" range (Vehicle stopped) Turn front engine mounting "IDLE" and "TRAVEL" with the CONSULT. 	Body vibration changes according to the front engine mounting condition.	<ul style="list-style-type: none"> Harness and connector Front engine mounting
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 valve opening step using CONSULT. 	Engine speed changes according to the opening step.	<ul style="list-style-type: none"> Harness and connector EVAP canister purge volume control valve
PURG CONT S/V	<ul style="list-style-type: none"> Start engine. Turn the EVAP canister purge control solenoid valve "ON" and "OFF" using CONSULT and listen for operating sound. 	EVAP canister purge control solenoid valve makes an operating sound. Check vacuum signal for EVAP canister purge control valve. VC ON ... Vacuum exists. VC OFF ... Vacuum does not exist.	<ul style="list-style-type: none"> Harness and connector EVAP canister purge control solenoid valve Vacuum hose
MAP/BARO SW/V	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Turn the MAP/BARO switch solenoid valve between "MAP" and "BARO" using CONSULT and listen for operating sound. 	MAP/BARO switch solenoid valve makes an operating sound.	<ul style="list-style-type: none"> Harness and connector MAP/BARO switch solenoid valve
FPCM	<ul style="list-style-type: none"> Start engine. Turn the FPCM between "LOW" and "HI" using CONSULT and check that "FPCM DR VOLT" of CONSULT changes. 	"FPCM DR VOLT" of CONSULT changes as follows; HI ... Approx. 0V LOW ... Approx. 3.7V	<ul style="list-style-type: none"> Harness and connector FPCM Dropping resistor
TANK F/TEMP SEN	<ul style="list-style-type: none"> Change the tank fuel temperature using CONSULT. 		

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

FUNCTION TEST MODE

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)	
SELF-DIAG RESULTS	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Displays the results of on-board diagnostic system. 	—		Objective system	GI MA
CLOSED THROTTLE POSI	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Throttle position sensor circuit is tested when throttle is opened and closed fully. ("IDLE POSITION" is the test item name for the vehicles in which idle is selected by throttle position sensor.) 	Throttle valve: opened	OFF	<ul style="list-style-type: none"> Harness and connector Throttle position sensor (Closed throttle position) Throttle position sensor (Closed throttle position) adjustment Throttle linkage Verify operation in DATA MONITOR mode. 	EM LC
		Throttle valve: closed	ON		EC
THROTTLE POSI SEN CKT	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Throttle position sensor circuit is tested when throttle is opened and closed fully. 	Range (Throttle valve fully opened — Throttle valve fully closed)	More than 3.0V	<ul style="list-style-type: none"> Harness and connector Throttle position sensor Throttle position sensor adjustment Throttle linkage Verify operation in DATA MONITOR mode. 	FE CL
PARK/NEUT POSI SW CKT	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Inhibitor/Neutral position switch circuit is tested when shift lever is manipulated. 	Out of N/P positions	OFF	<ul style="list-style-type: none"> Harness and connector Neutral position switch or Inhibitor switch Linkage or Inhibitor switch adjustment 	MT AT
		In N/P positions	ON		
FUEL PUMP CIRCUIT	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Fuel pump circuit is tested by checking the pulsation in fuel pressure when fuel tube is pinched. 	There is pressure pulsation on the fuel feed hose.		<ul style="list-style-type: none"> Harness and connector Fuel pump Fuel pump relay Fuel filter clogging Fuel level 	FA RA
EGRC SOL/V CIRCUIT	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) EGRC-solenoid valve circuit is tested by checking solenoid valve operating noise. 	The solenoid valve makes an operating sound every 3 seconds.		<ul style="list-style-type: none"> Harness and connector EGRC-solenoid valve 	BR ST
COOLING FAN CIRCUIT	<ul style="list-style-type: none"> Ignition switch: ON (Engine stopped) Cooling fan circuit is tested when cooling fan is rotated. 	The cooling fan rotates and stops every 3 seconds.		<ul style="list-style-type: none"> Harness and connector Cooling fan motor Cooling fan relay 	RS BT

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IDX

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

FUNCTION TEST ITEM	CONDITION	JUDGEMENT		CHECK ITEM (REMEDY)
START SIGNAL CIRCUIT	<ul style="list-style-type: none"> Ignition switch: ON → START Start signal circuit is tested when engine is started by operating the starter. Battery voltage and water temperature before cranking, and average battery voltage, mass air flow sensor output voltage and cranking speed during cranking are displayed. 	Start signal: OFF → ON		<ul style="list-style-type: none"> Harness and connector Ignition switch
PW/ST SIGNAL CIRCUIT	<ul style="list-style-type: none"> Ignition switch: ON (Engine running) Power steering circuit is tested when steering wheel is rotated fully and then set to a straight line running position. 	Locked position	ON	<ul style="list-style-type: none"> Harness and connector Power steering oil pressure switch Power steering oil pump
		Neutral position	OFF	
VEHICLE SPEED SEN CKT	<ul style="list-style-type: none"> Vehicle speed sensor circuit is tested when vehicle is running at a speed of 10 km/h (6 MPH) or higher. 	Vehicle speed sensor input signal is greater than 4 km/h (2 MPH)		<ul style="list-style-type: none"> Harness and connector Vehicle speed sensor Electric speedometer
IGN TIMING ADJ	<ul style="list-style-type: none"> After warming up, idle the engine. Ignition timing is checked by reading ignition timing with a timing light and checking whether it agrees with specifications. 	The timing light indicates the same value on the screen.		<ul style="list-style-type: none"> Camshaft position sensor (PHASE) Crankshaft position sensor (REF) Crankshaft position sensor (POS)
MIXTURE RATIO TEST	<ul style="list-style-type: none"> Air-fuel ratio feedback circuit (injection system, ignition system, vacuum system, etc.) is tested by examining the front heated oxygen sensor output at 2,000 rpm under non-loaded state. 	Front heated oxygen sensor COUNT: More than 5 times during 10 seconds		<ul style="list-style-type: none"> INJECTION SYS (Injector, fuel pressure regulator, harness or connector) IGNITION SYS (Spark plug, power transistor, ignition coil, harness or connector) VACUUM SYS (Intake air leaks) Front heated oxygen sensor circuit Front heated oxygen sensor operation Fuel pressure high or low Mass air flow sensor
POWER BALANCE	<ul style="list-style-type: none"> After warming up, idle the engine. Injector operation of each cylinder is stopped one after another, and resultant change in engine rotation is examined to evaluate combustion of each cylinder. (This is only displayed for models where a sequential multiport fuel injection system is used.) 	Difference in engine speed is greater than 25 rpm before and after cutting off the injector of each cylinder.		<ul style="list-style-type: none"> Injector circuit (Injector, harness or connector) Ignition circuit (Spark plug, power transistor, ignition coil, harness or connector) Compression Valve timing
IACV-AAC/V SYSTEM	<ul style="list-style-type: none"> After warming up, idle the engine. IACV-AAC valve system is tested by detecting change in engine speed when IACV-AAC valve opening is changed to 1 step, 25 steps and 102 steps. 	Difference in engine speed is greater than 150 rpm between when valve opening is at 102 steps and at 25 steps.		<ul style="list-style-type: none"> Harness and connector IACV-AAC valve Air passage restriction between air inlet and IACV-AAC valve IAS (Idle adjusting screw) adjustment

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

FUNCTION TEST ITEM	CONDITION	JUDGEMENT	CHECK ITEM (REMEDY)
<p>★EVAP (SMALL LEAK)</p>	<ul style="list-style-type: none"> • After warming up, idle the engine etc. • EVAP system is tested by using the evaporative gas pressure in the fuel tank or engine intake manifold pressure. 	<ul style="list-style-type: none"> • EVAP control system has no leak. • EVAP control system operates 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 control valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line tube leaks • EVAP purge line rubber tube bent. • Blocked or bent rubber tube to EVAP control system pressure sensor • EVAP canister purge control valve • EVAP canister purge volume control valve • EVAP canister purge control solenoid valve • Absolute pressure sensor • Tank fuel temperature sensor • MAP/BARO switch solenoid valve • Blocked or bent rubber tube to MAP/BARO switch solenoid valve

★: Always select "SINGLE TEST" with CONSULT when performing the "FUNCTION TEST".

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ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

FREEZE FRAME DATA

Freeze frame data item	Description
DIAG TROUBLE CODE [PXXXX]	<ul style="list-style-type: none"> ECCS component part/control system has a trouble code, it is displayed as "PXXXX". [Refer to "Alphabetical & P No. Index for DTC (EC-358).]
FUEL SYS-B1*1	<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 heated oxygen sensor(s) as feedback for fuel control "MODE 5": Open loop - has not yet satisfied condition to go to closed loop
FUEL SYS-B2*1	
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.
S-FUEL TRIM-B2 [%]	<ul style="list-style-type: none"> 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.
L-FUEL TRIM-B2 [%]	<ul style="list-style-type: none"> 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.
VHCL SPEED [km/h] or [mph]	<ul style="list-style-type: none"> The vehicle speed at the moment a malfunction is detected is displayed.
MAP*2 [kPa]	<ul style="list-style-type: none"> The intake manifold absolute pressure at the moment a malfunction is detected is displayed.

*1: Regarding A32 model, "B1" indicates right bank and "B2" indicates left bank.

*2: This item is not displayed on CONSULT. Only for Generic Scan Tool (GST).

ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION

CONSULT (Cont'd)

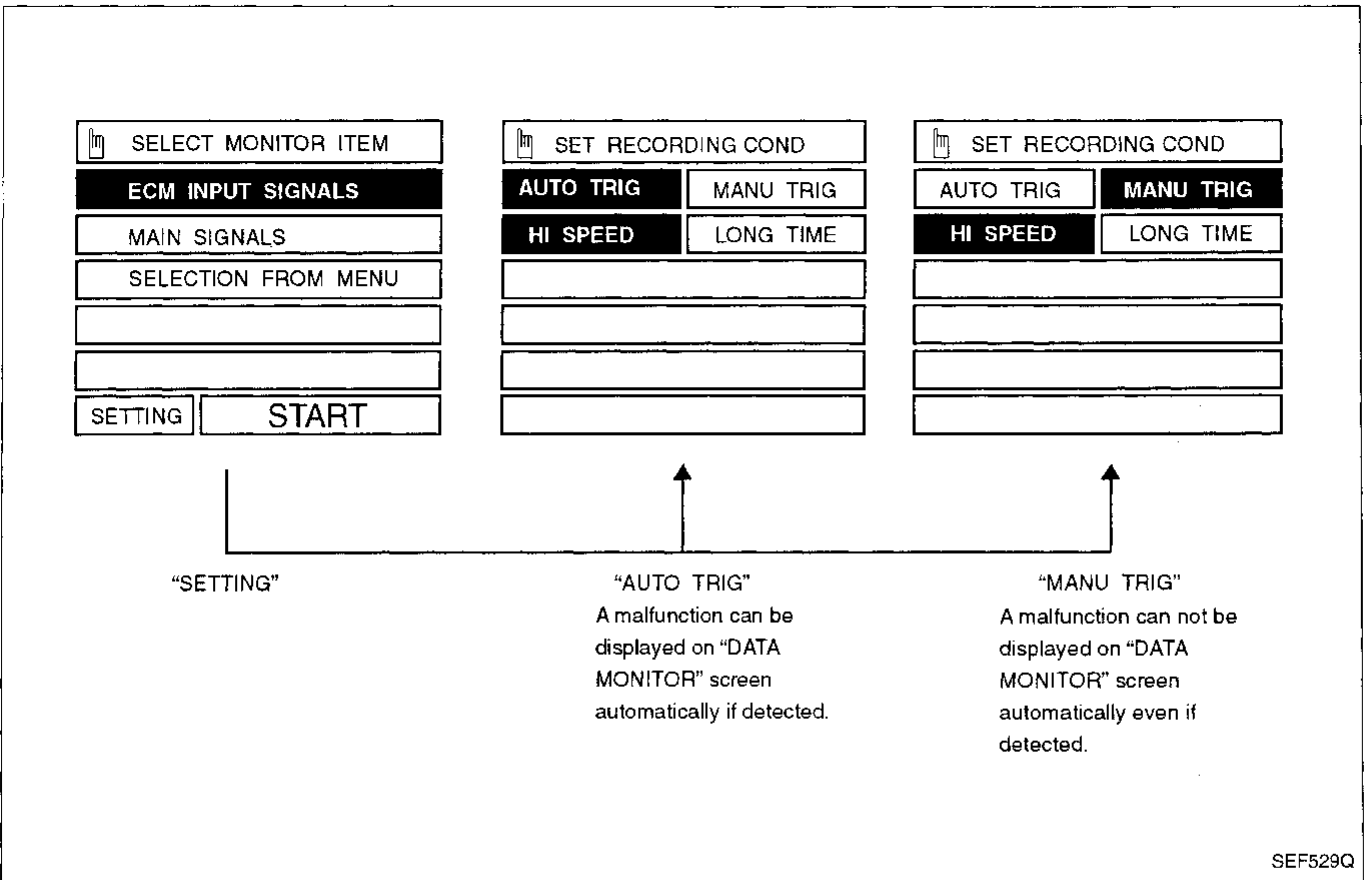
REAL TIME DIAGNOSIS IN DATA MONITOR MODE

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

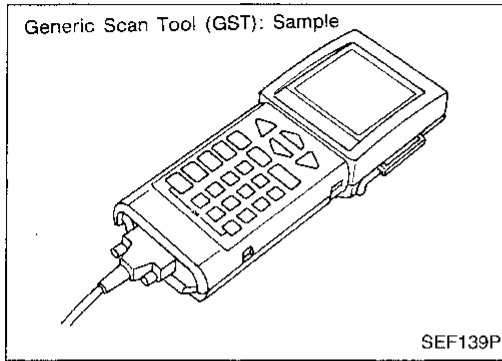
1. "AUTO TRIG" (Automatic trigger):
 - The malfunction will be identified on the CONSULT screen in real time. In other words, DTC and malfunction item will be displayed at the moment the malfunction is detected by ECM.
 - DATA MONITOR can be performed continuously until a malfunction is detected. However, DATA MONITOR cannot continue any longer after the malfunction detection.
2. "MANU TRIG" (Manual trigger):
 - DTC and malfunction item will not be displayed automatically on CONSULT 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 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 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 will be displayed. (Refer to GI section, "Incident Simulation Tests" in "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT".)
2. "MANU TRIG"
 - If the malfunction is displayed as soon as "DATA MONITOR" is selected, reset CONSULT 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.



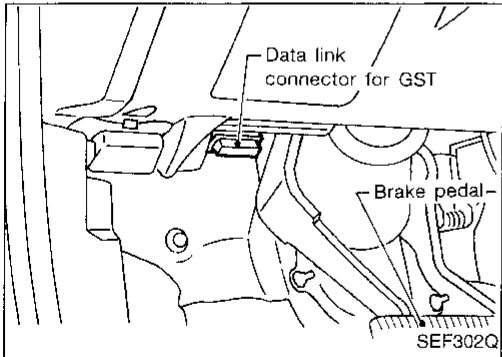
ON-BOARD DIAGNOSTIC SYSTEM DESCRIPTION



Generic Scan Tool (GST)

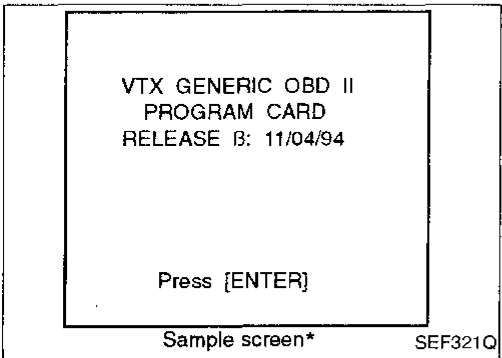
DESCRIPTION

Generic Scan Tool (OBDII scan tool) complying with SAE J1978 has five 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.

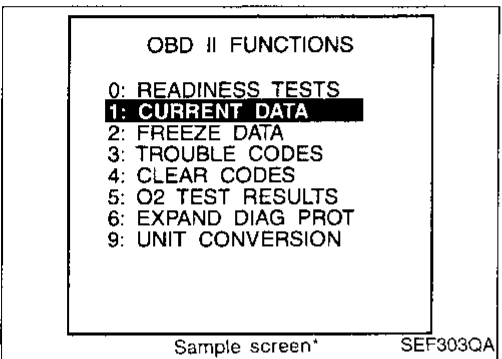


GST INSPECTION PROCEDURE

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



3. Turn ON ignition switch.
 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

Generic Scan Tool (GST) (Cont'd)

FUNCTION

Diagnostic test mode		Function
MODE 1	(CURRENT DATA)	This mode accesses 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 accesses to emission-related data value which were stored by ECM during the freeze frame. [For details, refer to "Freeze Frame Data" (EC-62).]
MODE 3	(TROUBLE CODES)	This mode accesses to emission-related power train trouble codes which were stored by ECM.
MODE 4	(CLEAR CODES)	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) • Clear heated oxygen sensor test data (MODE 5) • Reset status of system monitoring test (MODE 1)
MODE 5	(O2 TEST RESULTS)	This mode accesses to the on-board heated oxygen sensor monitoring test results.

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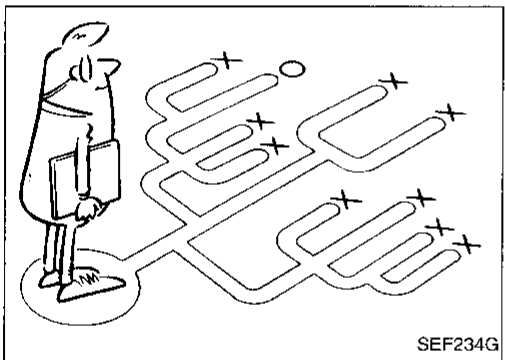
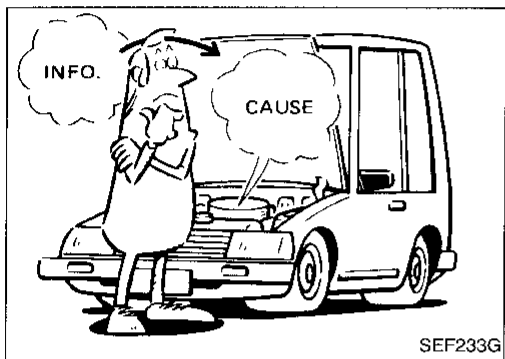
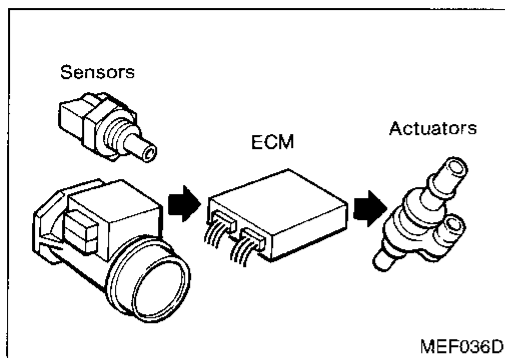
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Introduction

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.

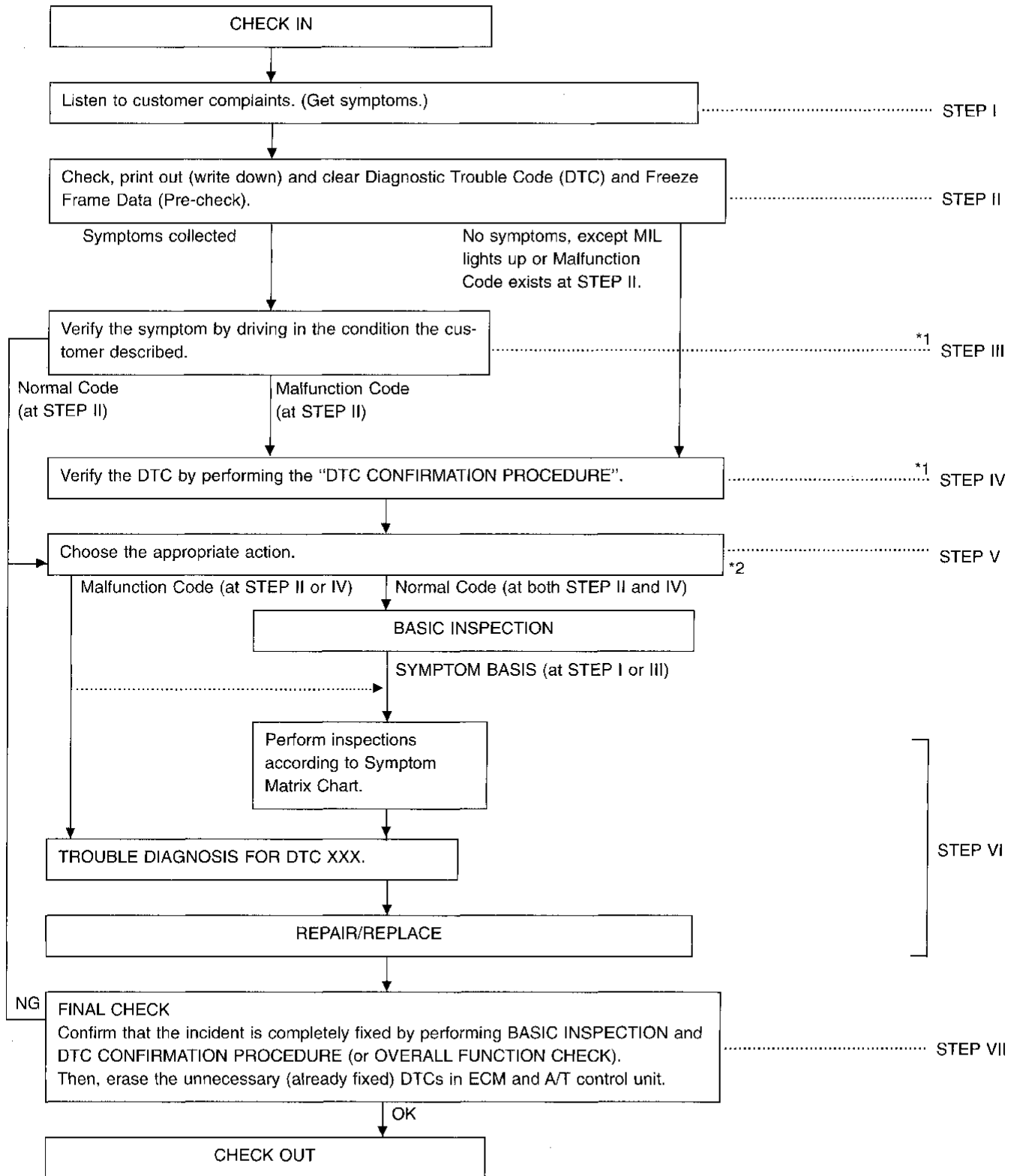
A visual check only may not find the cause of the problems. A road test with CONSULT (or GST) or a circuit tester connected should be performed. Follow the "Work Flow" on the next page.

Before undertaking actual checks, take just 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 EC-67 should be used.

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

TROUBLE DIAGNOSIS — Work Flow

Work Flow



***1: If the incident cannot be duplicated, see "Incident Simulation Tests" of "HOW TO PERFORM EFFICIENT DIAGNOSIS FOR AN ELECTRICAL INCIDENT" in GI section.**

***2: If the on-board diagnostic system cannot be performed, check main power supply and ground circuit (See TROUBLE DIAGNOSIS FOR POWER SUPPLY, EC-104).**

TROUBLE DIAGNOSIS — Work Flow

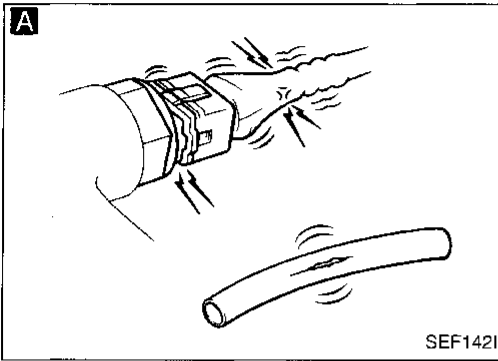
Description for Work Flow

STEP	DESCRIPTION	
STEP I	Get detailed information about the conditions and the environment when the incident/symptom occurred using the "DIAGNOSTIC WORK SHEET" as shown on the next page.	GI
STEP II	Before confirming the concern, check and write down (print out using CONSULT or Generic Scan Tool) the Diagnostic Trouble Code (DTC) and the freeze frame data, then erase the code and the data. (Refer to EC-39.) The DTC and the freeze frame data can be used when duplicating the incident at STEP III & IV. Study the relationship between the cause, specified by DTC, and the symptom described by the customer. (The "Symptom Matrix Chart" will be useful. See page EC-88.)	MA EM
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 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 section.) If the malfunction code is detected, skip STEP IV and perform STEP V.	LC
STEP IV	Try to detect the Diagnostic Trouble Code (DTC) by driving in (or performing) the "DTC CONFIRMATION PROCEDURE". Check and read the DTC and freeze frame data by using CONSULT or Generic Scan Tool. During the DTC verification, be sure to connect CONSULT 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 section.) In case the "DTC CONFIRMATION PROCEDURE" is not available, perform the "OVERALL FUNCTION CHECK" instead. The 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 DTC detection.	EC FE CL
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 XX. If the normal code is indicated, proceed to the BASIC INSPECTION on next page. Then perform inspections according to the Symptom Matrix Chart. (Refer to EC-88.)	MT AT
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 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. Refer to EC-91. 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.	FA RA BR
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 (Diagnostic trouble code 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) DTC in ECM and A/T control unit. (Refer to EC-39.)	ST RS BT

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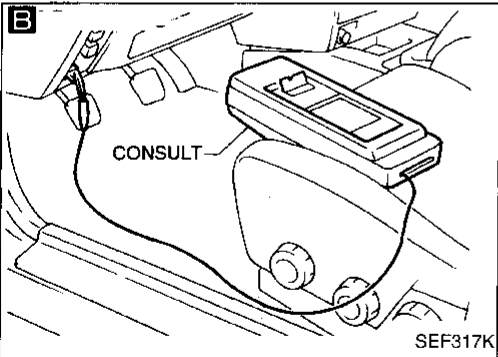


Basic Inspection

Precaution:

Perform Basic Inspection without electrical or mechanical loads applied;

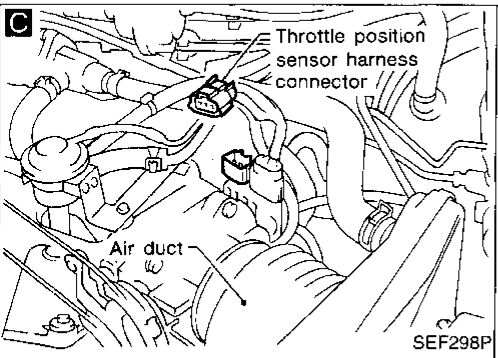
- Headlamp switch is OFF,
- Air conditioner switch is OFF,
- Rear defogger switch is OFF,
- Steering wheel is in the straight-ahead position, etc.



A

BEFORE STARTING

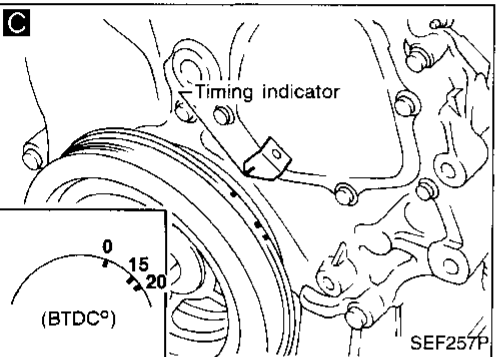
1. Check service records for recent repairs of related problems, or the current need for scheduled maintenance.
2. Open engine hood and check the following:
 - Harness connectors for improper connections
 - Vacuum hoses for splits, kinks, or improper connections
 - Wiring for improper connections, pinches, or cuts



B

CONNECT CONSULT TO THE VEHICLE
Connect "CONSULT" to the data link connector for CONSULT and select "ENGINE" from the menu. (Refer to page EC-51.)

Warm up engine sufficiently.



C

CHECK IGNITION TIMING.

1. Disconnect throttle position sensor harness connector.
2. Check ignition timing at idle using timing light. (Refer to EC-30.)

Ignition timing:
 $15^{\circ} \pm 2^{\circ}$ BTDC

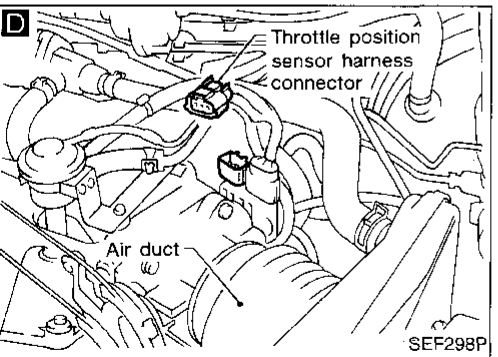
NG → Check camshaft position sensor (PHASE) (EC-197), crankshaft position sensor (REF) (EC-283), and crankshaft position sensor (POS) (EC-192).

D

CHECK IDLE ADJ. SCREW INITIAL SET RPM.
When disconnecting throttle position sensor harness connector, does engine speed fall to the following speed?
(Refer to EC-30.)

M/T: 575±50 rpm
A/T: 650±50 rpm (in "N" position)

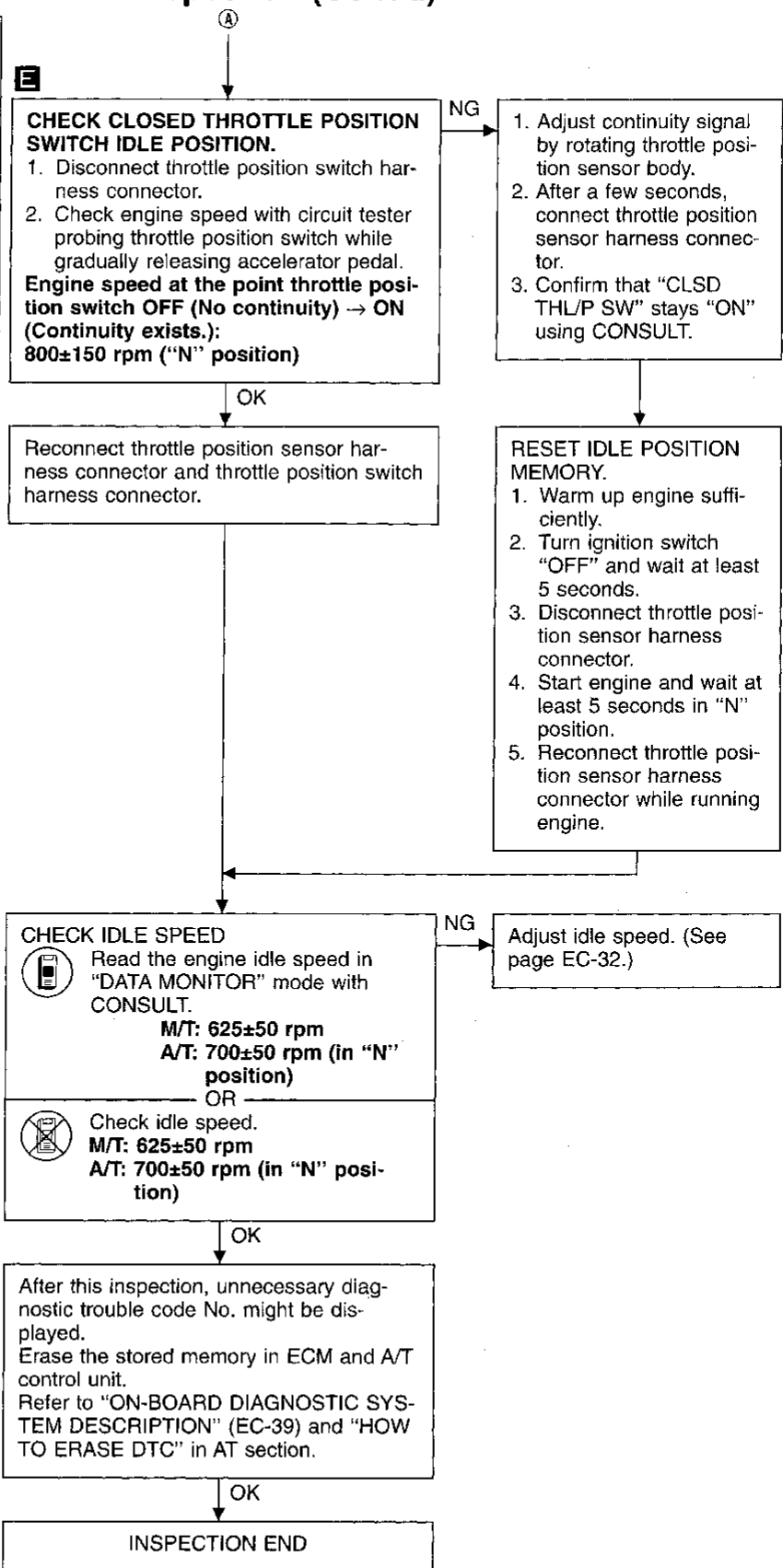
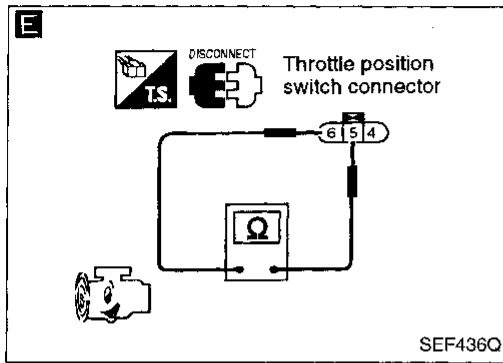
No → Adjust engine speed by turning idle adjusting screw.



Yes
(Go to A on next page.)

TROUBLE DIAGNOSIS — Basic Inspection

Basic Inspection (Cont'd)



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Diagnostic Trouble Code (DTC) Chart

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
(P0000)	0505	No failure (NO SELF DIAGNOSTIC FAILURE INDICATED...)	<ul style="list-style-type: none"> No malfunction related to OBD system is detected by both ECM and A/T control unit.
P0100	0102	Mass air flow sensor circuit (MASS AIR FLOW SEN)	<ul style="list-style-type: none"> An excessively high or low voltage is sent to ECM. Voltage sent to ECM is not practical when compared with the camshaft position sensor signal and throttle position sensor signals.
P0105	0803	Absolute pressure sensor (ABSOL PRESS SENSOR)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. <hr/> <ul style="list-style-type: none"> A low voltage from the sensor is sent to ECM under heavy load driving conditions. <hr/> <ul style="list-style-type: none"> A high voltage from the sensor is sent to ECM under light load driving conditions.
P0110	0401	Intake air temperature sensor circuit (INT AIR TEMP SEN)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.
P0115	0103	Engine coolant temperature sensor circuit (COOLANT TEMP SEN)	<ul style="list-style-type: none"> An excessively high or low voltage from the sensor is sent to ECM.
P0120	0403	Throttle position sensor circuit (THROTTLE POSI SEN)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. Rationally incorrect voltage from the sensor is sent to ECM compared with the voltage signals from mass air flow sensor and camshaft position sensor.
P0125	0908	Engine coolant temperature sensor function (*COOLANT TEMP SEN)	<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.
P0130	0503	Front heated oxygen sensor (right bank) circuit (FRONT O2 SENSOR-B1)	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. The voltage from the sensor is constantly approx. 0.3V. The maximum and minimum voltages from the sensor are not reached to the specified voltages. It takes more time for the sensor to respond between rich and lean than the specified time.
P0130	0307	Closed loop control (right bank) (CLOSED LOOP-B1)	<ul style="list-style-type: none"> The closed loop control function does not operate even when vehicle is driving in the specified condition.
P0135	0901	Front heated oxygen sensor's heater (right bank) circuit (FR O2 SE HEATER-B1)	<ul style="list-style-type: none"> The current amperage in the heater circuit is out of the normal range. (The improper voltage drop signal is sent to ECM through the heater.)

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.
 RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.
 LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.
 DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).
 RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).
 LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).
 DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

X: Applicable
—: Not applicable

Check Items (Possible Cause)	“DTC CONFIRMATION PROCEDURE” Quick Ref. *1	“OVERALL FUNCTION CHECK” Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page
• No failure	—	—	—	—	—
• Harness or connectors (The sensor circuit is open or shorted.) • Mass air flow sensor	RUNNING	RUNNING	X	2 trip	EC-108
• Harness or connectors (Absolute pressure sensor circuit is open or shorted.) • Absolute pressure sensor	IGN: ON	—			
• Absolute pressure sensor	—	IGN: ON	—	2 trip	EC-113
• Hoses (Hoses between the intake manifold and absolute pressure sensor have come off or are clogged.) • Intake air leaks • Absolute pressure sensor	RUNNING	—			
• Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor	IGN: ON	—	—	2 trip	EC-120
• Harness or connectors (The sensor circuit is open or shorted.) • Engine coolant temperature sensor	IGN: ON	—	X	2 trip	EC-125
• Harness or connectors (The sensor circuit is open or shorted.) • Throttle position sensor	—	IGN: ON	X	2 trip	EC-129
• Harness or connectors (High resistance in the sensor circuit) • Engine coolant temperature sensor • Thermostat	—	RUNNING	—	2 trip	EC-134
• Harness or connectors (The sensor circuit is open or shorted.) • Front heated oxygen sensor (right bank) • Injectors • Intake air leaks • Fuel pressure	—	RUNNING	—	2 trip	EC-139
• The front heated oxygen sensor (right bank) circuit is open or shorted. • Front heated oxygen sensor (right bank) • Front heated oxygen sensor heater (right bank)	—	RUNNING	—	1 trip	EC-144
• Harness or connectors (The heater circuit is open or shorted.) • Front heated oxygen sensor's heater (right bank)	RUNNING	—	—	2 trip	EC-146

*1: • This is Quick Reference of “DTC CONFIRMATION PROCEDURE”.

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The “OVERALL FUNCTION CHECK” is a simplified and effective way to inspect a component or circuit.

In some cases, the “OVERALL FUNCTION CHECK” is used rather than a “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE”.

When no DTC CONFIRMATION PROCEDURE is available, the “NG” result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

• During an “NG” OVERALL FUNCTION CHECK, the DTC might not be confirmed.

• This is Quick Reference of “OVERALL FUNCTION CHECK”.

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
P0136	0707	Rear heated oxygen sensor circuit (REAR O2 SENSOR)	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. The maximum and minimum voltages from the sensor are not reached to the specified voltages. It takes more time for the sensor to respond between "rich" and "lean" than the specified time.
P0150 (*3)	0308	Closed loop control (left bank) (CLOSED LOOP-B2)	<ul style="list-style-type: none"> The closed loop control function does not operate even when vehicle is driving in the specified condition.
P0150	0303	Front heated oxygen sensor (left bank) circuit (FRONT O2 SENSOR-B2)	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. The voltage from the sensor is constantly approx. 0.3V. The maximum and minimum voltages from the sensor are not reached to the specified voltages. It takes more time for the sensor to respond between rich and lean than the specified time.
P0155	1001	Front heated oxygen sensor's heater (left bank) circuit (FR O2 SE HEATER-B2)	<ul style="list-style-type: none"> The current amperage in the heater circuit is out of the normal range. (The improper voltage drop signal is sent to ECM through the heater.)
P0171	0115	Fuel injection system function (right bank) (lean side) (FUEL SYS LEAN/BK1)	<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.)
P0172	0114	Fuel injection system function (right bank) (rich side) (FUEL SYS RICH/BK1)	<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.)
P0174	0210	Fuel injection system function (left bank) (lean side) (FUEL SYS LEAN/BK2)	<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.)
P0175	0209	Fuel injection system function (left bank) (rich side) (FUEL SYS RICH/BK2)	<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.)
P0180	0402	Tank fuel temperature sensor circuit (TANK FUEL TEMP SEN)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor and intake air temperature sensor.

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.

RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.

DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).

RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).

DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

*3: Using CONSULT, "P0130" will be displayed.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

X: Applicable
—: Not applicable

Check Items (Possible Cause)	"DTC CONFIRMATION PROCEDURE" Quick Ref. *1	"OVERALL FUNCTION CHECK" Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page	
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Rear heated oxygen sensor • Fuel pressure • Injectors • Intake air leaks 	—	RUNNING (DRIVING)	—	2 trip	EC-149	MA
<ul style="list-style-type: none"> • The front heated oxygen sensor (left bank) circuit is open or shorted. • Front heated oxygen sensor (left bank) • Front heated oxygen sensor heater (left bank) 	—	RUNNING	—	1 trip	EC-144	LC
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Front heated oxygen sensor (left bank) • Injectors • Intake air leaks • Fuel pressure 	—	RUNNING	—	2 trip	EC-154	EC
<ul style="list-style-type: none"> • Harness or connectors (The heater circuit is open or shorted.) • Front heated oxygen sensor's heater (left bank) 	RUNNING	—	—	2 trip	EC-159	FE
<ul style="list-style-type: none"> • Intake air leaks • Front heated oxygen sensor (right bank) • Injector (right bank) • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor 	RUNNING	—	—	2 trip	EC-162	GL
<ul style="list-style-type: none"> • Front heated oxygen sensor (right bank) • Injectors (right bank) • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor 	RUNNING	—	—	2 trip	EC-167	WT
<ul style="list-style-type: none"> • Intake air leaks • Front heated oxygen sensor (left bank) • Injectors (left bank) • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor 	RUNNING	—	—	2 trip	EC-172	AT
<ul style="list-style-type: none"> • Front heated oxygen sensor (left bank) • Injectors (left bank) • Exhaust gas leaks • Incorrect fuel pressure • Mass air flow sensor 	RUNNING	—	—	2 trip	EC-177	FA
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Tank fuel temperature sensor 	IGN: ON	—	—	2 trip	EC-182	RA

*1: • This is Quick Reference of "DTC CONFIRMATION PROCEDURE".

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The "OVERALL FUNCTION CHECK" is a simplified and effective way to inspect a component or circuit.

In some cases, the "OVERALL FUNCTION CHECK" is used rather than a "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE".

When no DTC CONFIRMATION PROCEDURE is available, the "NG" result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

• During an "NG" OVERALL FUNCTION CHECK, the DTC might not be confirmed.

• This is Quick Reference of "OVERALL FUNCTION CHECK".

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...	
CONSULT GST	MIL			
P0300	0701	Multiple cylinders' misfire (MULTI CYL MISFIRE)	(Three way catalyst damage) The misfire occurs, which will damage three way catalyst by overheating.	(Exhaust quality deterioration) The misfire occurs, which will not damage three way catalyst but will affect emission deterioration.
P0301	0608	No. 1 cylinder's misfire (CYL 1 MISFIRE)		
P0302	0607	No. 2 cylinder's misfire (CYL 2 MISFIRE)		
P0303	0606	No. 3 cylinder's misfire (CYL 3 MISFIRE)		
P0304	0605	No. 4 cylinder's misfire (CYL 4 MISFIRE)		
P0305	0604	No. 5 cylinder's misfire (CYL 5 MISFIRE)		
P0306	0603	No. 6 cylinder's misfire (CYL 6 MISFIRE)		
P0325 (*4)	0304	Knock sensor circuit (KNOCK SENSOR)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. 	
P0335	0802	Crankshaft position sensor (POS) circuit [CRANK POS SEN (POS)]	<ul style="list-style-type: none"> The proper pulse signal from the sensor is not sent to ECM while the engine is running with the specified rpm. 	
P0340	0101	Camshaft position sensor (PHASE) circuit [CAM POS SEN (PHASE)]	<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 entered to ECM during engine running. The cylinder No. signal is not in the normal pattern during engine running. 	
P0400	0302	EGR function (EGR SYSTEM)	<ul style="list-style-type: none"> The EGR flow is excessively low or high during the specified driving condition. 	
P0402	0306	EGRC-BPT valve function (EGRC-BPT VALVE)	<ul style="list-style-type: none"> EGRC-BPT valve does not operate properly. 	
P0420	0702	Three way catalyst function (right bank) (TW CATALYST SYS-B1)	<ul style="list-style-type: none"> Three way catalyst does not operate properly. Three way catalyst does not have enough oxygen storage capacity. 	
P0430	0703	Three way catalyst function (left bank) (TW CATALYST SYS-B2)	<ul style="list-style-type: none"> Three way catalyst does not operate properly. Three way catalyst does not have enough oxygen storage capacity. 	

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.

RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.

DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).

RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).

DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

*4: Freeze frame data is not stored in the ECM for the "Knock sensor". The MIL will not light up for a "Knock sensor" malfunction.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

X: Applicable
—: Not applicable

Check Items (Possible Cause)	“DTC CONFIRMATION PROCEDURE” Quick Ref. *1	“OVERALL FUNCTION CHECK” Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page	
<ul style="list-style-type: none"> • Improper spark plug • The ignition secondary circuit is open or shorted. • Insufficient compression • Incorrect fuel pressure • EGR valve • The injector circuit is open or shorted. • Injectors • Intake air leaks • Lack of fuel • Magnetized signal plate (flywheel) 	DRIVING	—	—	(Three way catalyst damage) 1 trip (Exhaust quality deterioration) 2 trip	EC-185	GI MA EM LC EC
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Knock sensor 	RUNNING	—	—	—	EC-189	FE
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Crankshaft position sensor (POS) • Starter motor (EL section) • Starting system circuit (EL section) • Dead (Weak) battery 	RUNNING	—	—	2 trip	EC-192	CL MT
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Camshaft position sensor (PHASE) • Crankshaft position sensor (REF) • Crankshaft position sensor (REF) circuit • Crankshaft position sensor (POS) • Crankshaft position sensor (POS) circuit • Starter motor (EL section) • Starting system circuit (EL section) • Dead (Weak) battery 	RUNNING	—	—	2 trip	EC-197	AT FA
<ul style="list-style-type: none"> • EGR valve stuck closed, open or leak • Passage obstructed • EGRC-solenoid valve • EGR valve vacuum tube leaks • EGRC-BPT valve leaks 	—	RUNNING	—	2 trip	EC-201	RA
<ul style="list-style-type: none"> • EGRC-BPT valve • Rubber tube (Blocked, loose or disconnected) 	—	RUNNING	—	2 trip	EC-210	BR
<ul style="list-style-type: none"> • Three way catalyst • Exhaust tube • Intake air leaks • Injectors • Injector leaks 	—	RUNNING	—	1 trip	EC-212	ST
<ul style="list-style-type: none"> • Three way catalyst • Exhaust tube • Intake air leaks • Injectors • Injector leaks 	—	RUNNING	—	1 trip	EC-212	RS

*1: • This is Quick Reference of “DTC CONFIRMATION PROCEDURE”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The “OVERALL FUNCTION CHECK” is a simplified and effective way to inspect a component or circuit.
In some cases, the “OVERALL FUNCTION CHECK” is used rather than a “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE”.
When no DTC CONFIRMATION PROCEDURE is available, the “NG” result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

- During an “NG” OVERALL FUNCTION CHECK, the DTC might not be confirmed.
- This is Quick Reference of “OVERALL FUNCTION CHECK”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
P0440	0705	EVAP control system (small leak) [EVAP (SMALL LEAK)]	<ul style="list-style-type: none"> • EVAP control system has a leak. • EVAP control system does not operate properly.
P0443	0807	EVAP canister purge control valve/solenoid valve circuit (PURG CONT/V & S/V)	<ul style="list-style-type: none"> • The improper voltage signal is sent to ECM through the solenoid valve. • EVAP canister purge control valve does not operate properly (stuck open).
P0446	0903	EVAP canister vent control valve circuit (VENT CONTROL VALVE)	<ul style="list-style-type: none"> • An improper voltage signal is sent to ECM through EVAP canister vent control valve circuit. • EVAP canister vent control valve circuit does not operate properly.
P0450	0704	EVAP control system pressure sensor (EVAP SYS PRES SEN)	<ul style="list-style-type: none"> • An improper voltage signal from EVAP control system pressure sensor is sent to ECM.
P0500	0104	Vehicle speed sensor circuit (VEHICLE SPEED SEN)	<ul style="list-style-type: none"> • The almost 0 km/h (0 MPH) signal from the sensor is sent to ECM even when vehicle is driving.

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.
 RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.
 LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.
 DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).
 RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).
 LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).
 DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

—: Not applicable

Check Items (Possible Cause)	“DTC CONFIRMATION PROCEDURE” Quick Ref. *1	“OVERALL FUNCTION CHECK” Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page
<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 control valve. • Foreign matter caught in EVAP canister vent control valve. • EVAP canister or fuel tank leaks • EVAP purge line (Pipe or 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 purge control valve • EVAP canister purge volume control valve • EVAP canister purge control solenoid valve • Absolute pressure sensor • Tank fuel temperature sensor • MAP/BARO switch solenoid valve • Blocked or bent rubber tube to MAP/BARO switch solenoid valve 	RUNNING	IGN: OFF	—	2 trip	EC-215
<ul style="list-style-type: none"> • Harness or connectors (The solenoid valve circuit is open or shorted.) • EVAP canister purge control solenoid valve 	IGN: ON	—	—	2 trip	EC-225
<ul style="list-style-type: none"> • EVAP canister purge control valve • EVAP canister purge control solenoid valve • Vacuum hoses for clogging or disconnection • EVAP control system pressure sensor 	LIFTING	—	—	2 trip	EC-225
<ul style="list-style-type: none"> • Harness or connectors (EVAP canister vent control valve circuit is open or shorted.) 	RUNNING	—	—	2 trip	EC-233
<ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor • Blocked rubber tube to EVAP canister vent control valve 	—	IGN: OFF	—	2 trip	EC-233
<ul style="list-style-type: none"> • Harness or connectors (The EVAP control system pressure sensor circuit is open or shorted.) • EVAP control system pressure sensor • EVAP canister vent control valve (The valve is stuck open.) 	IGN: ON	—	—	2 trip	EC-238
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Vehicle speed sensor 	DRIVING	LIFTING	—	2 trip	EC-242

*1: • This is Quick Reference of “DTC CONFIRMATION PROCEDURE”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The “OVERALL FUNCTION CHECK” is a simplified and effective way to inspect a component or circuit.
In some cases, the “OVERALL FUNCTION CHECK” is used rather than a “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE”.
When no DTC CONFIRMATION PROCEDURE is available, the “NG” result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

- During an “NG” OVERALL FUNCTION CHECK, the DTC might not be confirmed.
- This is Quick Reference of “OVERALL FUNCTION CHECK”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

GI
MA
EM
LC
EC
FE
CL
WT
AT
FA
RA
BR
ST
RS
HA
EL
IDX

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
P0505	0205	Idle speed control function (IACV-AAC VALVE)	<ul style="list-style-type: none"> The idle speed control function does not operate properly.
P0510	0203	Closed throttle position switch (CLOSED THRL POS SW)	<ul style="list-style-type: none"> Battery voltage from the throttle position switch is sent to ECM with the throttle valve opened.
P0600 (*5)	0504	Signal circuit from A/T control unit to ECM (A/T COMM LINE)	<ul style="list-style-type: none"> ECM receives incorrect voltage from A/T control unit continuously.
P0605	0301	ECM (ECM)	<ul style="list-style-type: none"> ECM calculation function is malfunctioning.
P0705	1003	Park/Neutral position switch circuit (PARK/NEUT POSI SW)	<ul style="list-style-type: none"> The signal of the park/neutral position switch is not changed in the process of engine starting and driving.
P1105	1302	MAP/BARO switch solenoid valve (MAP/BARO SW SOL/V)	<ul style="list-style-type: none"> MAP/BARO switch solenoid valve remains at the voltage supplied, even though ECM is no longer supplying the voltage to the valve. There is little difference between absolute pressure sensor input voltage at ambient barometric pressure and that at intake manifold pressure.
P1220	1305	FPCM circuit (FPCM)	<ul style="list-style-type: none"> An improper signal from the FPCM to a point between the fuel pump and the dropping resistor, is detected by ECM.
P1320	0201	Ignition signal circuit (IGN SIGNAL-PRIMARY)	<ul style="list-style-type: none"> The ignition signal in the primary circuit is not sent to ECM during engine cranking or running.
P1335	0407	Crankshaft position sensor (REF) circuit [CRANK POS SEN (REF)]	<ul style="list-style-type: none"> 120° signal is not sent to ECM for the first few seconds during engine cranking. 120° signal is not sent to ECM during engine running. 120° signal cycle excessively changes during engine running.
P1336	0905	Crankshaft position sensor (POS) [CRANK P/S (POS)•COG]	<ul style="list-style-type: none"> The chipping of the signal plate (flywheel) gear tooth (cog) is detected by ECM.
P1400	1005	EGRC-solenoid valve (EGRC SOLENOID/V)	<ul style="list-style-type: none"> The improper voltage signal is sent to ECM through the solenoid valve.

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.

RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.

DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).

RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).

DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

*5: In case of these diagnostic items, the freeze frame data will not be stored in ECM.

These diagnoses do not have the 2 trip detection logic, and will not light up the MIL.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

X: Applicable
—: Not applicable

Check Items (Possible Cause)	"DTC CONFIRMATION PROCEDURE" Quick Ref. *1	"OVERALL FUNCTION CHECK" Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page	
<ul style="list-style-type: none"> • Harness or connectors (The IACV-AAC valve circuit is shorted.) • IACV-AAC valve 	RUNNING	—	—	2 trip	EC-246	GI MA
<ul style="list-style-type: none"> • Harness or connectors (The IACV-AAC valve circuit is open.) • IACV-AAC valve 	RUNNING	—	—	2 trip	EC-246	EM
<ul style="list-style-type: none"> • Harness or connectors (The closed throttle position switch circuit is shorted.) • Closed throttle position switch 	—	RUNNING	—	2 trip	EC-252	LC
<ul style="list-style-type: none"> • Harness or connectors (The circuit between ECM and A/T control unit is open or shorted.) • A/T control unit 	LIFTING	—	—	—	EC-256	EC
<ul style="list-style-type: none"> • ECM (ECCS control module) 	IGN: ON	—	X	2 trip	EC-259	FE
<ul style="list-style-type: none"> • Harness or connectors (The neutral position switch or inhibitor switch circuit is open or shorted.) • Neutral position switch (M/T models) • Inhibitor switch (A/T models) 	—	IGN: ON	—	2 trip	EC-261	CL
<ul style="list-style-type: none"> • Harness or connectors (MAP/BARO switch solenoid valve circuit is open or shorted.) • Hoses (Hoses are clogged or disconnected.) • Absolute pressure sensor • MAP/BARO switch solenoid valve 	RUNNING	—	—	2 trip	EC-265	MT AT
<ul style="list-style-type: none"> • Harness or connectors (The FPCM circuit is open or shorted.) • Dropping resistor • FPCM 	—	RUNNING	—	2 trip	EC-271	FA
<ul style="list-style-type: none"> • Harness or connectors (The ignition primary circuit is open or shorted.) • Power transistor unit built into ignition coil • Condenser • Crankshaft position sensor (REF) • Crankshaft position sensor (REF) circuit 	RUNNING	—	—	2 trip	EC-277	RA
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Crankshaft position sensor (REF) • Starter motor (EL section) • Starting system circuit (EL section) • Dead (Weak) battery 	RUNNING	—	X	2 trip	EC-283	BR ST
<ul style="list-style-type: none"> • Harness or connectors • Crankshaft position sensor (POS) • Signal plate (Flywheel) 	RUNNING	—	—	2 trip	EC-287	RS
<ul style="list-style-type: none"> • Harness or connectors (The EGRC-solenoid valve circuit is open or shorted.) • EGRC-solenoid valve 	—	IGN: ON	—	2 trip	EC-292	BT

*1: • This is Quick Reference of "DTC CONFIRMATION PROCEDURE".

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The "OVERALL FUNCTION CHECK" is a simplified and effective way to inspect a component or circuit.

In some cases, the "OVERALL FUNCTION CHECK" is used rather than a "DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE".

When no DTC CONFIRMATION PROCEDURE is available, the "NG" result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

• During an "NG" OVERALL FUNCTION CHECK, the DTC might not be confirmed.

• This is Quick Reference of "OVERALL FUNCTION CHECK".

Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

ENGINE RELATED ITEMS

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
P1401	0305	EGR temperature sensor circuit (EGR TEMP SENSOR)	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM, even when engine coolant temperature is low or high.
P1441	0801	Vacuum cut valve bypass valve (VC/V BYPASS/V)	<ul style="list-style-type: none"> An improper voltage signal is sent to ECM through the bypass valve. Vacuum cut valve bypass valve does not operate properly.
P1445	1008	EVAP canister purge volume control valve (PURG VOLUME CONT/V)	<ul style="list-style-type: none"> The improper voltage signal is sent to ECM through the valve. The canister purge flow is detected during the specified driving condition, even when EVAP canister purge volume control valve is completely shut off.
P1447	0111	EVAP control system purge flow monitoring (EVAP PURG FLOW/MON)	<ul style="list-style-type: none"> EVAP control system does not operate properly. EVAP control system has a leak in line between intake manifold and EVAP control system pressure sensor.
P1605	0804	A/T diagnosis communication line (A/T DIAG COMM LINE)	<ul style="list-style-type: none"> An incorrect signal from A/T control unit is sent to ECM.
P1900	1308	Cooling fan circuit (COOLING FAN)	<ul style="list-style-type: none"> Cooling fan does not operate properly. (Overheat) Cooling system does not operate properly. (Overheat) Engine coolant was not added to the system using the proper filling method.

Note: A dead (weak) battery will reduce the accuracy of the on-board diagnosis and may cause the MIL to light up without any malfunctions.

Abbreviations for Quick Reference of "DTC CONFIRMATION PROCEDURE"

IGN: ON : Turning the ignition switch ON is required for checking the function of the sensor, switch, solenoid and circuit.

RUNNING : Running engine is required for checking the function of the sensor, switch, solenoid and circuit.

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required.

DRIVING : Driving the vehicle in the specified pattern is required.

Abbreviations for Quick Reference of "OVERALL FUNCTION CHECK"

IGN: ON : Turning the ignition switch ON is required for the ECM to detect a malfunction (if one exists).

RUNNING : Running engine is required for the ECM to detect a malfunction (if one exists).

LIFTING : Lifting up the vehicle, running engine and spinning wheels are required for the ECM to detect a malfunction (if one exists).

DRIVING : Driving the vehicle in the specified pattern is required for the ECM to detect a malfunction (if one exists).

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

—: Not applicable

Check Items (Possible Cause)	“DTC CONFIRMATION PROCEDURE” Quick Ref. *1	“OVERALL FUNCTION CHECK” Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page
<ul style="list-style-type: none"> • Harness or connectors (The EGR temperature sensor circuit is open or shorted.) • EGR temperature sensor • Malfunction of EGR, EGRC-BPT valve or EGRC-solenoid valve 	—	RUNNING	—	2 trip	EC-295
<ul style="list-style-type: none"> • Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted.) • Vacuum cut valve bypass valve 	RUNNING	—	—	2 trip	EC-300
<ul style="list-style-type: none"> • Vacuum cut valve bypass valve • Vacuum cut valve • Bypass hoses for clogging • EVAP control system pressure sensor 	—	IGN: OFF	—	—	—
<ul style="list-style-type: none"> • Harness or connectors (The valve circuit is open or shorted.) • EVAP canister purge volume control valve 	RUNNING	—	—	—	—
<ul style="list-style-type: none"> • EVAP control system pressure sensor • EVAP canister purge volume control valve (The valve is stuck open.) • EVAP canister purge control valve • Hoses (Hoses are connected incorrectly.) 	LIFTING	—	—	2 trip	EC-305
<ul style="list-style-type: none"> • EVAP canister purge volume control valve stuck closed • EVAP canister purge control valve stuck closed • EVAP control system pressure sensor • Loose or disconnected rubber tube • Blocked rubber tube • EVAP canister purge control solenoid valve • Blocked or bent rubber tube to MAP/BARO switch solenoid valve • Cracked EVAP canister • Absolute pressure sensor • MAP/BARO switch solenoid valve 	—	LIFTING (M/T models) RUNNING (A/T models)	—	2 trip	EC-311
<ul style="list-style-type: none"> • Harness or connectors (The communication line circuit is open or shorted.) • A/T control unit • Dead (Weak) battery 	RUNNING	—	—	2 trip	EC-318
<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-331).</p>	—	IGN: ON (RUNNING)	—	2 trip	EC-321

- *1: • This is Quick Reference of “DTC CONFIRMATION PROCEDURE”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.
- *2: • The “OVERALL FUNCTION CHECK” is a simplified and effective way to inspect a component or circuit.
In some cases, the “OVERALL FUNCTION CHECK” is used rather than a “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE”.
When no DTC CONFIRMATION PROCEDURE is available, the “NG” result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.
- During an “NG” OVERALL FUNCTION CHECK, the DTC might not be confirmed.
 - This is Quick Reference of “OVERALL FUNCTION CHECK”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

A/T RELATED ITEMS (Be sure to erase the DTC stored in ECM after the A/T related repair.)

Diagnostic trouble code No.		Detected items (Screen terms for CONSULT, "SELF-DIAG RESULTS" mode)	Malfunction is detected when ...
CONSULT GST	MIL		
P0705	1101	Inhibitor switch circuit (INHIBITOR SWITCH)	• A/T control unit does not receive the correct voltage signal from the switch based on the gear position.
P0710	1208	Fluid temperature sensor (FLUID TEMP SENSOR)	• A/T control unit receives an excessively low or high voltage from the sensor.
P0720	1102	Revolution sensor (VHCL SPEED SEN●A/T)	• A/T control unit does not receive the proper voltage signal from the sensor.
P0725	1207	Engine speed signal (ENGINE SPEED SIG)	• A/T control unit does not receive the proper voltage signal from the ECM.
P0731	1103	Improper shifting to 1st gear position (A/T 1ST SIGNAL)	• A/T cannot be shifted to the 1st gear position even electrical circuit is good.
P0732	1104	Improper shifting to 2nd gear position (A/T 2ND SIGNAL)	• A/T cannot be shifted to the 2nd gear position even electrical circuit is good.
P0733	1105	Improper shifting to 3rd gear position (A/T 3RD SIGNAL)	• A/T cannot be shifted to the 3rd gear position even electrical circuit is good.
P0734	1106	Improper shifting to 4th gear position or TCC (A/T 4TH SIGNAL OR TCC)	• A/T cannot be shifted to the 4th gear position or perform lock-up even electrical circuit is good.
P0740	1204	T/C clutch solenoid valve (TOR CONV CLUTCH SV)	• A/T control unit detects the improper voltage drop when it tries to operate the solenoid valve.
P0745	1205	Line pressure solenoid valve (LINE PRESSURE S/V)	• A/T control unit detects the improper voltage drop when it tries to operate the solenoid valve.
P0750	1108	Shift solenoid valve A (SHIFT SOLENOID/V A)	• A/T control unit detects the improper voltage drop when it tries to operate the solenoid valve.
P0755	1201	Shift solenoid valve B (SHIFT SOLENOID/V B)	• A/T control unit detects the improper voltage drop when it tries to operate the solenoid valve.
P1705	1206	Throttle position sensor Throttle position switch (THRTL POSI SEN●A/T)	• A/T control unit receives an excessively low or high voltage from the sensor.
P1760	1203	Overrun clutch solenoid valve (OVERRUN CLUTCH S/V)	• A/T control unit detects the improper voltage drop when it tries to operate the solenoid valve.

*1: DRIVING pattern 1-6 means as follows:

- Pattern 1 should meet b and c.
- Pattern 2 should meet a and c.
- Pattern 3 should meet a through e.
- Pattern 4 should meet a and b.
- Pattern 5 should meet a through c.
- Pattern 6 should meet a through d.

a: Selector lever is in "D" position.

b: Vehicle speed is over 10 km/h (6 MPH).

c: Throttle opening is over 1/8.

d: Engine speed is over 450 rpm.

e: A/T fluid temperature is 20 - 120°C (68 - 248°F).

*: For details, refer to each DTC CONFIRMATION PROCEDURE in AT section.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

X: Applicable
—: Not applicable

Check Items (Possible Cause)	“DTC CONFIRMATION PROCEDURE” Quick Ref. *1	“OVERALL FUNCTION CHECK” Quick Ref. *2	Fail Safe System	MIL Illumination	Reference Page
<ul style="list-style-type: none"> • Harness or connectors (The switch circuit is open or shorted.) • Inhibitor switch 	DRIVING (pattern 1)	—	—	2 trip	See “Self-diagnosis”, “TROUBLE DIAGNOSES” in AT section.
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Fluid temperature sensor 	DRIVING (pattern 6)	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Revolution sensor 	DRIVING (pattern 2)	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The signal circuit is open or shorted.) 	DRIVING (pattern 5)	—	X	2 trip	
<ul style="list-style-type: none"> • Shift solenoid valve A • Shift solenoid valve B • Overrun clutch solenoid valve • Line pressure solenoid valve • Each clutch • Hydraulic control circuit 	DRIVING (pattern 3)	—	—	2 trip	
<ul style="list-style-type: none"> • T/C clutch solenoid valve 					
<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • T/C clutch solenoid valve 	IGN: ON	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • Line pressure solenoid valve 	IGN: ON	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • Shift solenoid valve A 	IGN: ON	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • Shift solenoid valve B 	IGN: ON	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Throttle position sensor • Throttle position switch 	DRIVING (pattern 4)	—	X	2 trip	
<ul style="list-style-type: none"> • Harness or connectors (The solenoid circuit is open or shorted.) • Overrun clutch solenoid valve 	IGN: ON	—	X	2 trip	

*1: • This is Quick Reference of “DTC CONFIRMATION PROCEDURE”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

*2: • The “OVERALL FUNCTION CHECK” is a simplified and effective way to inspect a component or circuit.
In some cases, the “OVERALL FUNCTION CHECK” is used rather than a “DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE”.
When no DTC CONFIRMATION PROCEDURE is available, the “NG” result of the OVERALL FUNCTION CHECK can be considered to mean the same as a DTC detection.

- During an “NG” OVERALL FUNCTION CHECK, the DTC might not be confirmed.
- This is Quick Reference of “OVERALL FUNCTION CHECK”.
Details are described in each TROUBLE DIAGNOSIS FOR DTC XXXXX.

TROUBLE DIAGNOSIS — General Description

Diagnostic Trouble Code (DTC) Chart (Cont'd)

INSPECTION PRIORITY

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"> • ECM (P0605, 0301) • Mass air flow sensor circuit (P0100, 0102) • Throttle position sensor circuit (P0120, 0403) • EGRC-solenoid valve circuit (P1400, 1005) • A/T diagnosis communication line (P1605, 0804) • Tank fuel temperature sensor (P0180, 0402) 	<ul style="list-style-type: none"> • Camshaft position sensor (PHASE) circuit (P0340, 0101) • Vehicle speed sensor circuit (P0500, 0104) • Intake air temperature sensor circuit (P0110, 0401) • Knock sensor circuit (P0325, 0304) • Crankshaft position sensor (REF) circuit (P1335, 0407) • Crankshaft position sensor (POS) circuit (P0335, 0802) (P1336, 0905) 	<ul style="list-style-type: none"> • Engine coolant temperature sensor circuit (P0115, 0103) (P0125, 0908) • Ignition signal circuit (P1320, 0201) • Park/Neutral position switch circuit (P0705, 1003)
2	<ul style="list-style-type: none"> • EGR temperature sensor circuit (P1401, 0305) • Absolute pressure sensor circuit (P0105, 0803) • MAP/BARO switch solenoid valve circuit (P1105, 1302) • EVAP canister purge control valve/solenoid valve circuit (P0443, 0807) • Vacuum cut valve bypass valve (P1441, 0801) • A/T related sensors, solenoid valves and switches (P0705-P0710, 1101-1208) 	<ul style="list-style-type: none"> • Front heated oxygen sensor's heater circuit (P0135, 0901) (P0155, 1001) • Cooling fan circuit (P1900, 1308) • EVAP control system pressure sensor circuit (P0450, 0704) • EVAP canister vent control valve circuit (P0446, 0903) • Closed throttle position switch circuit (P0510, 0203) 	<ul style="list-style-type: none"> • Front heated oxygen sensor circuit (P0130, 0503) (P0150, 0303) • Rear heated oxygen sensor circuit (P0136, 0707) • EVAP canister purge volume control valve circuit (P1445, 1008) • EVAP control system purge flow monitoring (P1447, 0111)
3	<ul style="list-style-type: none"> • EGR function (P0400, 0302) • EGRC-BPT valve function (P0402, 0306) • IACV-AAC valve circuit (P0505, 0205) • EVAP control system (small leak) (P0440, 0705) 	<ul style="list-style-type: none"> • Misfire (P0306 - P0300, 0603 - 0701) • Closed loop control (P0130, 0307) (P0150, 0308) • Improper shifting (P0731 - P0734, 1103 - 1106) • Fuel pump control module (FPCM) circuit (P1220, 1305) 	<ul style="list-style-type: none"> • Fuel injection system function (P0172, 0114), (P0171, 0115), (P0175, 0209), (P0174, 0210) • Three way catalyst function (P0420, 0702) (P0430, 0703) • Signal circuit from A/T control unit to ECM (P0600, 0504)

TROUBLE DIAGNOSIS — General Description

Fail-Safe Chart

The ECM enters fail-safe mode, if any of the following DTCs is recorded due to the open or short circuit.

DTC No.		Detected items	Engine operating condition in fail-safe mode												
CONSULT GST	MIL														
P0100	0102	Mass air flow sensor circuit	Engine speed will not rise more than 2,400 rpm due to the fuel cut.												
P0115	0103	Engine coolant temperature sensor circuit	Engine coolant temperature will be determined based on the time after turning ignition switch "ON" or "START". <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th style="text-align: center;">Condition</th> <th style="text-align: center;">Engine coolant temperature decided</th> </tr> </thead> <tbody> <tr> <td>Just as ignition switch is turned ON or Start</td> <td style="text-align: center;">40°C (104°F)</td> </tr> <tr> <td>More than 4 minutes after ignition Start</td> <td style="text-align: center;">80°C (176°F)</td> </tr> <tr> <td>Except as shown above</td> <td style="text-align: center;">40 - 80°C (104 - 176°F) (Depends on the time)</td> </tr> </tbody> </table>		Condition	Engine coolant temperature decided	Just as ignition switch is turned ON or Start	40°C (104°F)	More than 4 minutes after ignition Start	80°C (176°F)	Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)			
Condition	Engine coolant temperature decided														
Just as ignition switch is turned ON or Start	40°C (104°F)														
More than 4 minutes after ignition Start	80°C (176°F)														
Except as shown above	40 - 80°C (104 - 176°F) (Depends on the time)														
P0120	0403	Throttle position sensor circuit	Throttle position will be determined based on the amount of mass air flow and the engine speed. Therefore, acceleration will be poor. <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th style="text-align: center;">Driving condition</th> </tr> </thead> <tbody> <tr> <td>When engine is idling</td> <td style="text-align: center;">Normal</td> </tr> <tr> <td>When accelerating</td> <td style="text-align: center;">Poor acceleration</td> </tr> </tbody> </table>		Driving condition	When engine is idling	Normal	When accelerating	Poor acceleration						
Driving condition															
When engine is idling	Normal														
When accelerating	Poor acceleration														
P1335	0407	Crankshaft position sensor (REF) circuit	Compression TDC signal (120° signal) is controlled by camshaft position sensor (PHASE) signal and crankshaft position sensor (POS) signal. Ignition timing will be delayed 0° to 2°.												
—	—	Start signal circuit	If the ECM always receives a start signal, the ECM will judge the start signal "OFF" when engine speed is above 1,000 rpm. This prevents extra enrichment. After the engine speed is below 200 rpm, start-up enrichment will be allowed until the engine speed reaches 1,000 rpm.												
—	—	ECM	<p>Fail-safe system activating condition when ECM is malfunctioning 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 MALFUNCTION INDICATOR LAMP on the instrument panel lights to warn the driver.</p> <p>Engine control, with fail-safe system, operates when ECM is malfunctioning When the fail-safe system is operating, fuel injection, ignition timing, fuel pump operation, IACV-AAC valve operation and cooling fan operation are controlled under certain limitations.</p> <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th style="text-align: center;">Operation</th> </tr> </thead> <tbody> <tr> <td>Engine speed</td> <td style="text-align: center;">Engine speed will not rise more than 3,000 rpm.</td> </tr> <tr> <td>Fuel injection</td> <td style="text-align: center;">Simultaneous multipoint fuel injection system</td> </tr> <tr> <td>Ignition timing</td> <td style="text-align: center;">Ignition timing is fixed at the preset value.</td> </tr> <tr> <td>Fuel pump</td> <td style="text-align: center;">Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls.</td> </tr> <tr> <td>Cooling fans</td> <td style="text-align: center;">Cooling fan relay "ON" (High speed condition) when engine is running, and "OFF" when engine stalls.</td> </tr> </tbody> </table>		Operation	Engine speed	Engine speed will not rise more than 3,000 rpm.	Fuel injection	Simultaneous multipoint fuel injection system	Ignition timing	Ignition timing is fixed at the preset value.	Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls.	Cooling fans	Cooling fan relay "ON" (High speed condition) when engine is running, and "OFF" when engine stalls.
Operation															
Engine speed	Engine speed will not rise more than 3,000 rpm.														
Fuel injection	Simultaneous multipoint fuel injection system														
Ignition timing	Ignition timing is fixed at the preset value.														
Fuel pump	Fuel pump relay is "ON" when engine is running and "OFF" when engine stalls.														
Cooling fans	Cooling fan relay "ON" (High speed condition) when engine is running, and "OFF" when engine stalls.														

GI
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 EM
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TROUBLE DIAGNOSIS — General Description

Symptom Matrix Chart

SYSTEM — Basic engine control system		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)	
New CT/CS		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA	
Fuel	Fuel pump circuit	●	●	●	○	●		○	○			○			EC-339
	Fuel pressure regulator system	●	●	○	○	○	○	○	○	○		○			EC-27
	Injector circuit	●	●	●	○	●		●	●			●			EC-333
	Evaporative emission system	○	○	○	○	○	○	○	○	○		○			EC-22
Air	Positive crankcase ventilation system	○	○	○	○	○	○	○	○	○		○	○		EC-26
	Incorrect idle speed adjustment	○	○				●	○	○	●		○			EC-32
	IACV-AAC valve circuit	●	●				●	○	●	●					EC-246
	IACV-FICD solenoid valve circuit	○	○				●	○	○	●					EC-350
Ignition	Incorrect ignition timing adjustment	○	○	●	●	●		●	●			●			EC-32
	Ignition circuit	●	●	●	●	●		●	●			●			EC-277
EGR	EGRC-solenoid valve circuit		○	●	○	○						○			EC-292
	EGR system	○	○	●	●	○	○	●	●	○		○			EC-201
Main power supply and ground circuit		●	○	○	○	○		●	●		○	○		○	EC-104
Cooling	Cooling fan circuit	○	○	○	○	○	○	○	○	○	●	○		○	EC-321
Air conditioner circuit		○	○	○	○	○	○	○	○	○		○		○	HA section

● ; High Possibility Item
○ ; Low Possibility Item

TROUBLE DIAGNOSIS — General Description

Symptom Matrix Chart (Cont'd)

SYSTEM — ECCS system	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)		
New CT/CS	AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
ECCS															
Crankshaft position sensor (REF) circuit	○	○												EC-283	
Crankshaft position sensor (POS) circuit	○	○												EC-192, 287	
Camshaft position sensor (PHASE) circuit	●													EC-197	
Mass air flow sensor circuit	●	●	●	○	●		●	●				●		EC-108	
Front heated oxygen sensor circuit		○	●	○	●		●	●				●		EC-154, 139	
Engine coolant temperature sensor circuit	●	○	○	○	○	○	●	●	○			○		EC-125, 134	
Throttle position sensor circuit		●	●		●	○	●	●	○			●		EC-129	
Incorrect throttle position sensor adjustment		●	○		○	●	○	○	●			○		EC-70	
Vehicle speed sensor circuit		○	○		○							○		EC-242	
Knock sensor circuit			●	○	○							○		EC-189	
ECM	○	○	○	○	○	○	○	○	○	○	○			EC-259, 87	
Start signal circuit	○													EC-337	
Park/Neutral position switch circuit			○		○		○	○				○		EC-261	
Power steering oil pressure switch circuit		○					○	○						EC-346	
Front engine mounting control circuit							○	○						EC-343	
Electrical load signal circuit							○	○						EC-354	

● ; High Possibility Item
○ ; Low Possibility Item

GI

MA

EM

LC

EC

FE

GL

MT

AT

FA

RA

BR

ST

RS

BT

HA

EL

IDX

TROUBLE DIAGNOSIS — General Description

Symptom Matrix Chart (Cont'd)

SYSTEM — Engine mechanical & other		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)		
New CT/CS		AA	AB	AC	AD	AE	AF	AG	AH	AJ	AK	AL	AM	HA		
Fuel	Fuel tank	○	○												—	
	Fuel piping	●	○	○	○	○		○	○			○				
	Vapor lock		○													
	Valve deposit	○	○	○	○	○		○	○			○				
	Poor fuel (Heavy weight gasoline, Low octane)	○	○	○	○	○		○	○			○				
Air	Air duct		○	○				○	○			○			—	
	Air cleaner		○	○				○	○			○				
	Air leakage from air duct (Mass air flow sensor — throttle body)	○	○	○	○	○	○	○	○	○		○				
	Throttle body, Throttle wire	●	●	●		●	●	○	○	●		○				FE section
	Air leakage from intake manifold/Collector/Gasket	●	●	●	○	●	○	●	●	○		●				—
Cranking	Battery	○	○	○		○		○	○			○		○	—	
	Alternator circuit	○	○	○		○		○	○			○		○		EL section
	Starter circuit	●														—
	Flywheel	●														—
	Clutch interlock switch	●														CL section
	Inhibitor switch	●														AT section
	Theft warning circuit	○														EL section
Engine	Cylinder head	●	○	●	○	●		●	●			○			—	
	Cylinder head gasket	○	○	●	●	●		●	●		○	○	○			
	Cylinder block	●	●	○	○	○		○	○			○	○			
	Piston	●	○	○	○	○		○	○			○	○			
	Piston ring	●	○	○	○	○		○	○			○	○			
	Connecting rod	○	○	○	○	○		○	○			○	○			
	Bearing	●	●	○	○	○		○	○			○	○			
	Crankshaft	●	●	○	○	●		●	●			○	○			
Valve mechanism	Timing chain	●	●	●	○	●		●	●			○				
	Camshaft	○	●	●	○	●		●	●			○				
	Intake valve	●	○	○	○	●		●	●			○	○			
Exhaust	Exhaust valve	○	○	○	○	○		○	○			○	○		—	
	Exhaust manifold/Tube/Muffler/Gasket	●	●	●	●	○		●	●			○				
Lubrication	Three way catalytic converter	○	○	○	○	○		○	○			○				
	Oil pan/Oil strainer/Oil pump/Oil filter/Oil gallery	●	●	○	○	○		●	●			○	○			
Cooling	Oil level (Low)/Filthy oil	○	○	○	○	○		○	○			○	○			
	Radiator/Hose/Radiator filler cap	○	○	○	○	○		○	○		○	○				
	Thermostat	○	○	○	○	○	○	○	○	○	○	○				
	Water pump	○	○	○	○	○		○	○		○	○				
	Water gallery	○	○	○	○	○		○	○		○	○				
	Cooling fan	○	○	○	○	○	○	○	○	○	○	○				
Coolant level (low)/Contaminated coolant	○	○	○	○	○		○	○		○	○					

● ; High Possibility Item
○ ; Low Possibility Item

TROUBLE DIAGNOSIS — General Description

CONSULT Reference Value in Data Monitor Mode

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, because the monitor may show the specification data in spite of the ignition timing not being adjusted to the specification data. This IGN TIMING monitors the data calculated by the ECM according to the signals input from the crankshaft position sensor (POS) 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
CKPS●RPM (POS)	<ul style="list-style-type: none"> • Tachometer: Connect • Run engine and compare tachometer indication with the CONSULT value. 		Almost the same speed as the CONSULT value.
CKPS●RPM (REF)			
POS COUNT	<ul style="list-style-type: none"> • Engine: Running 		179 - 181
MAS AIR/FL SE	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load 	Idle	1.0 - 1.7V
		2,000 rpm	1.5 - 2.1V
COOLAN TEMP/S	<ul style="list-style-type: none"> • Engine: After warming up 		More than 70°C (158°F)
FR O2 SEN-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
FR O2 SEN-B1			
FR O2 MNTR-B2			LEAN ↔ RICH
FR O2 MNTR-B1			Changes more than 5 times during 10 seconds.
RR O2 SENSOR	<ul style="list-style-type: none"> • Engine: After warming up 	Maintaining engine speed at 2,000 rpm	0 ↔ Approx. 2.2V
RR O2 MNTR			LEAN ↔ RICH
VHCL SPEED SE	<ul style="list-style-type: none"> • Turn drive wheels and compare speedometer indication with the CONSULT value 		Almost the same speed as the CONSULT 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"> • Ignition switch: ON (Engine stopped) 	Throttle valve: fully closed	0.35 - 0.65V
		Throttle valve: fully opened	Approx. 4.0V
EGR TEMP SEN	<ul style="list-style-type: none"> • Engine: After warming up 		Less than 4.5V
START SIGNAL	<ul style="list-style-type: none"> • Ignition switch: ON → START → ON 		OFF → ON → OFF
CLSD THL/P SW	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	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 	Air conditioner switch: "OFF"	OFF
		Air conditioner 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"> • Engine: Running 	Rear window defogger or headlamp "ON"	ON
		Except the above	OFF

TROUBLE DIAGNOSIS — General Description

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

MONITOR ITEM	CONDITION	SPECIFICATION
IGNITION SW	<ul style="list-style-type: none"> Ignition switch: ON → OFF 	ON → OFF
INJ PULSE-B2	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle
INJ PULSE-B1		2,000 rpm
B/FUEL SCHDL	ditto	Idle
		2,000 rpm
IGN TIMING	ditto	Idle
		2,000 rpm
IACV-AAC/V	ditto	Idle
		2,000 rpm
ENGINE MOUNT	<ul style="list-style-type: none"> Engine: Running 	Idle
		2,000 rpm
PURG VOL C/V	ditto	Vehicle stopped
		Vehicle running
A/F ALPHA-B2	<ul style="list-style-type: none"> Engine: After warming up 	Maintaining engine speed at 2,000 rpm
A/F ALPHA-B1		
EVAP SYS PRES	<ul style="list-style-type: none"> Ignition switch: ON 	Approx. 3.4V
AIR COND RLY	<ul style="list-style-type: none"> Air conditioner switch: OFF → ON 	OFF → ON
FUEL PUMP RLY	<ul style="list-style-type: none"> Ignition switch is turned to ON (Operates for 1 second) Engine running and cranking 	ON
	Except as shown above	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
		Engine coolant temperature is between 95°C (203°F) and 104°C (219°F)
		Engine coolant temperature is 105°C (221°F) or more
EGRC SOL/V	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle
		Racing up to 1,500 - 2,000 rpm
VENT CONT/V	<ul style="list-style-type: none"> Ignition switch: ON 	OFF
O2 SEN HTR-B1	<ul style="list-style-type: none"> Engine speed: Idle 	ON
O2 SEN HTR-B2	<ul style="list-style-type: none"> Engine speed: Above 3,600 rpm 	OFF
VCV BYPASS/V	<ul style="list-style-type: none"> Ignition switch: ON 	OFF
PURG CONT S/V	<ul style="list-style-type: none"> Engine: After warming up 	Idle
		2,000 rpm
CAL/LD VALUE	<ul style="list-style-type: none"> Engine: After warming up Air conditioner switch: "OFF" Shift lever: "N" No-load 	Idle
		2,500 rpm

TROUBLE DIAGNOSIS — General Description

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

MONITOR ITEM	CONDITION	SPECIFICATION		
ABSOL TH●P/S	<ul style="list-style-type: none"> • Ignition switch: ON (Engine stopped) 	Throttle valve: fully closed	0.0%	GI
		Throttle valve: fully opened	Approx. 88%	
MASS AIRFLOW	<ul style="list-style-type: none"> • Engine: After warming up • Air conditioner switch: "OFF" • Shift lever: "N" • No-load 	Idle	2.0 - 6.0 g●m/s	MA
		2,500 rpm	7.0 - 20.0 g●m/s	
FPCM DR VOLT	<ul style="list-style-type: none"> • Engine: After warming up 	Within 30 seconds of starting engine	Approx. 0V	EM
		More than 30 seconds after starting engine	Approx. 3.5V	
FPCM	ditto	Within 30 seconds of starting engine	HI	LC
		More than 30 seconds after starting engine	LOW	
MAP/BARO SW/V	<ul style="list-style-type: none"> • Ignition switch: ON 		OFF	EC
ABSOL PRES/SE	<ul style="list-style-type: none"> • Engine: After warming up 	Engine is not running	Approx. 4.4V	FE
		Idle	Approx. 1.2V	

GI

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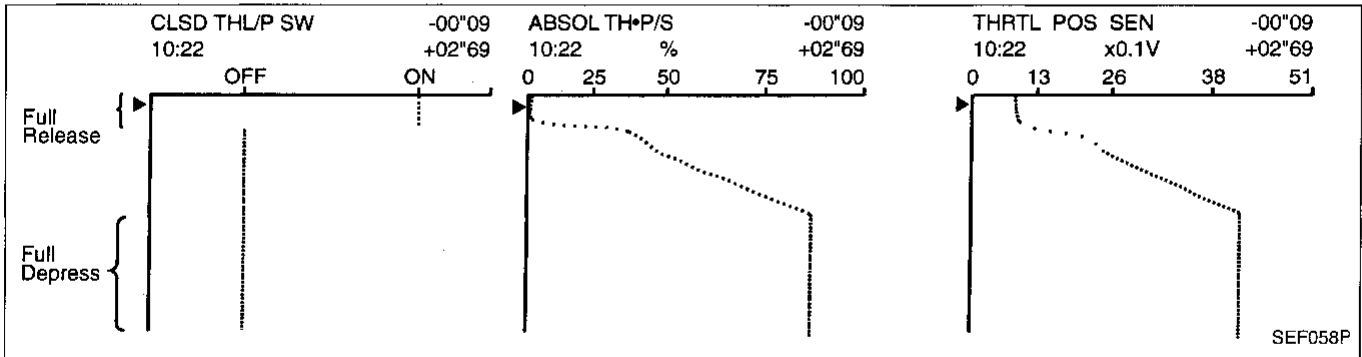
Major Sensor Reference Graph in Data Monitor Mode

The following are the major sensor reference graphs in "DATA MONITOR" mode.
(Select "HI SPEED" in "DATA MONITOR" with CONSULT.)

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

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".

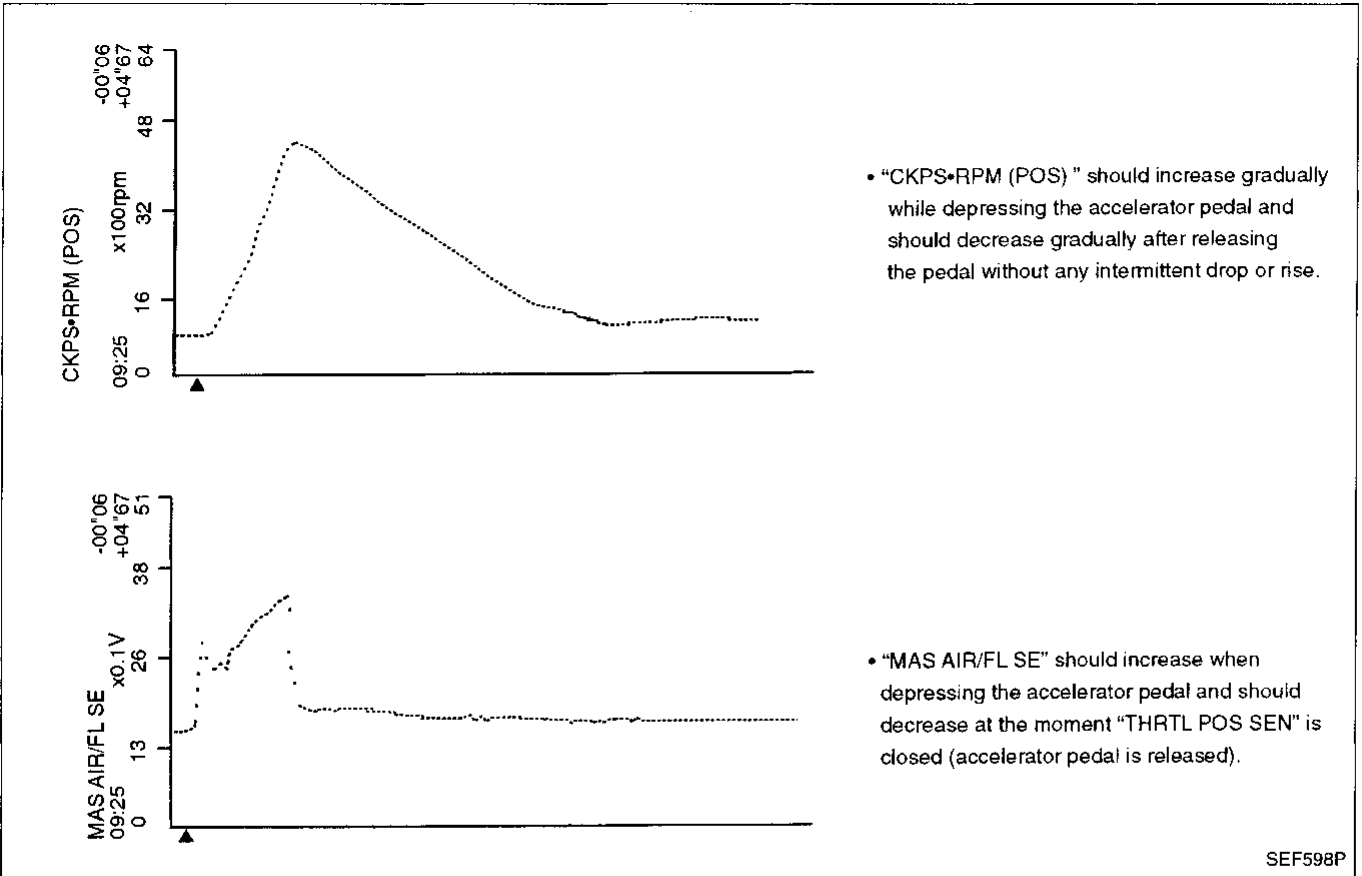
The signal of "THRTL POS SEN" and "ABSOL TH·P/S" should rise gradually without any intermittent drop or rise after "CLSD THL/P SW" is changed from "ON" to "OFF".



CKPS·RPM (POS), MAS AIR/FL SE, THRTL POS SEN, RR O2 SENSOR, FR O2 SENSOR, INJ PULSE

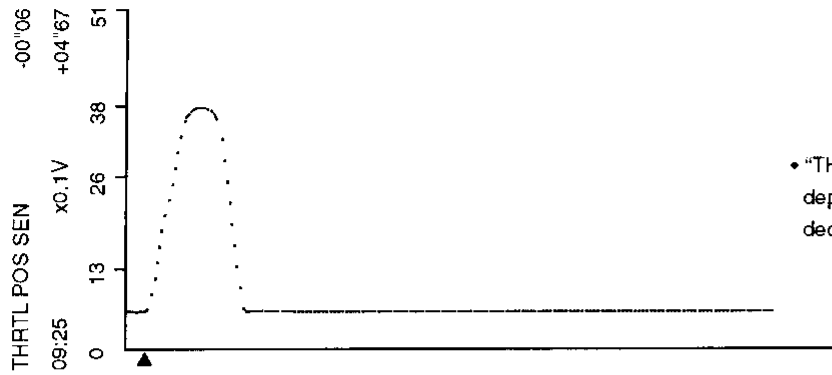
Below is the data for "CKPS·RPM (POS)", "MAS AIR/FL SE", "THRTL POS SEN", "RR O2 SENSOR", "FR O2 SENSOR" and "INJ PULSE" when revving engine quickly up to 4,800 rpm under no load after warming up engine sufficiently.

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

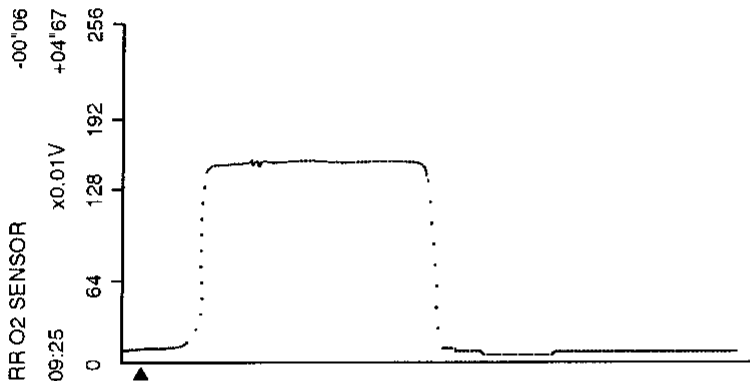


TROUBLE DIAGNOSIS — General Description

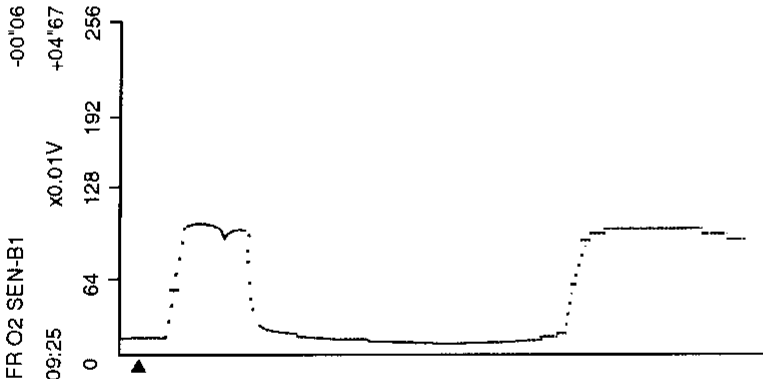
Major Sensor Reference Graph in Data Monitor Mode (Cont'd)



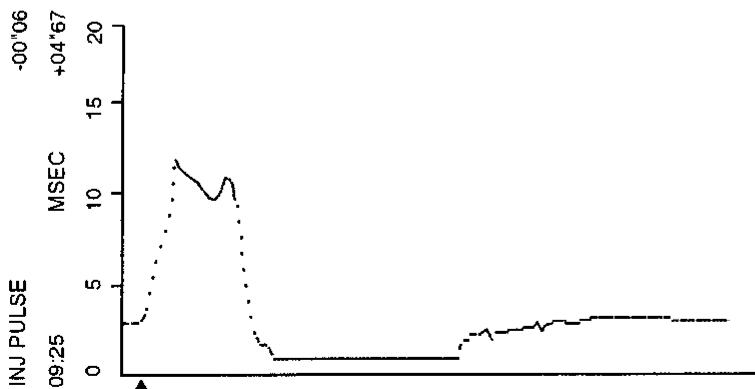
- "THRTL POS SEN" should increase while depressing the accelerator pedal and should decrease while releasing it.



- "RR O2 SENSOR" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



- "FR O2 SEN-B1" may increase immediately after depressing the accelerator pedal and may decrease after releasing the pedal.



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

GI

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EM

LC

EC

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CL

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BR

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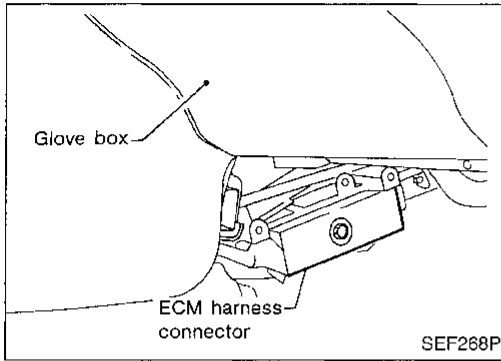
RS

BT

HA

EL

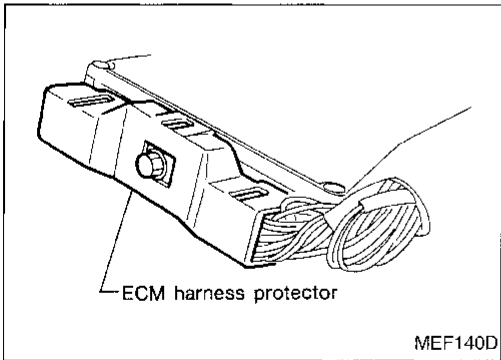
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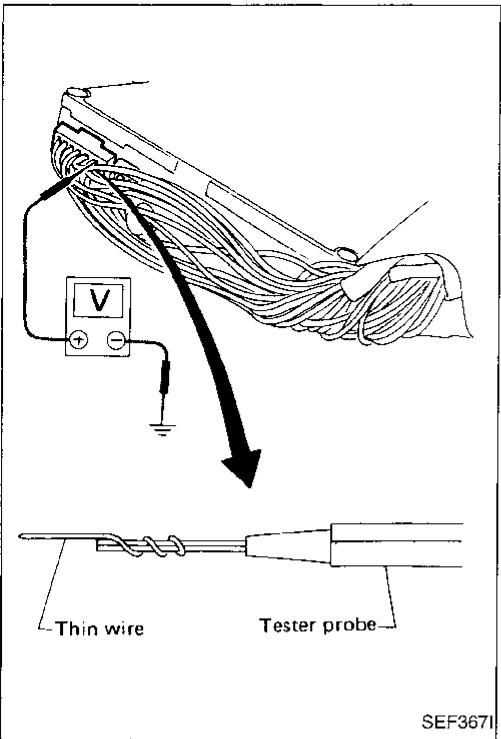
ECM Terminals and Reference Value

PREPARATION

1. ECM is located behind the center console panel. For this inspection, remove the center console under cover.

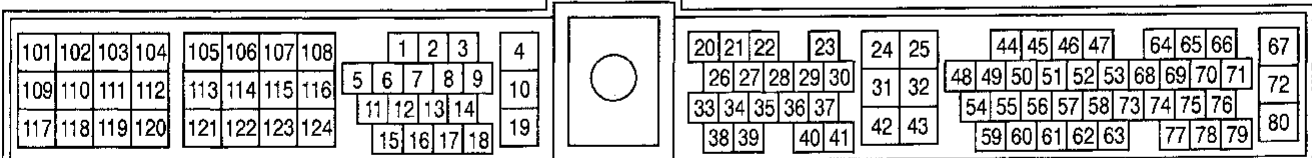


2. Remove ECM harness protector.



3. Perform all voltage measurements with the connectors connected. Extend tester probe as shown to perform tests easily.

ECM HARNESS CONNECTOR TERMINAL LAYOUT



SEF533P

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

ECM INSPECTION TABLE

Remarks: Specification data are reference values, and are measured between each terminal and Ⓞ (ECCS ground) with a voltmeter.

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)	
1 2 3	Y/R	Ignition signal (No. 1)	Engine is running. └ Idle speed	Approximately 0.45V★ (AC voltage)	GI
	G/R	Ignition signal (No. 2)			MA
	L/R	Ignition signal (No. 3)	Engine is running. └ Engine speed is 2,000 rpm.	Approximately 0.55V★ (AC voltage)	EM
4	W/B	ECCS relay (Self-shutoff)	Engine is running. Ignition switch "OFF" └ For a few seconds after turning ignition switch "OFF"	0 - 1V	LC
			Ignition switch "OFF" └ A few seconds passed after turning ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)	EC
5	W/G	Tachometer	Engine is running. └ Idle speed	Approximately 7V★	CL
6	R	A/T diagnosis signal	Ignition switch "ON" Engine is running.	0.5 - 3.0V	MT
7 8 9	GY	Ignition signal (No. 4)	Engine is running. └ Idle speed	Approximately 0.45V★ (AC voltage)	AT
	PU/W	Ignition signal (No. 5)			FA
	GY/R	Ignition signal (No. 6)	Engine is running. └ Engine speed is 2,000 rpm	Approximately 0.55V★ (AC voltage)	
10	B	ECCS ground	Engine is running. └ Idle speed	Engine ground	RA
11	B/P	Fuel pump relay	Ignition switch "ON" └ For 1 second after turning ignition switch "ON" Engine is running.	0 - 1V	BR
			Ignition switch "ON" └ 1 second after turning ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)	ST
12	B/R	Air conditioner relay	Engine is running. └ Both air conditioner switch and blower switch are "ON".	0 - 1V	RS
			Engine is running. └ Air conditioner switch is "OFF".	BATTERY VOLTAGE (11 - 14V)	BT

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

EL

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TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)
13 14	LG LG/R	Cooling fan relay (High) Cooling fan relay (Low)	Engine is running. └ Cooling fan is not operating.	BATTERY VOLTAGE (11 - 14V)
			Engine is running. └ Cooling fan is operating.	0 - 1V
15	B/P	Fuel pump control module	Engine is running. (Warm-up condition) └ Idle speed (within 30 seconds after starting engine)	0 - 0.4V
			Engine is running. (Warm-up condition) └ Idle speed (30 seconds after starting engine and thereafter)	Approximately 5V
16	OR/Y	MAP/BARO switch solenoid valve	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)
18	LG/B	Malfunction indicator lamp	Ignition switch "ON"	Approximately 0.1V
			Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
19	B	ECCS ground	Engine is running. └ Idle speed	Engine ground
20	BR/W	Start signal	Ignition switch "ON"	Approximately 0V
			Ignition switch "START"	BATTERY VOLTAGE (11 - 14V)
21	G/B	Air conditioner switch	Engine is running. └ Both air conditioner switch and blower switch are "ON". (Compressor operates.)	Approximately 0V
			Engine is running. └ Air conditioner switch is "OFF".	BATTERY VOLTAGE (11 - 14V)
22	G/W (M/T models) G/OR (A/T models)	Neutral position switch (M/T models) Inhibitor switch (A/T models)	Ignition switch "ON" └ Gear position is "Neutral position" (M/T models). └ Gear position is "N" or "P" (A/T models).	Approximately 0V
			Ignition switch "ON" └ Except the above gear position	Approximately 5V
23	W	Throttle position sensor	Ignition switch "ON" (Warm-up condition) └ Accelerator pedal released	0.35 - 0.65V
			Ignition switch "ON" └ Accelerator pedal fully depressed	Approximately 4V
24	R	Ignition switch	Ignition switch "OFF"	0V
			Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)	
25	B	ECCS ground	Engine is running. └ Idle speed	Engine ground	GI
26	Y	EVAP canister purge volume control valve	Engine is running. └ Idle speed	0 - 0.4V	MA
27	G				
28	G/R	Fuel pump control module check	Engine is running. (Warm-up condition) └ Idle speed (within 30 seconds after starting engine)	0 - 0.4V	EM
			Engine is running. └ Idle speed (30 seconds after starting engine and thereafter)		3 - 4V
29	P/L	Vehicle speed sensor	Engine is running. └ Jack up front wheels and run engine at idle in "1st" position (M/T models) or "1" position (A/T models).	Approximately 5.2V★ (AC voltage)	FE
					CL
31	GY/L	Throttle position switch (Closed position)	Ignition switch "ON" (Warm-up condition) └ Accelerator pedal released	BATTERY VOLTAGE (11 - 14V)	MT
			Ignition switch "ON" └ Accelerator pedal depressed	Approximately 0V	AT
32	B	ECCS ground	Engine is running. └ Idle speed	Engine ground	EA
33	W/L	Front engine mounting	Engine is running. └ For 2 seconds after engine speed changes from 2,000 rpm to idle speed	0 - 0.4V	RA
			Engine is running. └ Except the above		BATTERY VOLTAGE (11 - 14V)
34	W/R	Front engine mounting	Engine is running. └ For 2 seconds after engine speed changes from idle speed to 2,000 rpm	0 - 0.4V	ST
			Engine is running. └ Except the above		BATTERY VOLTAGE (11 - 14V)
37	L/W	Throttle position sensor signal	Ignition switch "ON" (Warm-up condition) └ Accelerator pedal released	Approximately 0.4V	HA
			Ignition switch "ON" └ Accelerator pedal fully depressed		Approximately 3V

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

IDX

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)
39	G	Power steering oil pressure switch	Engine is running. └ Steering wheel is being turned.	0 - 1.5V
			Engine is running. └ Steering wheel is not being turned.	BATTERY VOLTAGE (11 - 14V)
42	R	Sensor's power supply	Ignition switch "ON"	Approximately 5V
43	B	Sensor's ground	Engine is running. (Warm-up condition) └ Idle speed	0V
44 48	W W	Crankshaft position sensor (REF)	Engine is running. └ Idle speed	Approximately 2.3V★ (AC voltage)
46 47	W W	Camshaft position sensor (PHASE)	Engine is running. └ Idle speed	Approximately 5.3V★ (AC voltage)
49	W	Crankshaft position sensor (POS)	Engine is running. └ Idle speed	Approximately 2.5V★ (AC voltage)
50 51	W W	Front heated oxygen sensor (Right bank) Front heated oxygen sensor (Left bank)	Engine is running. └ After warming up sufficiently and engine speed is 2,000 rpm.	0 - Approximately 1.0V (periodically change)
52	P/L	Tank fuel temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with fuel temperature.
54	W	Mass air flow sensor	Engine is running. (Warm-up condition) └ Idle speed	1.0 - 1.7V
			Engine is running. (Warm-up condition) └ Engine speed is 2,000 rpm.	1.5 - 2.1V
55	B	Mass air flow sensor ground	Engine is running. (Warm-up condition) └ Idle speed	Approximately 0V
56	W	Rear heated oxygen sensor	Engine is running. └ After warming up sufficiently and engine speed is 2,000 rpm.	0 - Approximately 2.2V*
58	SB	Intake air temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with intake air temperature.
59	Y	Engine coolant temperature sensor	Engine is running.	0 - 5.0V Output voltage varies with engine coolant temperature.

★: Average voltage for pulse signal (Actual pulse signal can be confirmed by oscilloscope.)

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)	
61	W	Absolute pressure sensor	Ignition switch "ON" └ Engine is not running.	Approximately 4.4V	GI
			Engine is running. (Warm-up condition) └ Idle speed (5 seconds after starting engine)	Approximately 1.2V	MA
62	W	EVAP control system pressure sensor	Ignition switch "ON"	Approximately 3.4V	EM
63	L/OR	EGR temperature sensor	Engine is running. (Warm-up condition) └ Idle speed	Less than 4.5V	LC
			Engine is running. (Warm-up condition) └ EGR system is operating.	0 - 1.0V	EC
64	W	Knock sensor	Engine is running. └ Idle speed	2.0 - 3.0V	FE
65	R/L	A/T signal No. 4	Ignition switch "ON"	6 - 8V	CL
			Engine is running. └ Idle speed	0V	MT
66	Y/B	A/T signal No. 5	Ignition switch "ON"	0V	AT
			Engine is running. └ Idle speed	6 - 8V	FA
67 72	R R	Power supply for ECM	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)	RA
69	G/B	Data link connector for GST	Ignition switch "ON" └ GST is disconnected.	6 - 10V	BR
70	OR/L	EVAP canister vent control valve	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)	ST
73	W/L	A/T signal No. 1	Ignition switch "ON"	6 - 8V	RS
			Engine is running. └ Idle speed	0V	BT
74	W/PU	A/T signal No. 2	Ignition switch "ON"	6 - 8V	HA
75	BR/Y	Data link connector for CONSULT	Engine is running.	Approximately 0V	EL
76	P		└ Idle speed	Approximately 4 - 9V	EL
78	LG		└ Connect CONSULT and select DATA MONITOR mode.	Approximately 3.5V	EL
77	R/W	A/T signal No. 3	Ignition switch "ON"	0V	EL
			Engine is running. └ Idle speed	6 - 8V	IDX

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)
79	R/W	Electrical load signal	Engine is running. └ Idle speed (Electrical load: "OFF")	0V
			Engine is running. └ Idle speed (Headlamp, rear window defogger: "ON")	BATTERY VOLTAGE (11 - 14V)
80	W	Power supply (Back-up)	Ignition switch "OFF"	BATTERY VOLTAGE (11 - 14V)
101 115 122 123	PU/G GY/G Y GY/L	IACV-AAC valve	Engine is running. └ Idle speed	0.1 - 14V
102	R/B	Injector No. 1	Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
104	R/Y	Injector No. 3		
106	L/W	Injector No. 5		
109	R/G	Injector No. 2		
111	B/OR	Injector No. 4		
113	PU/R	Injector No. 6		
103	L/B	EGRC-solenoid valve	Engine is running. (Warm-up condition) └ Engine speed is 2,000 rpm.	BATTERY VOLTAGE (11 - 14V)
			Engine is running. (Warm-up condition) └ Idle speed	0 - 0.7V
105	PU	Rear heated oxygen sensor heater	Ignition switch "ON" Engine is running.	0 - 0.3V
108	B	ECCS ground	Engine is running. └ Idle speed	Engine ground
110 118	G/B L/R	EVAP canister purge volume control valve	Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
112	B	Rear heated oxygen sensor heater ground	Engine is running. └ Idle speed	0 - Approximately 0.09V
114	L/Y	EVAP canister purge control solenoid valve	Engine is running. └ Idle speed	BATTERY VOLTAGE (11 - 14V)
116	B	ECCS ground	Engine is running. └ Idle speed	Engine ground
119	L/Y	Front heated oxygen sensor heater (right bank)	Engine is running. └ Engine speed is below 3,600 rpm.	0 - 0.5V
			Engine is running. └ Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
120	OR/G	Vacuum cut valve bypass valve	Ignition switch "ON"	BATTERY VOLTAGE (11 - 14V)

TROUBLE DIAGNOSIS — General Description

ECM Terminals and Reference Value (Cont'd)

TER-MINAL NO.	WIRE COLOR	ITEM	CONDITION	DATA (DC voltage)
121	L	Front heated oxygen sensor heater (left bank)	Engine is running. └ Engine speed is below 3,600 rpm.	0 - 0.5V
			Engine is running. └ Engine speed is above 3,600 rpm.	BATTERY VOLTAGE (11 - 14V)
124	B	ECCS ground	Engine is running. └ Idle speed	Engine ground

* During the on-board diagnosis for the open circuit. Approx. 1.5 - 5V will appear. This is not a malfunction. (Refer to page EC-149.)

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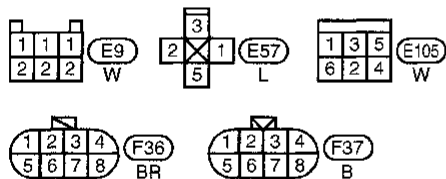
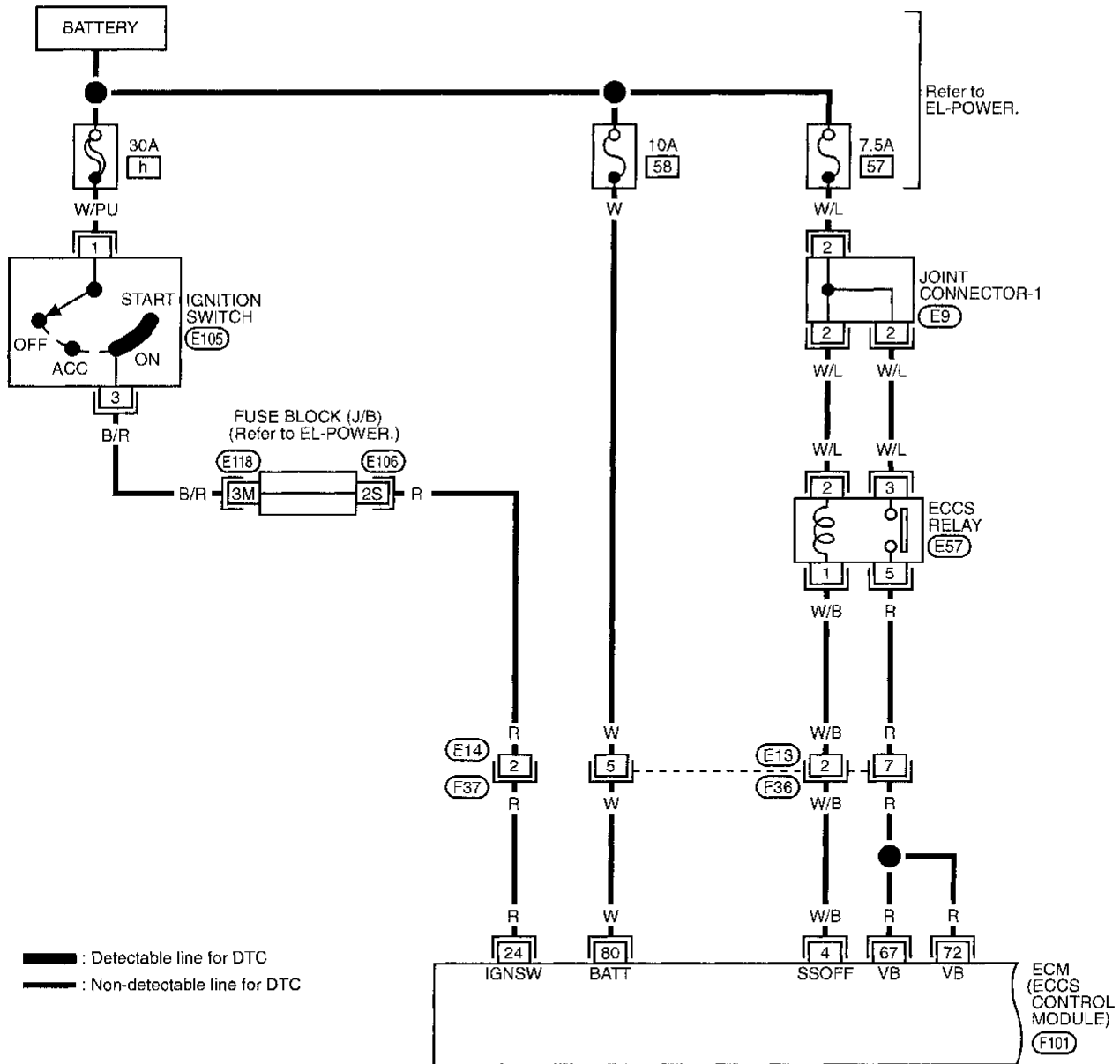
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TROUBLE DIAGNOSIS FOR POWER SUPPLY

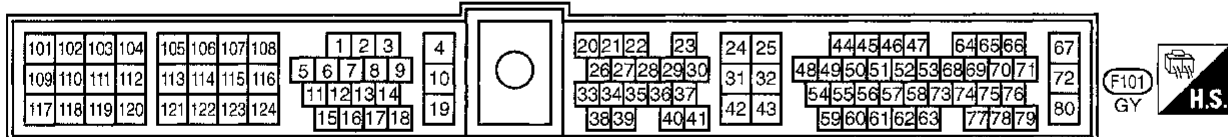
Main Power Supply and Ground Circuit

EC-MAIN-01



Refer to last page (Foldout page).

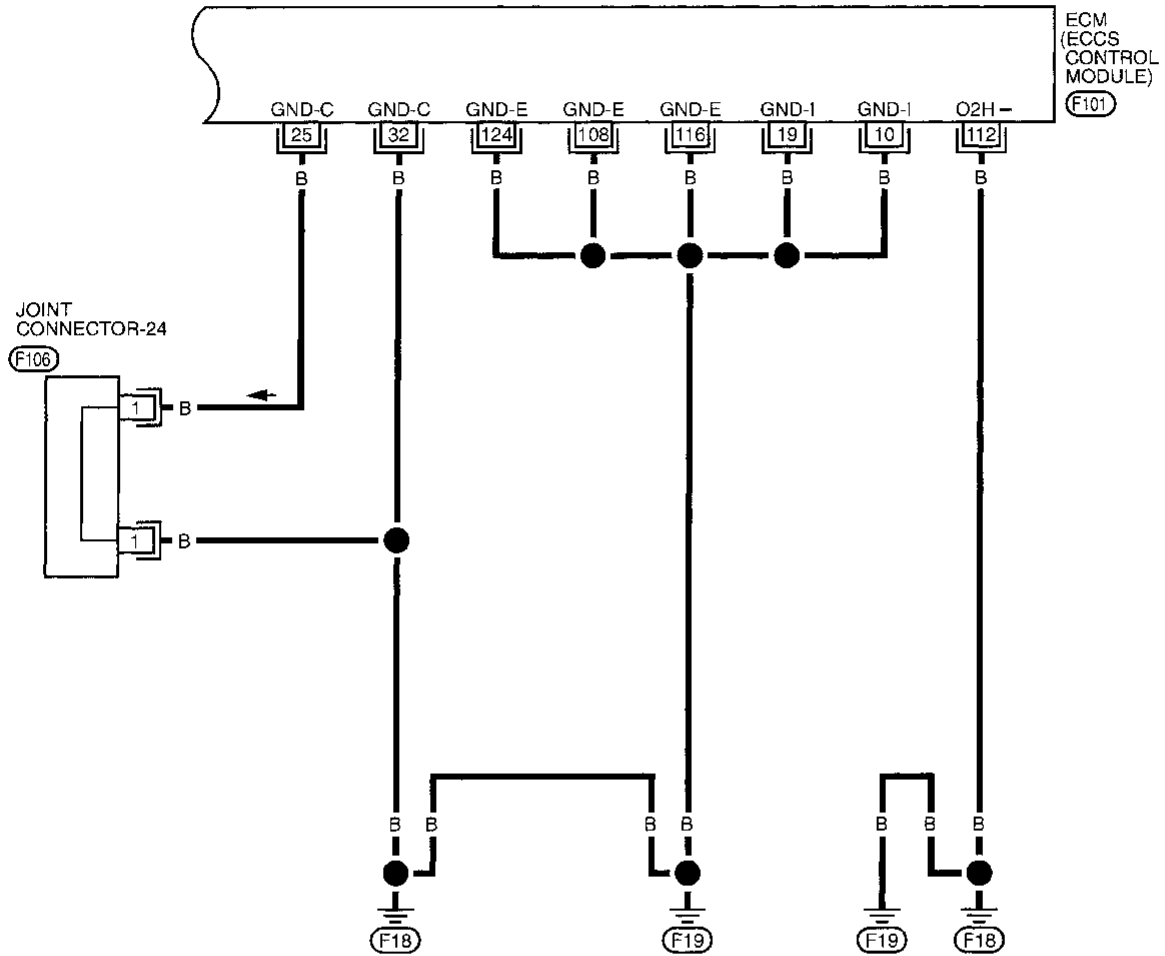
E106
E118



TROUBLE DIAGNOSIS FOR POWER SUPPLY

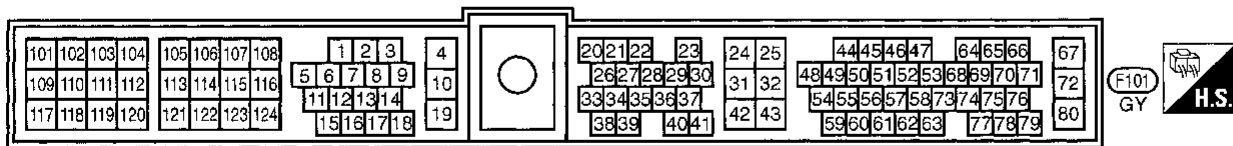
Main Power Supply and Ground Circuit (Cont'd)

EC-MAIN-02



— : Detectable line for DTC
 — : Non-detectable line for DTC

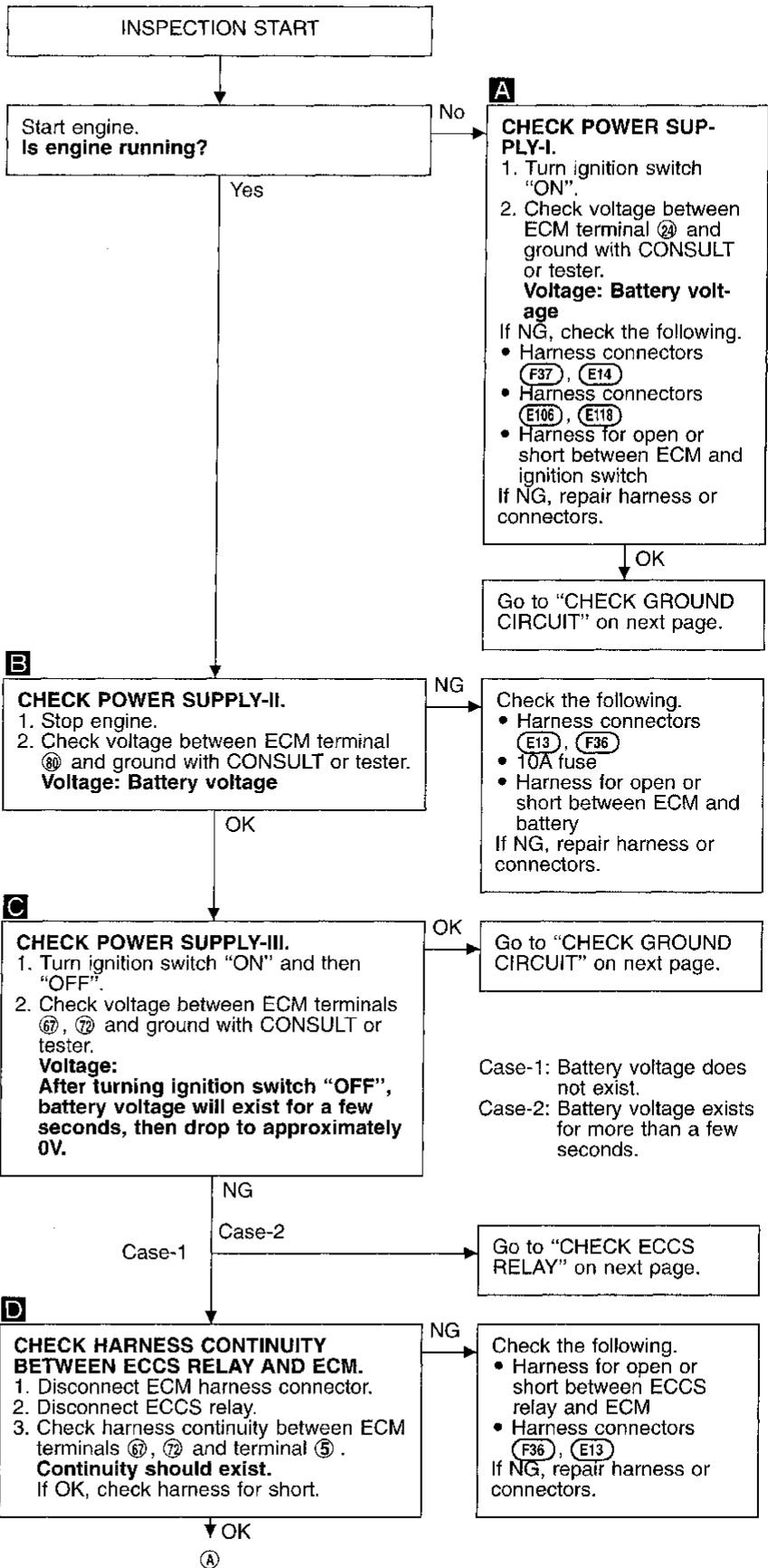
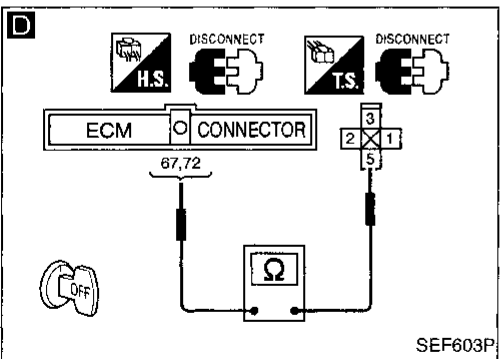
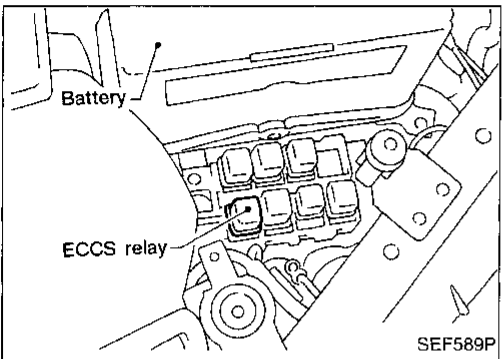
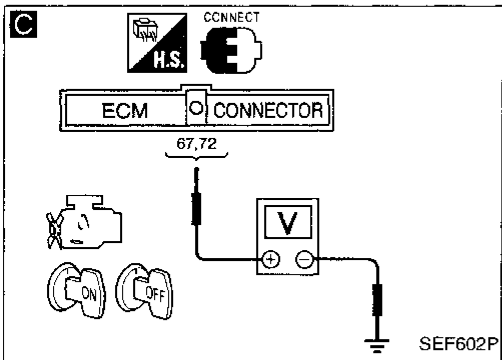
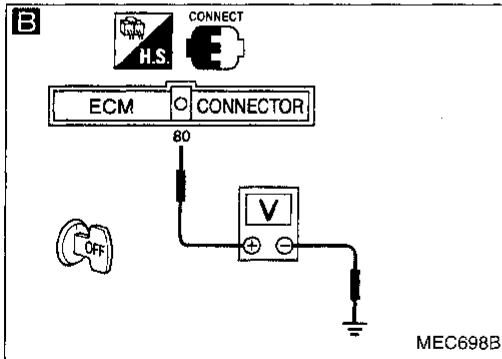
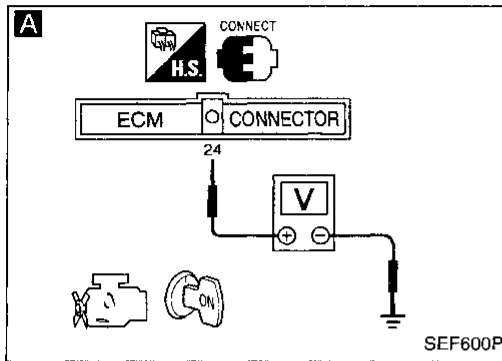
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TROUBLE DIAGNOSIS FOR POWER SUPPLY

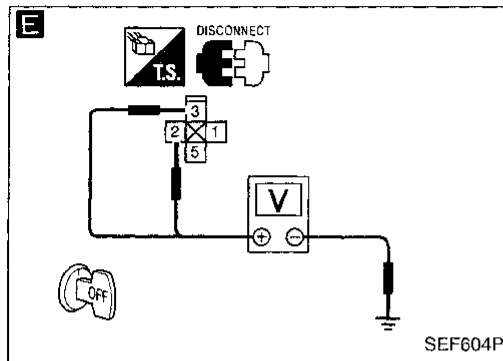
Main Power Supply and Ground Circuit (Cont'd)

DIAGNOSTIC PROCEDURE



TROUBLE DIAGNOSIS FOR POWER SUPPLY

Main Power Supply and Ground Circuit (Cont'd)



E

CHECK VOLTAGE BETWEEN ECCS RELAY AND GROUND.

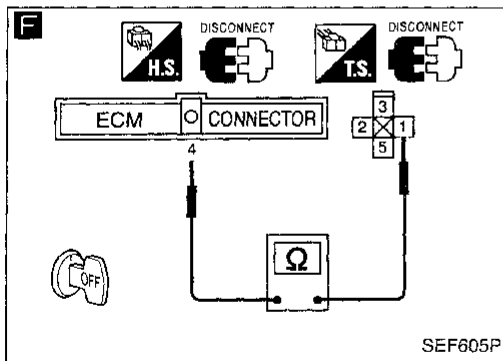
1. Check voltage between terminals ②, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.

- 7.5A fuse
- Joint connector-1
- Harness for open or short between ECCS relay and battery

If NG, repair harness or connectors.

OK →



F

CHECK OUTPUT SIGNAL CIRCUIT.

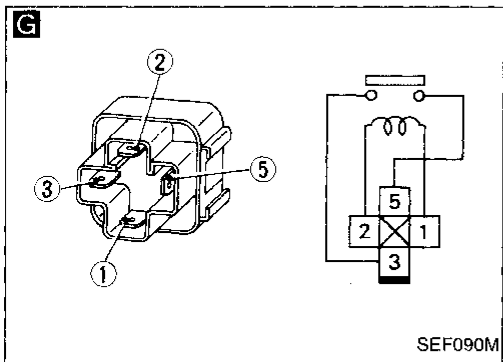
1. Check harness continuity between ECM terminal ④ and terminal ①.
Continuity should exist.
If OK, check harness for short.

NG → Check the following.

- Harness for open or short between ECCS relay and ECM
- Harness connectors (F36, E13)

If NG, repair harness or connectors.

OK →



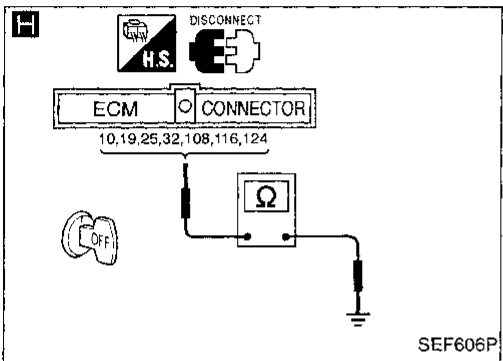
G

CHECK ECCS RELAY.

1. Apply 12V direct current between relay terminals ① and ②.
2. Check continuity between relay terminals ③ and ⑤.
12V (① - ②) applied:
Continuity exists.
No voltage applied:
No continuity

NG → Replace ECCS relay.

OK →



H

CHECK GROUND CIRCUIT.

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.
3. Disconnect ECM harness connector.
4. Check harness continuity between ECM terminals ⑩, ⑱, ㉕, ㉔, ⑩⑧, ⑪⑥, ⑫④ and engine ground.
Continuity should exist.
If OK, check harness for short.

NG → Check the following.

- Joint connector-11
- Harness for open or short between ECM terminal ㉕ and engine ground

If NG, repair harness or connectors.

OK →

Check ECM pin terminals for damage and check the connection of ECM harness connector.

INSPECTION END

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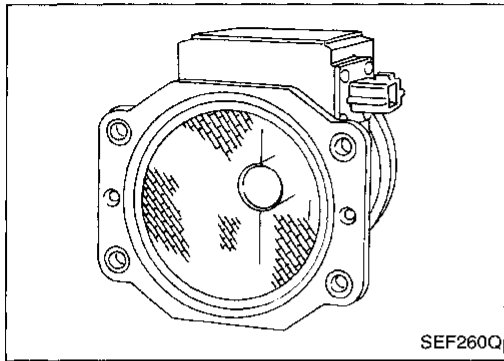
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TROUBLE DIAGNOSIS FOR DTC P0100



Mass Air Flow Sensor (MAFS) (DTC: 0102)

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 the hot film as air flow increases. This maintains the temperature of the hot film. The ECM detects the air flow by means of this current change.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0100 0102	A) 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.) • Mass air flow sensor
	B)C) Voltage sent to ECM is not practical when compared with the crankshaft position sensor (POS) and throttle position sensor signals.	

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Procedure for malfunction A



- 1) Turn ignition switch "ON", and wait at least 6 seconds.
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and wait at least 3 seconds.

OR



- 1) Turn ignition switch "ON", and wait at least 6 seconds.
- 2) Start engine and wait at least 3 seconds.
- 3) Select "MODE 3" with GST.

OR



- 1) Turn ignition switch "ON", and wait at least 6 seconds.
- 2) Start engine and wait at least 3 seconds.
- 3) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 4) Perform diagnostic test mode II (Self-diagnostic results) with ECM.

TROUBLE DIAGNOSIS FOR DTC P0100

Mass Air Flow Sensor (MAFS) (DTC: 0102) (Cont'd)

Procedure for malfunction B

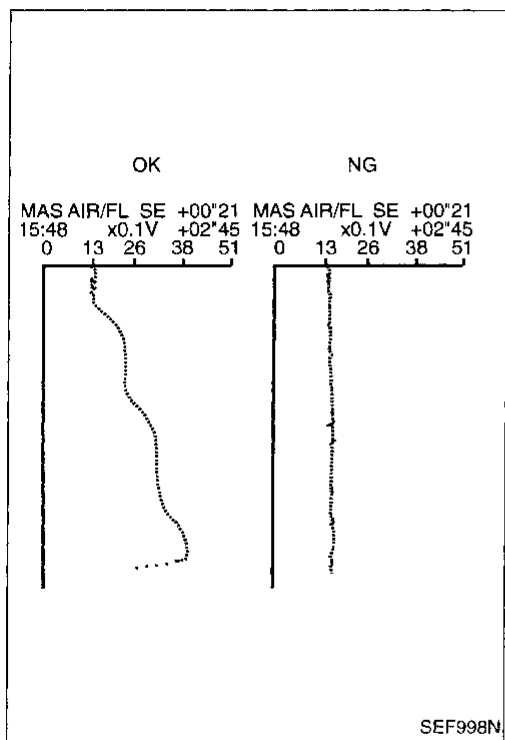
- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and warm it up sufficiently.
- 4) Run engine for at least 10 seconds at idle speed.

OR

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up sufficiently.
- 3) Run engine for at least 10 seconds at idle speed.
- 4) Select "MODE 3" with GST.

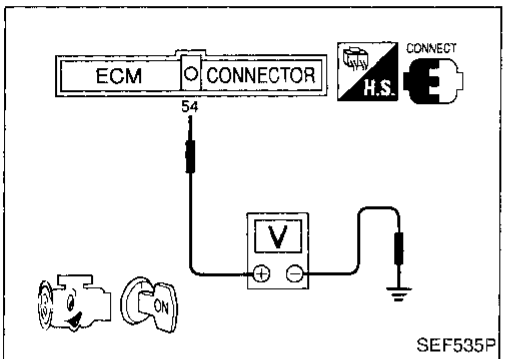
OR

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up sufficiently.
- 3) Run engine for at least 10 seconds at idle speed.
- 4) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 5) Perform diagnostic test mode II (Self-diagnostic results) with ECM.



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 DTC might not be confirmed.

Procedure for malfunction C

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and warm it up sufficiently.
- 4) Check the voltage of mass air flow sensor with "DATA MONITOR".
- 5) Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

OR

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up sufficiently.
- 3) Select "MODE 1" with GST.
- 4) Check the mass air flow with "MODE 1".
- 5) Check for linear mass air flow rise in response to increases to about 4,000 rpm in engine speed.

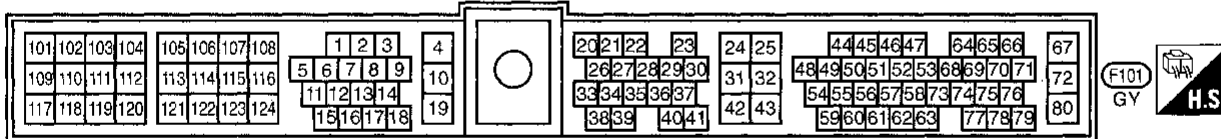
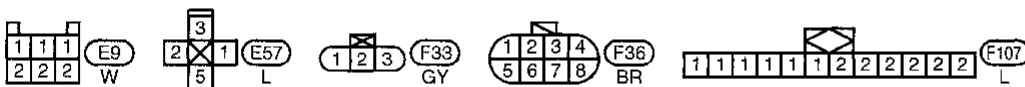
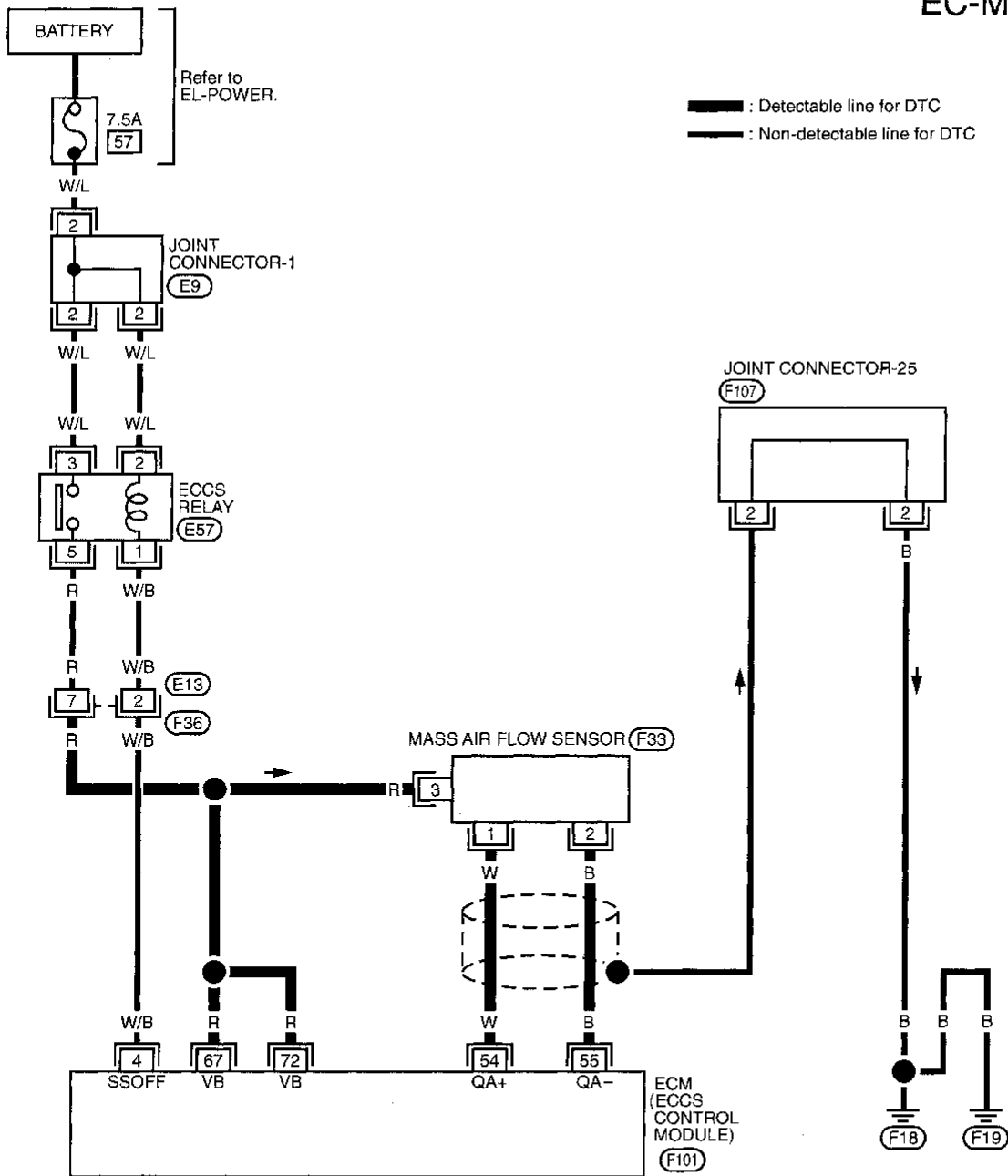
OR

- 1) Turn ignition switch "ON".
- 2) Start engine and warm it up sufficiently.
- 3) Check the voltage between ECM terminal 54 and ground.
- 4) Check for linear voltage rise in response to increases to about 4,000 rpm in engine speed.

TROUBLE DIAGNOSIS FOR DTC P0100

Mass Air Flow Sensor (MAFS) (DTC: 0102) (Cont'd)

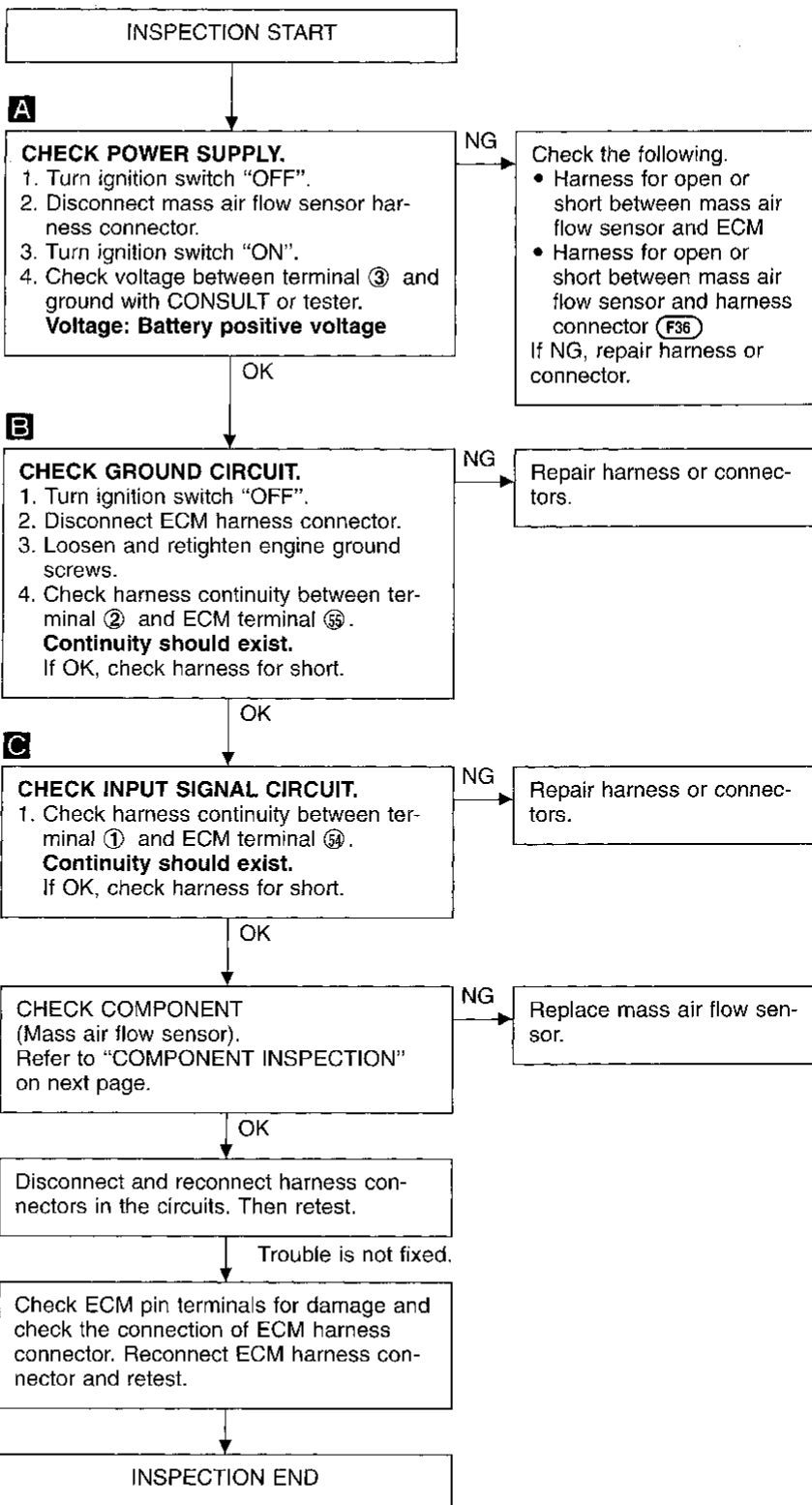
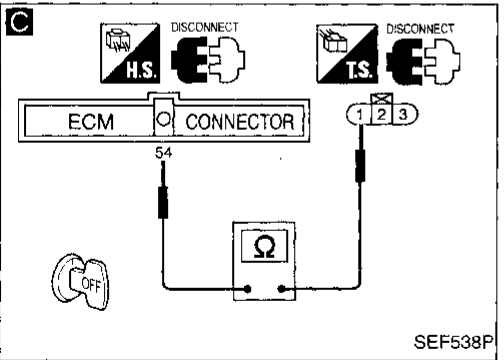
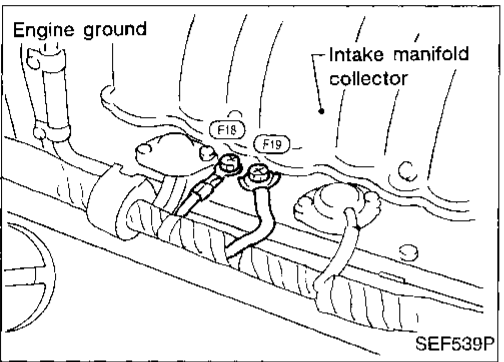
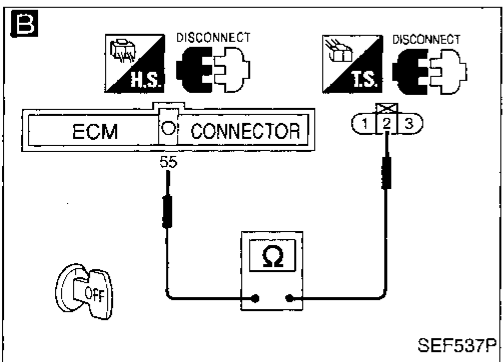
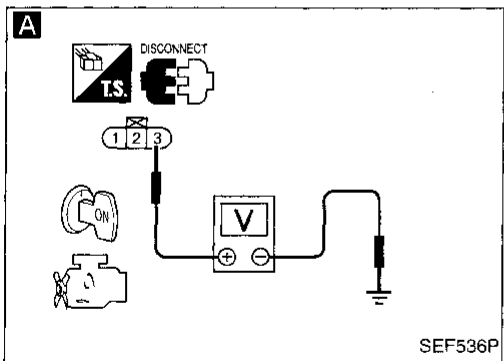
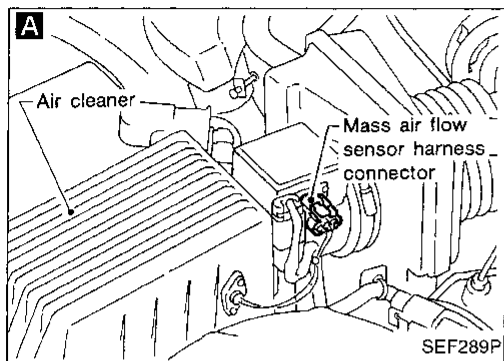
EC-MAFS-01



TROUBLE DIAGNOSIS FOR DTC P0100

Mass Air Flow Sensor (MAFS) (DTC: 0102) (Cont'd)

DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR DTC P0100

Mass Air Flow Sensor (MAFS) (DTC: 0102) (Cont'd)

COMPONENT INSPECTION

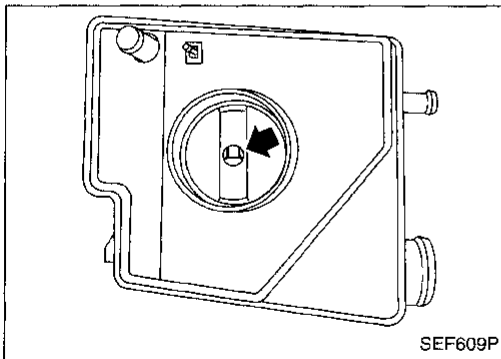
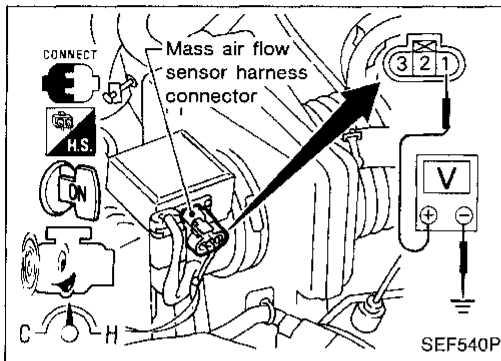
Mass air flow sensor

1. Turn ignition switch "ON".
2. Start engine and warm it up sufficiently.
3. Check voltage between terminal ① and ground.

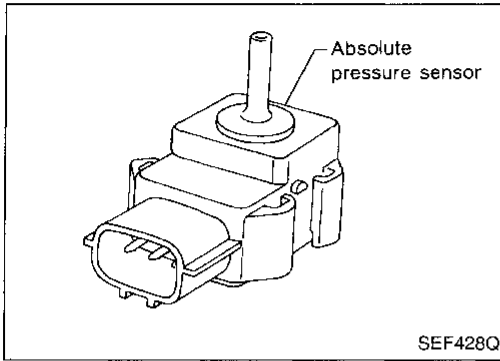
Conditions	Voltage V
Ignition switch "ON" (Engine stopped.)	Less than 1.0
Idle (Engine is warmed-up sufficiently.)	1.0 - 1.7
Idle to about 4,000 rpm*	1.0 - 1.7 to Approx. 4.0

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

4. If NG, remove mass air flow sensor from air duct. Check hot film for damage or dust.



TROUBLE DIAGNOSIS FOR DTC P0105



Absolute Pressure Sensor (DTC: 0803)

The absolute pressure sensor is connected to the MAP/BARO switch solenoid valve by a hose. The sensor detects ambient barometric pressure and intake manifold pressure and sends the voltage signal to the ECM. As the pressure increases, the voltage rises. The absolute pressure sensor is not used to control the engine system. It is used only for on-board diagnosis.

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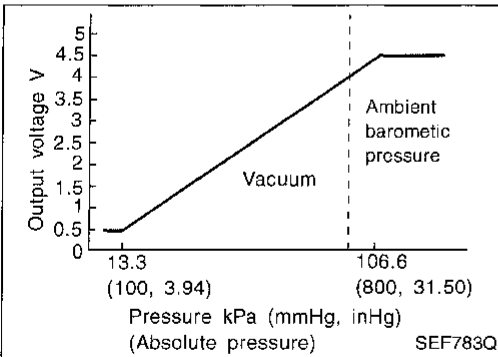
RS

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Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0105 0803	A) An excessively low or high voltage from the sensor is sent to ECM.	<ul style="list-style-type: none"> • Harness or connectors (Absolute pressure sensor circuit is open or shorted.) • Absolute pressure sensor
	B) A low voltage from the sensor is sent to ECM under heavy load driving conditions.	<ul style="list-style-type: none"> • Absolute pressure sensor
	C) A high voltage from the sensor is sent to ECM under light load driving conditions.	<ul style="list-style-type: none"> • Hoses (Hoses between the intake manifold and absolute pressure sensor are disconnected or clogged.) • Intake air leaks • Absolute pressure sensor

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Perform "Procedure for malfunction A" first. If the DTC cannot be confirmed, perform "OVERALL FUNCTION CHECK", "Procedure for malfunction B". If there is no problem on "Procedure for malfunction B", perform "Procedure for malfunction C".

Procedure for malfunction A

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Wait at least 6 seconds.

OR

- 1) Turn ignition switch "ON" and wait at least 6 seconds.
- 2) Select "MODE 3" with GST.

OR

- 1) Turn ignition switch "ON" and wait at least 6 seconds.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0105

Absolute Pressure Sensor (DTC: 0803) (Cont'd)

If the DTC cannot be confirmed, perform "OVERALL FUNCTION CHECK", "Procedure for malfunction B" on next page.

Procedure for malfunction C



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 4) Start engine and let it idle.
- 5) Wait at least 15 seconds.

OR



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Start engine.
- 4) Let engine idle and wait at least 15 seconds.
- 5) Select "MODE 3" with GST.

OR



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Start engine.
- 4) Let engine idle and wait at least 15 seconds.
- 5) Turn ignition switch "OFF".
- 6) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0105

Absolute Pressure Sensor (DTC: 0803) (Cont'd) OVERALL FUNCTION CHECK

Use this procedure to check the overall function of absolute pressure sensor circuit. During this check, a DTC might not be confirmed.

Procedure for malfunction B

- 1) Turn ignition switch "ON".
- 2) Select "ABSOL PRES/SE" in "DATA MONITOR" mode with CONSULT.
- 3) Make sure that the voltage of "ABSOL PRES/SE" is more than 1.74 [V].

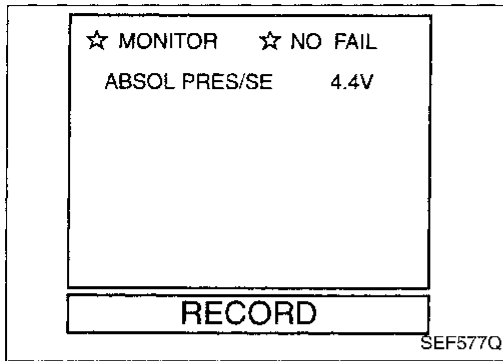
OR

- 1) Turn ignition switch "ON".
- 2) Select "MAP" in "MODE 1" with GST.
- 3) Make sure that the pressure of "MAP" is more than 46 kPa (0.47 kg/cm², 6.7 psi).

OR

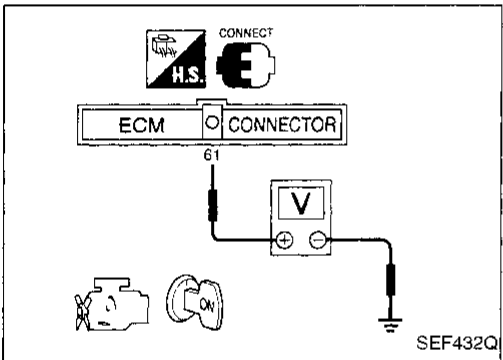
- 1) Turn ignition switch "ON".
- 2) Make sure that the voltage between ECM terminal ⑥1 and ground is more than 1.74 [V].

If the DTC cannot be confirmed, perform "Procedure for malfunction C" on the previous page.



FUEL SYS #1	OLDRIVE
FUEL SYS #2	OLDRIVE
CALC LOAD	0%
MAP	102KPaA
SHORT FT #1	0%
LONG FT #1	0%
SHORT FT #2	0%
LONG FT #2	0%
ENGINE SPD	0RPM
VEHICLE SPD	0MPH
IGN ADVANCE	1.0°
INTAKE AIR	25°C

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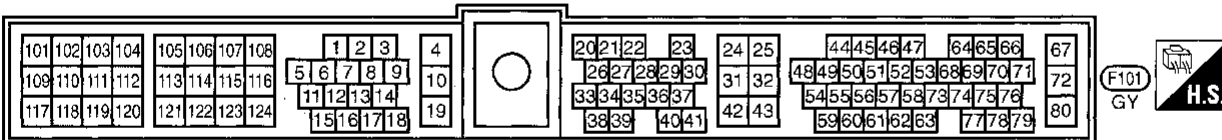
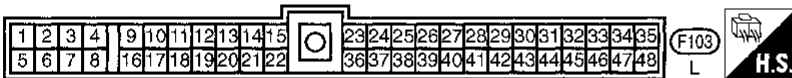
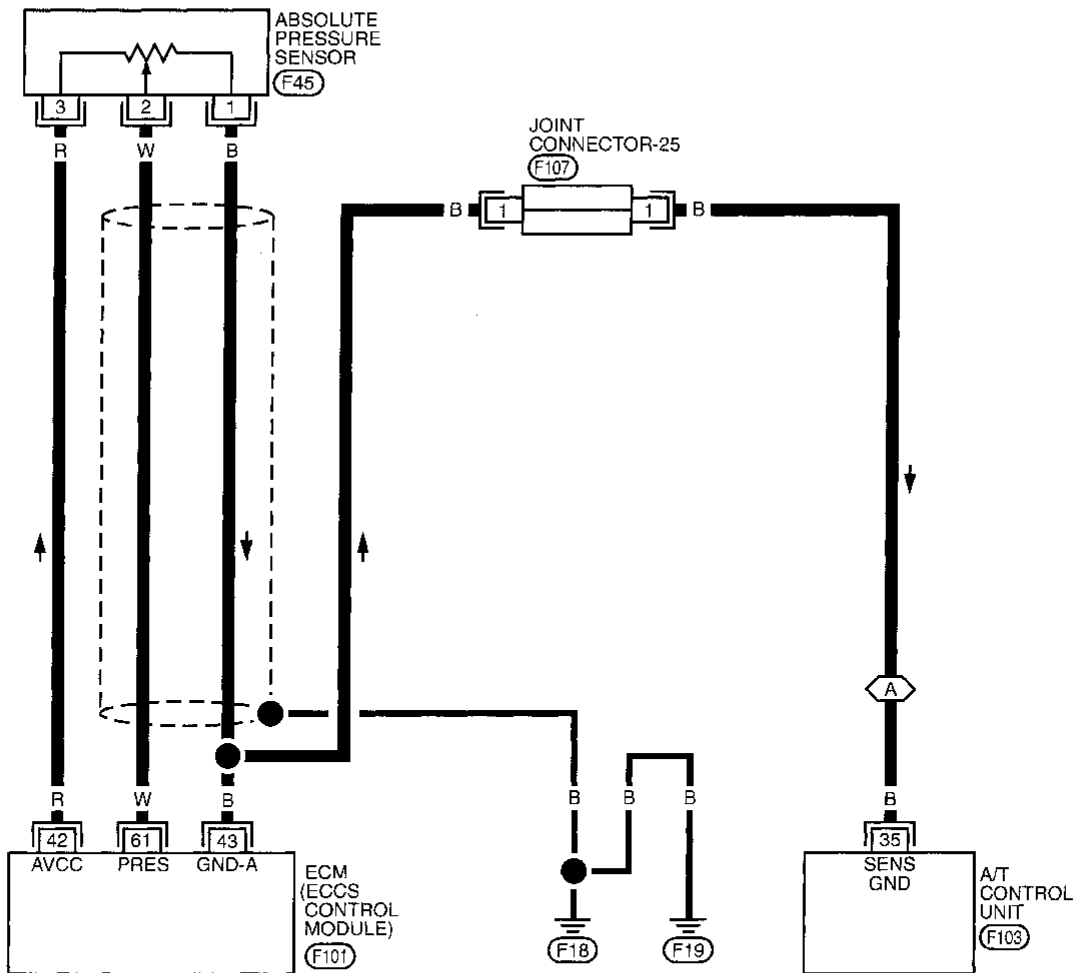
IDX

TROUBLE DIAGNOSIS FOR DTC P0105

Absolute Pressure Sensor (DTC: 0803) (Cont'd)

EC-AP/SEN-01

-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : A/T models

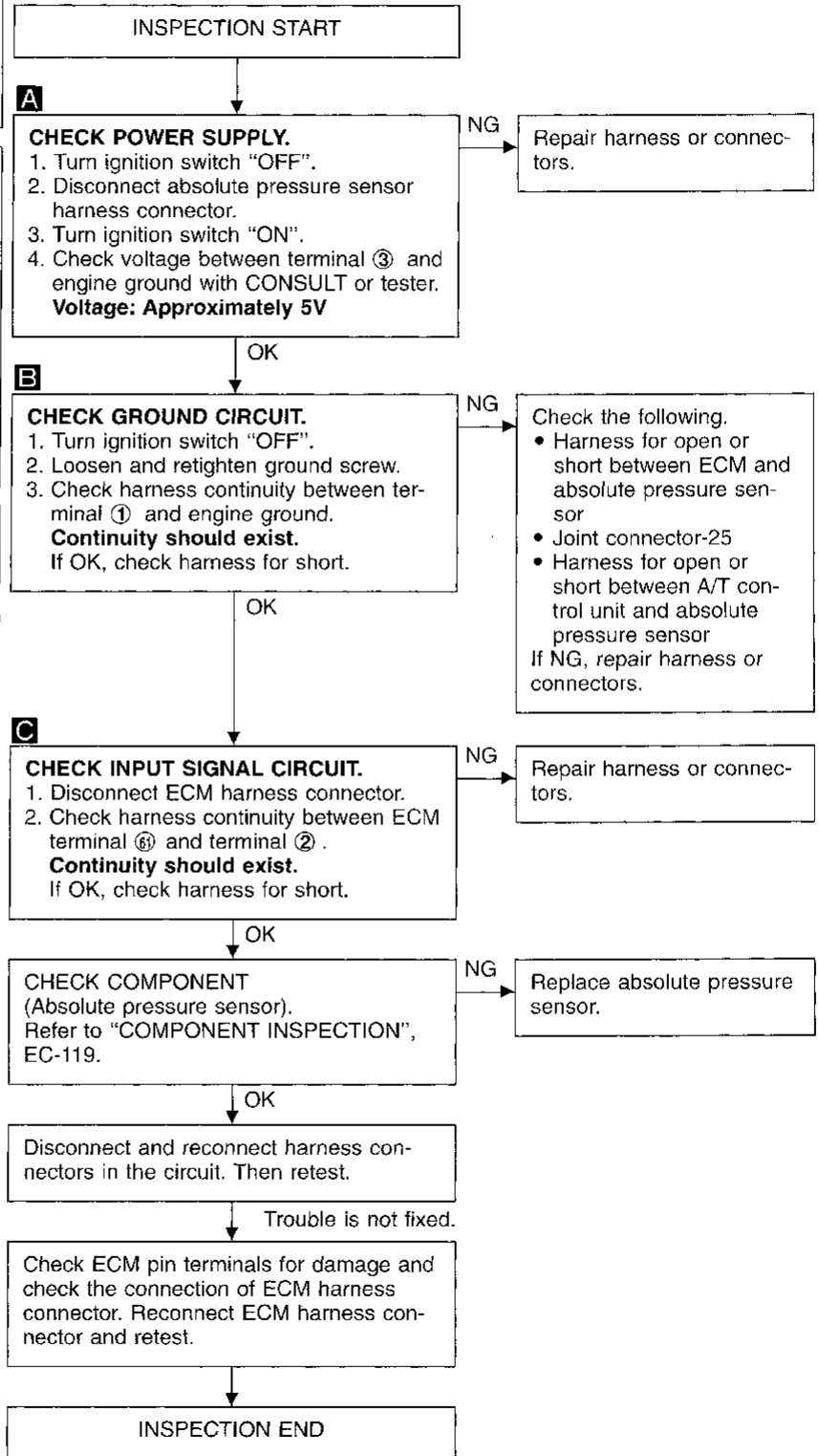
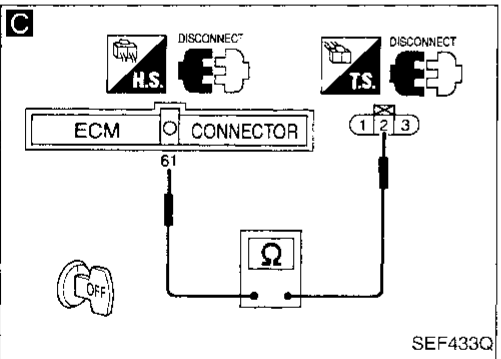
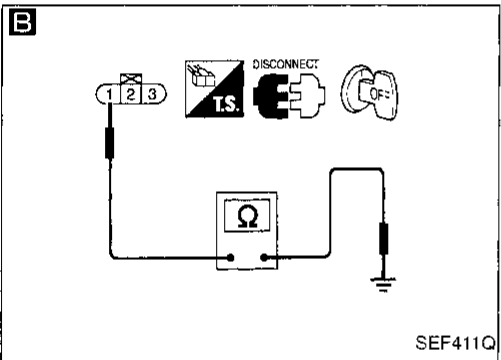
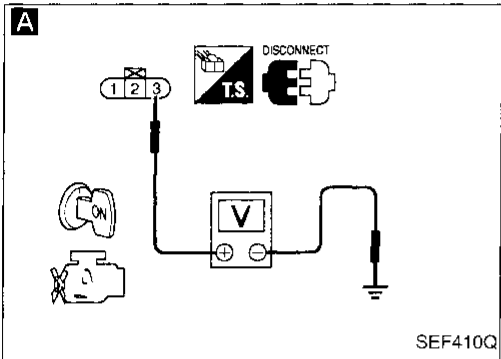
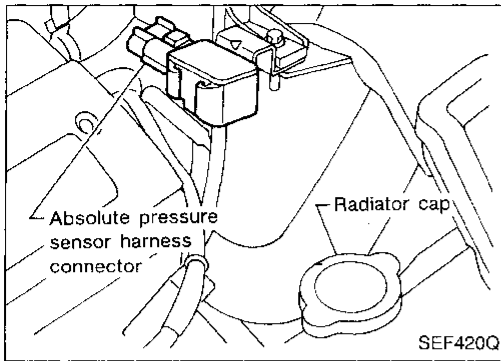


TROUBLE DIAGNOSIS FOR DTC P0105

Absolute Pressure Sensor (DTC: 0803) (Cont'd) DIAGNOSTIC PROCEDURE

If the trouble is duplicated after "Procedure for malfunction A or B", perform "Procedure A" below. If the trouble is duplicated after "Procedure for malfunction C", perform "Procedure B" on next page.

Procedure A



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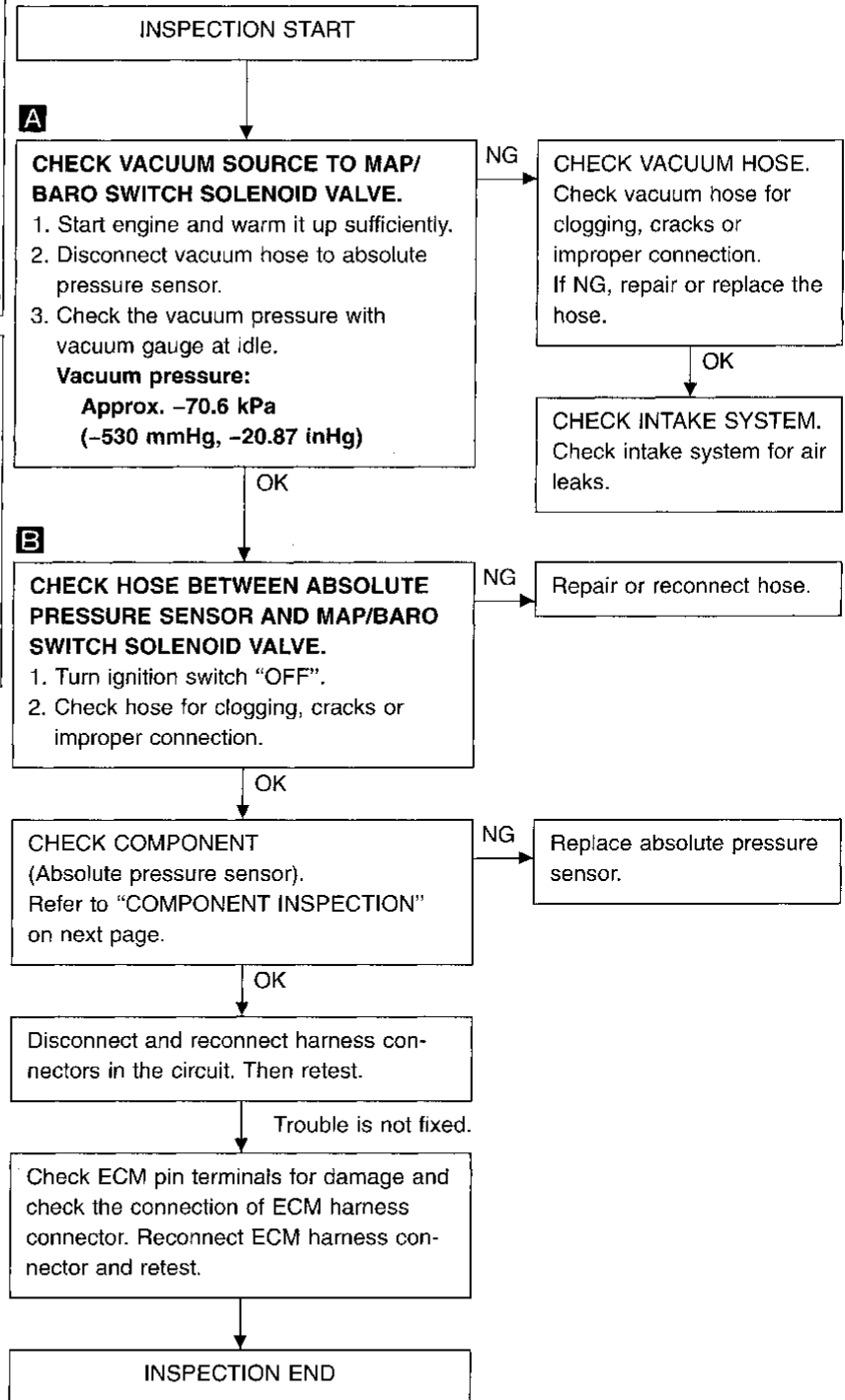
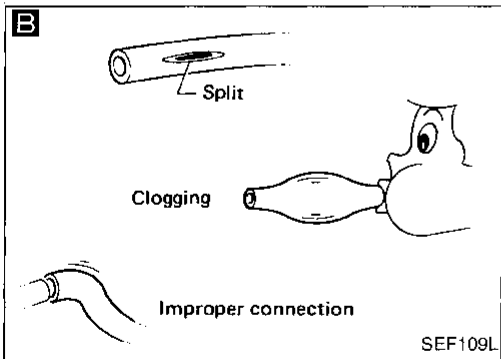
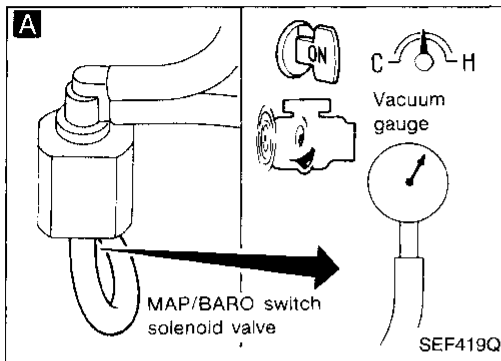
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TROUBLE DIAGNOSIS FOR DTC P0105

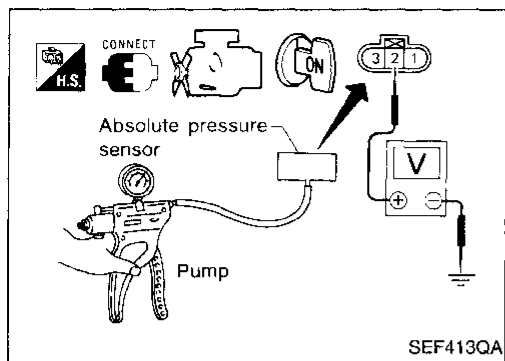
Absolute Pressure Sensor (DTC: 0803) (Cont'd)

Procedure B



TROUBLE DIAGNOSIS FOR DTC P0105

Absolute Pressure Sensor (DTC: 0803) (Cont'd) COMPONENT INSPECTION



Absolute pressure sensor

1. Remove absolute pressure sensor with its harness connector connected.
2. Remove hose from absolute pressure sensor.
3. Turn ignition switch "ON" and check output voltage between terminal ② and engine ground.

The voltage should be 3.2 to 4.8 V.

4. Use pump to apply vacuum of -26.7 kPa (-200 mmHg, -7.87 inHg, -3.87 psi) to absolute pressure sensor as shown in figure and check the output voltage.

The voltage should be 1.0 to 1.4 V lower than the value measured in step 3.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

5. If NG, replace absolute pressure sensor.

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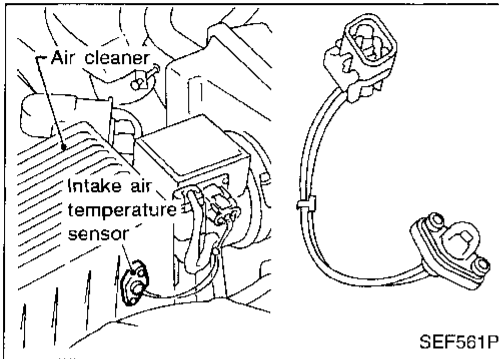
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TROUBLE DIAGNOSIS FOR DTC P0110

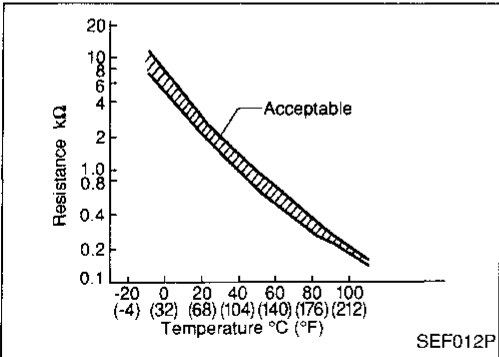


Intake Air Temperature Sensor (DTC: 0401)

The intake air temperature sensor is mounted to the air cleaner housing, 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.

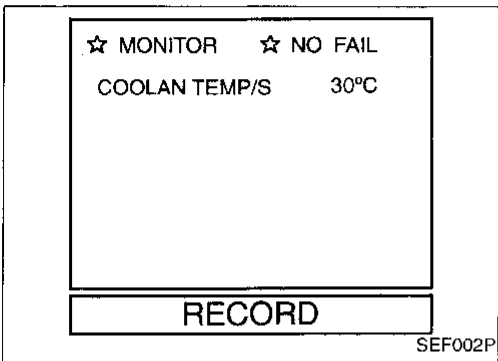
This sensor is not directly used to control the engine system. It is used only for the on-board diagnosis.



(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

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0110 0401	<p>A) An excessively low or high voltage from the sensor is sent to ECM.</p> <p>B) Rationally incorrect voltage from the sensor is sent to ECM, compared with the voltage signal from engine coolant temperature sensor.</p>	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Intake air temperature sensor

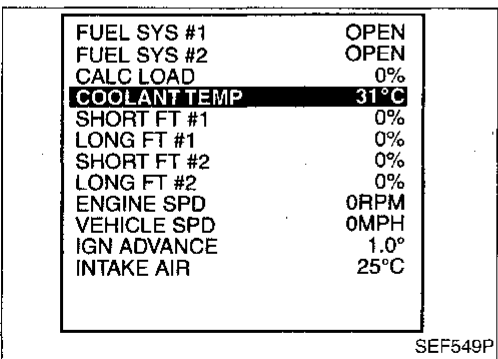


DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Procedure for malfunctions A and B

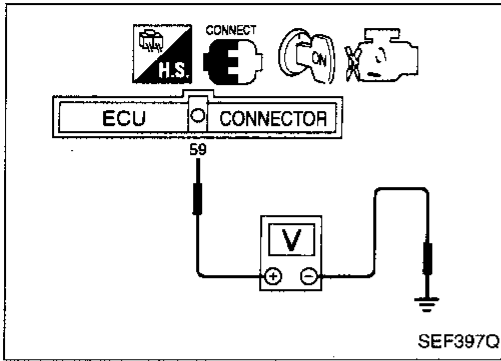
- 1) Wait until engine coolant temperature is less than 90°C (194°F).
 - (1) Turn ignition switch "ON".
 - (2) Select "DATA MONITOR" mode with CONSULT.
 - (3) Check the engine coolant temperature.
 - (4) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
 - 2) Turn ignition switch "ON".
 - 3) Select "DATA MONITOR" mode with CONSULT.
 - 4) Wait at least 5 seconds.
- OR

- 1) Wait until engine coolant temperature is less than 90°C (194°F).
 - (1) Turn ignition switch "ON".
 - (2) Select MODE 1 with GST.
 - (3) Check the engine coolant temperature.



TROUBLE DIAGNOSIS FOR DTC P0110

Intake Air Temperature Sensor (DTC: 0401) (Cont'd)



- (4) If the engine coolant temperature is not less than 90°C (194°F), turn ignition switch "OFF" and cool down engine.
- 2) Turn ignition switch "ON" and wait at least 5 seconds. GI
- 3) Select MODE 3 with GST.

OR

- 1) Wait until engine coolant temperature is less than 90°C (194°F). MA
 - (1) Turn ignition switch "ON".
 - (2) Check voltage between ECM terminal 59 and ground. EM

Voltage: More than 1.2 (V)

 - (3) If the voltage is not more than 1.2 (V), turn ignition switch "OFF" and cool down engine. LC
- 2) Turn ignition switch "ON" wait at least 5 seconds. EC
- 3) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 4) Perform diagnostic test mode II (Self-diagnostic results) with ECM. FE

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
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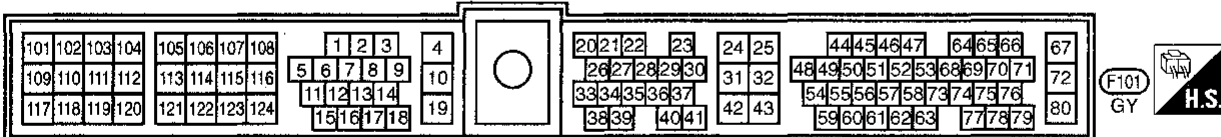
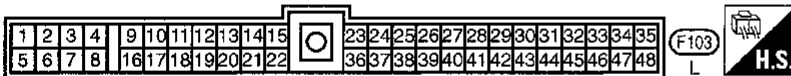
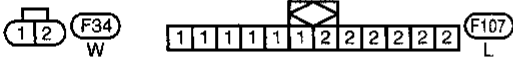
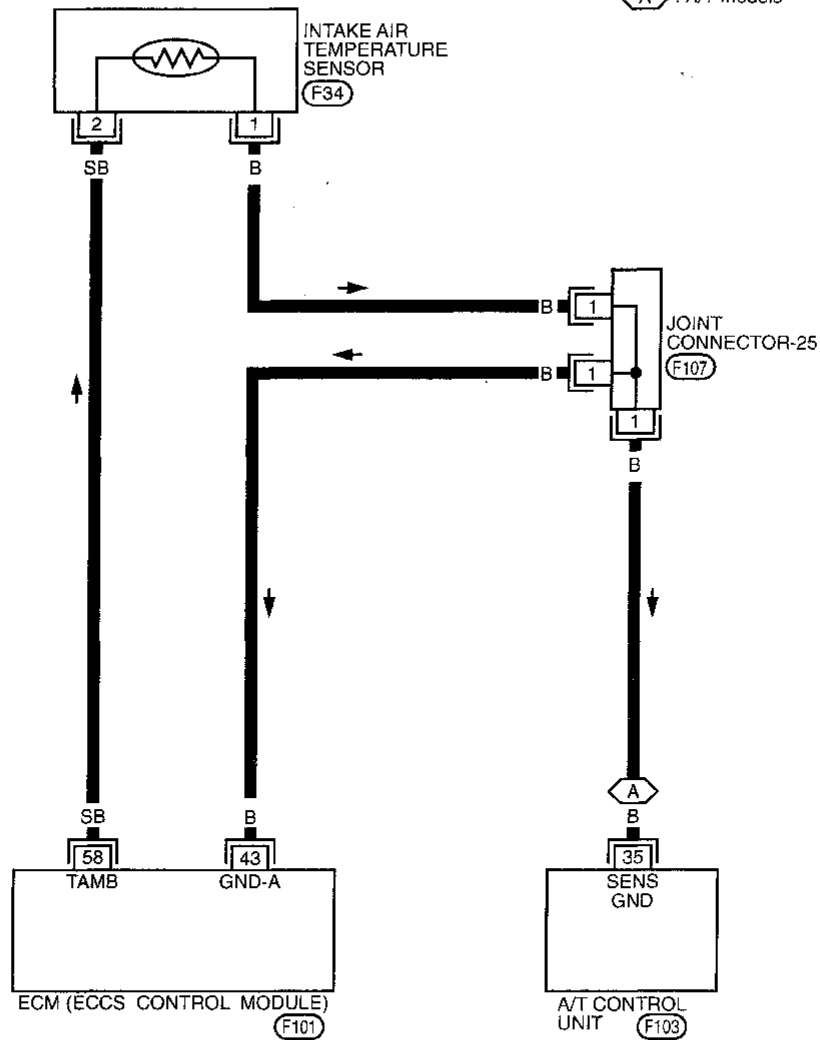
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TROUBLE DIAGNOSIS FOR DTC P0110

Intake Air Temperature Sensor (DTC: 0401) (Cont'd)

EC-IATS-01

 : Detectable line for DTC
 : Non-detectable line for DTC
 : A/T models

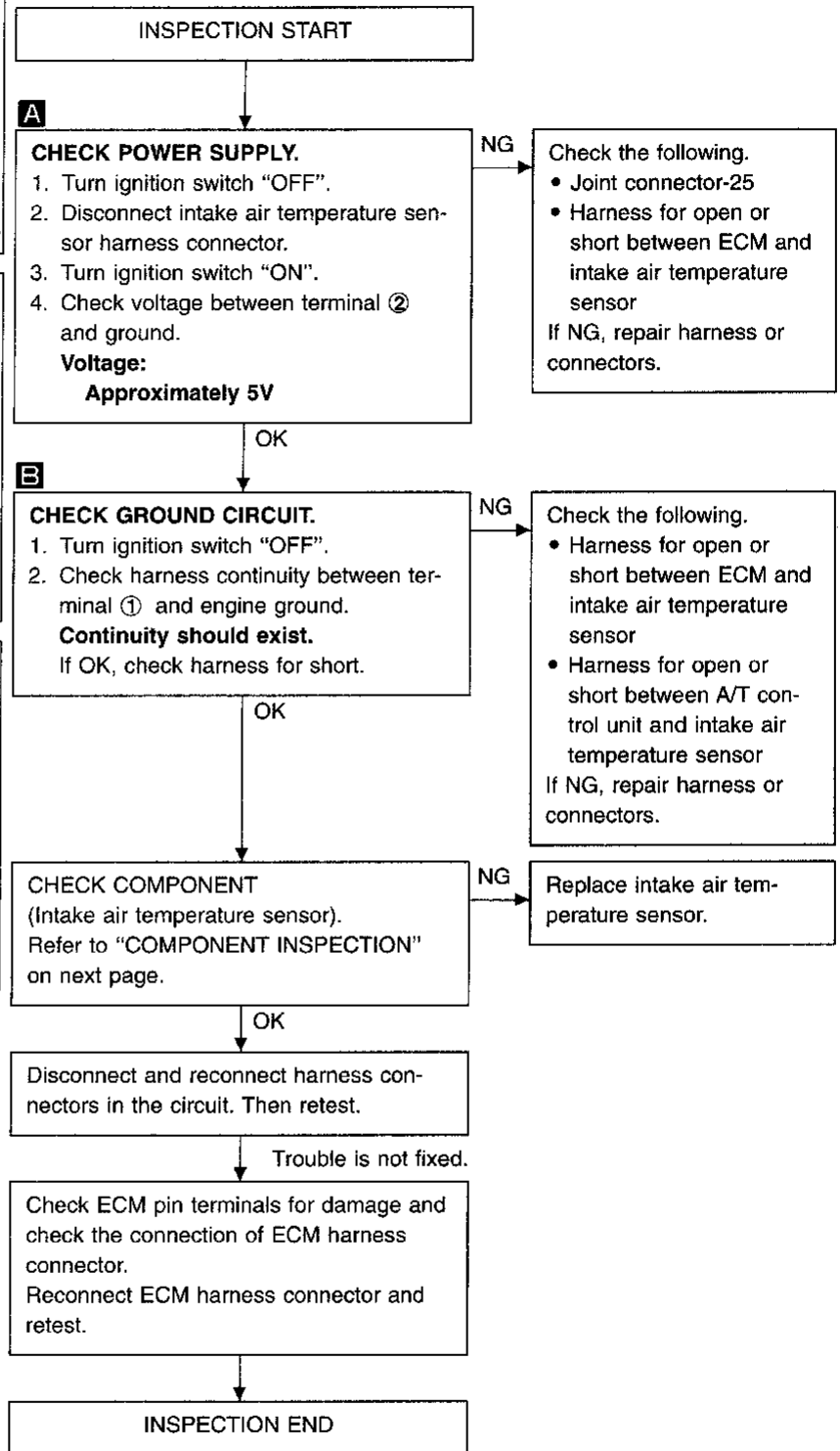
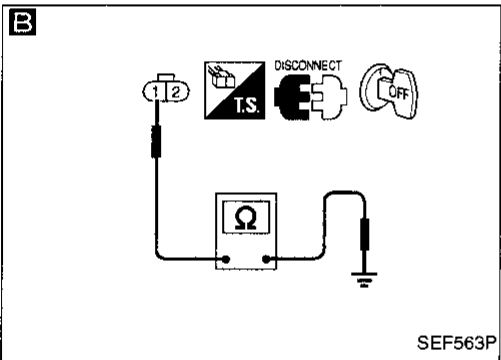
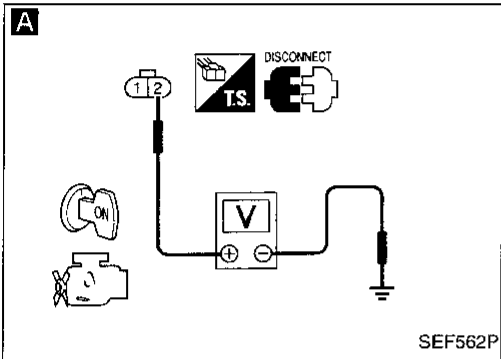
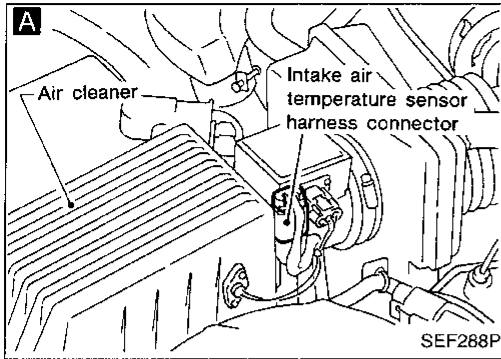


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TROUBLE DIAGNOSIS FOR DTC P0110

Intake Air Temperature Sensor (DTC: 0401) (Cont'd)

DIAGNOSTIC PROCEDURE



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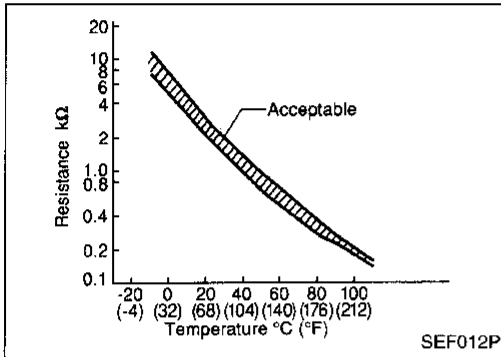
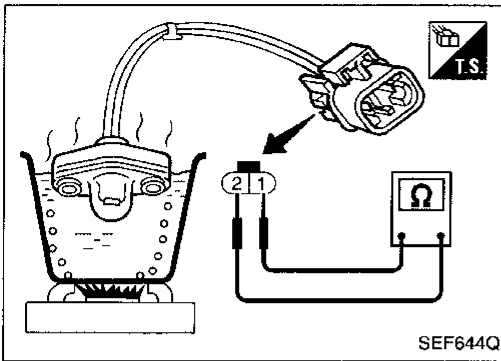
TROUBLE DIAGNOSIS FOR DTC P0110

Intake Air Temperature Sensor (DTC: 0401) (Cont'd)

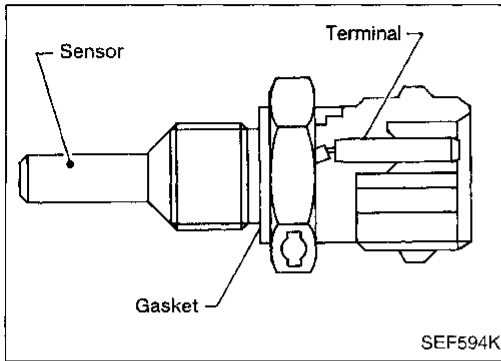
COMPONENT INSPECTION

Intake air temperature sensor

Check resistance as shown in the figure.

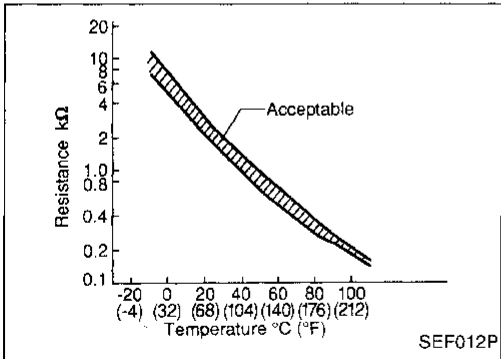


Intake air temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
80 (176)	0.27 - 0.38



Engine Coolant Temperature Sensor (ECTS) (DTC: 0103)

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)	1.0	0.236 - 0.260

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0115 0103	<ul style="list-style-type: none"> 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

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Wait at least 5 seconds.

OR



- 1) Turn ignition switch "ON" and wait at least 5 seconds.
- 2) Select "MODE 3" with GST.

OR






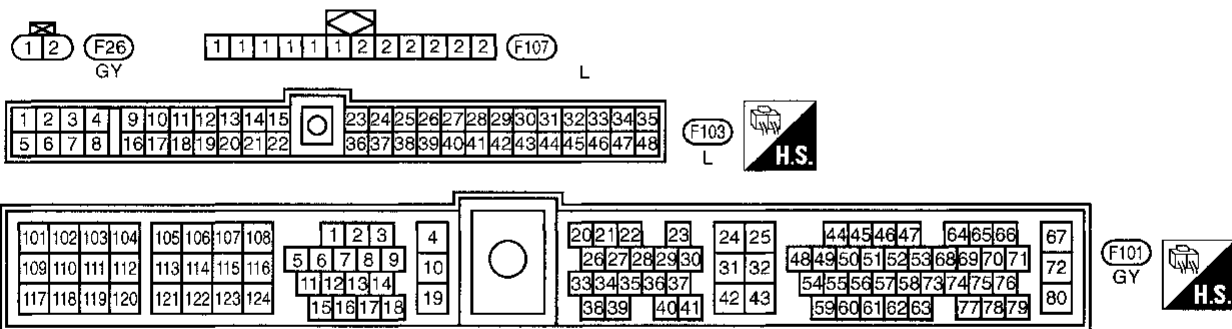
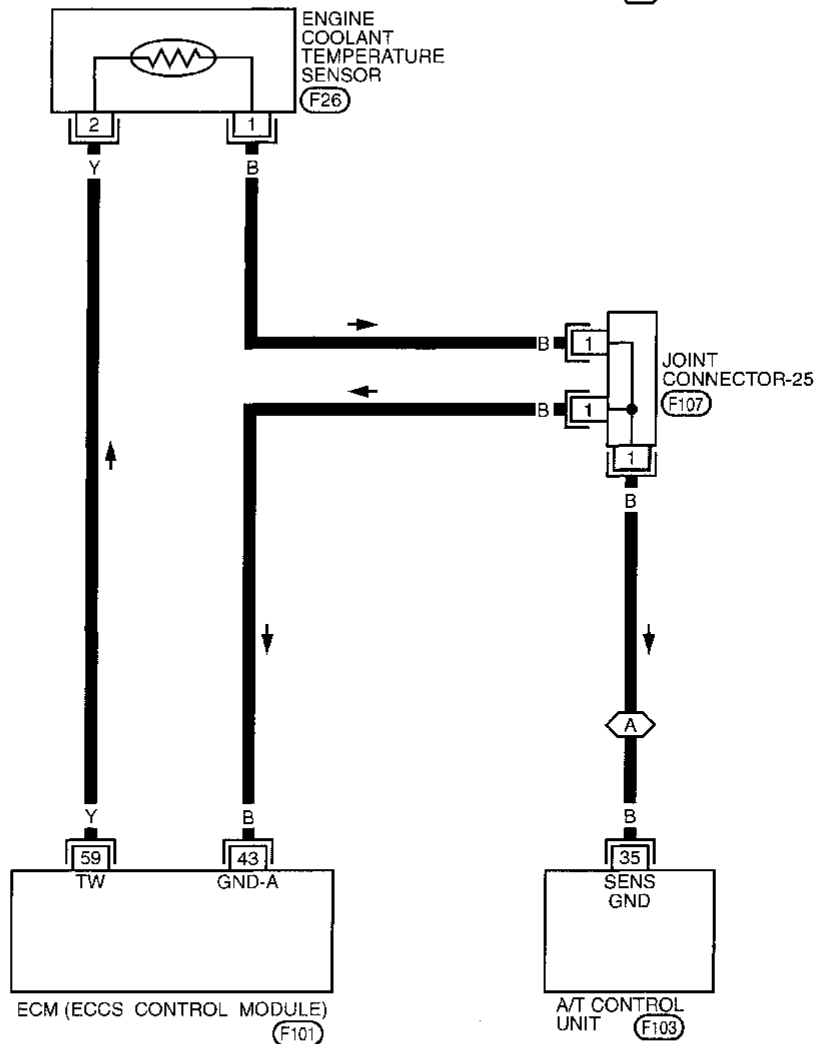
- 1) Turn ignition switch "ON" and wait at least 5 seconds.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform diagnostic test mode II (Self-diagnostic results) with ECM.

TROUBLE DIAGNOSIS FOR DTC P0115

Engine Coolant Temperature Sensor (ECTS) (DTC: 0103) (Cont'd)

EC-ECTS-01

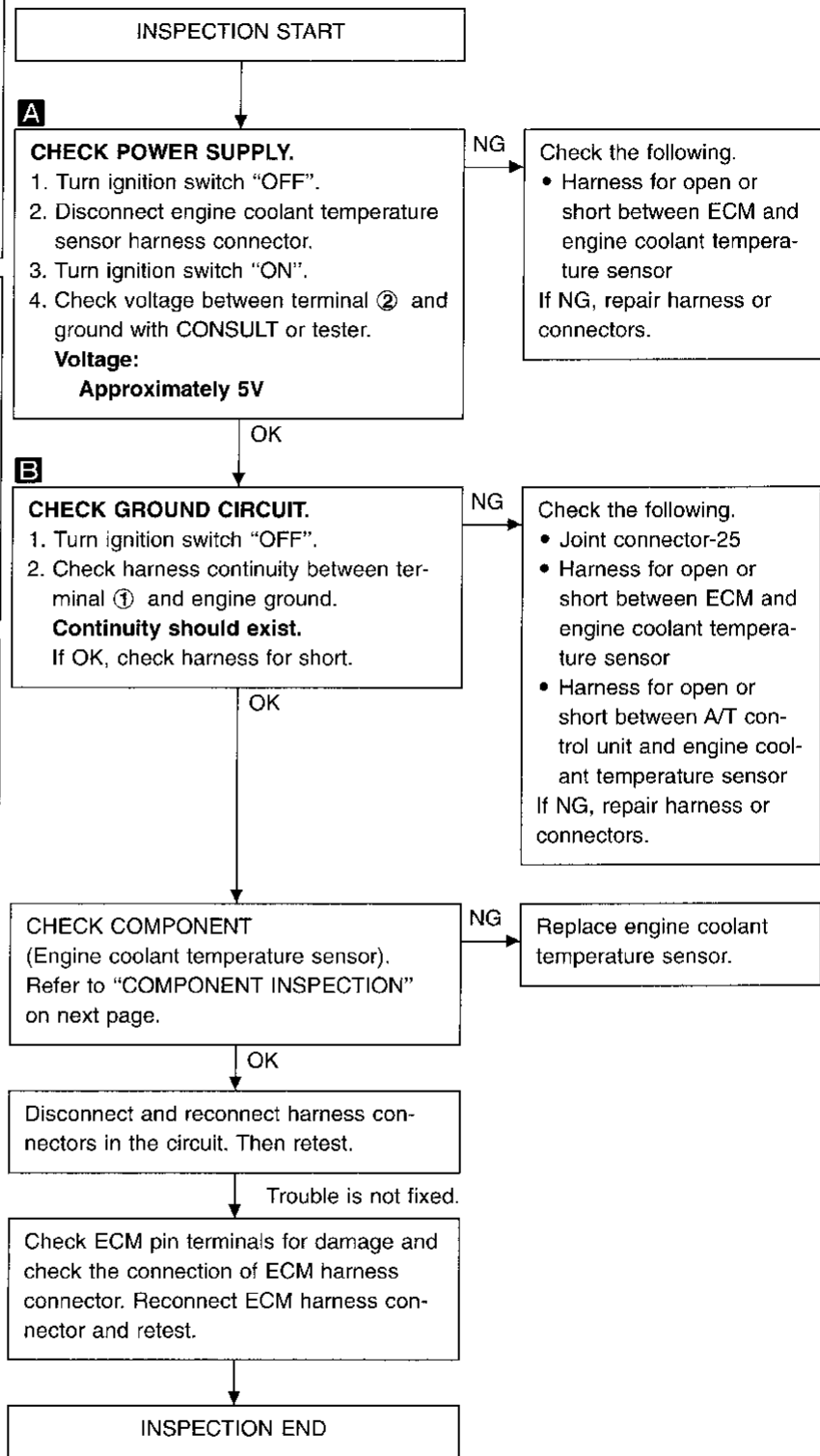
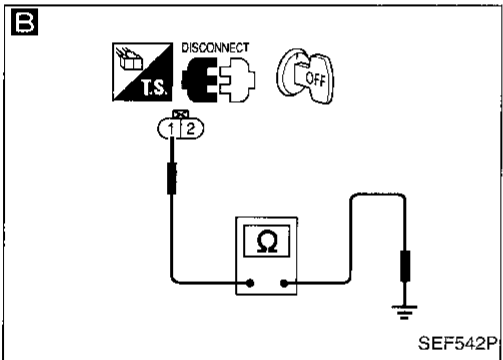
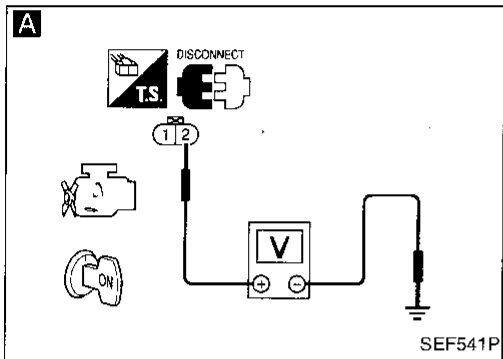
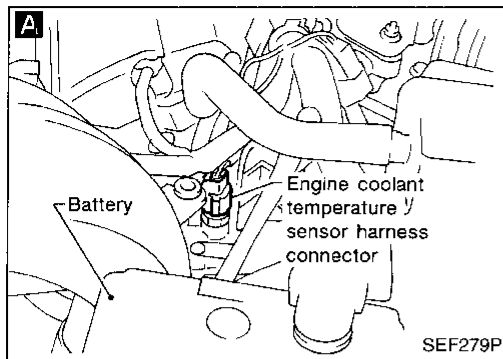
-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : A/T models



TROUBLE DIAGNOSIS FOR DTC P0115

Engine Coolant Temperature Sensor (ECTS) (DTC: 0103) (Cont'd)

DIAGNOSTIC PROCEDURE



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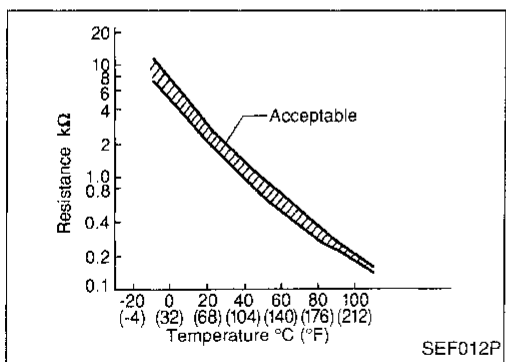
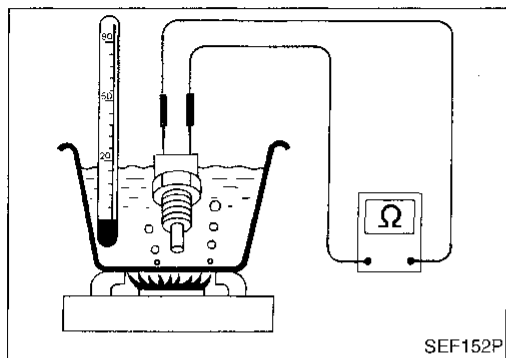
TROUBLE DIAGNOSIS FOR DTC P0115

Engine Coolant Temperature Sensor (ECTS) (DTC: 0103) (Cont'd)

COMPONENT INSPECTION

Engine coolant temperature sensor

Check resistance as shown in the figure.



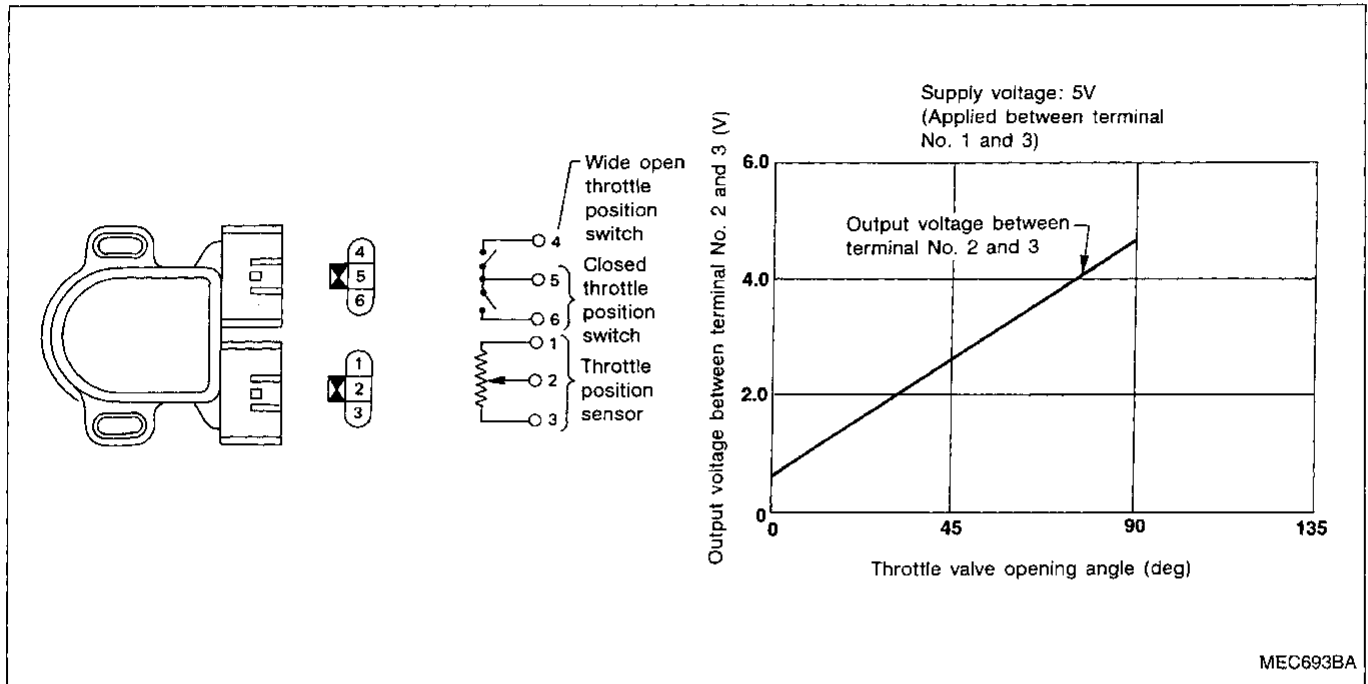
Temperature °C (°F)	Resistance kΩ
20 (68)	2.1 - 2.9
50 (122)	0.68 - 1.00
90 (194)	0.236 - 0.260

If NG, replace engine coolant temperature sensor.

Throttle Position Sensor (DTC: 0403)

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 one controls engine operation such as fuel cut. In addition, a "Wide open and closed throttle position switch" is built into the throttle position sensor unit.



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0120 0403	<ul style="list-style-type: none"> An excessively low or high voltage from the sensor is sent to ECM. Rationally incorrect voltage is sent to ECM compared with the signals from mass air flow sensor, crankshaft position sensor (POS) and IACV-AAC valve. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Throttle position sensor

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TROUBLE DIAGNOSIS FOR DTC P0120

Throttle Position Sensor (DTC: 0403) (Cont'd)

OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the throttle position sensor circuit. During this check, a DTC might not be confirmed.

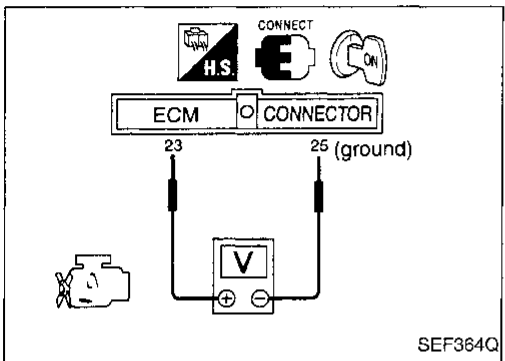
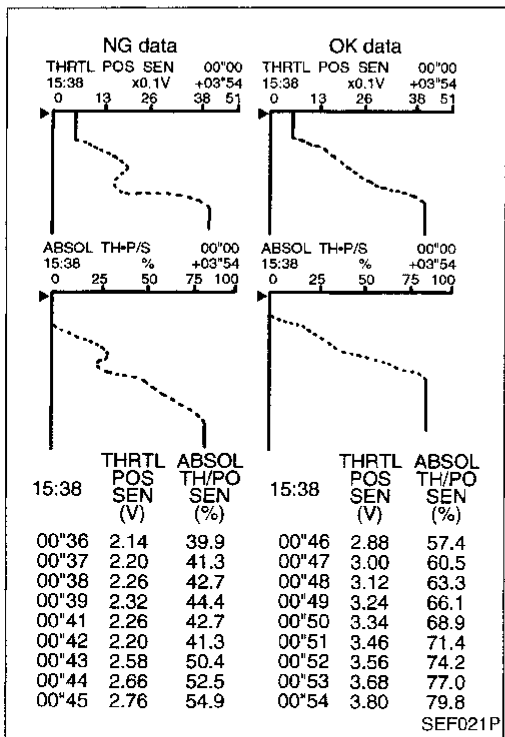
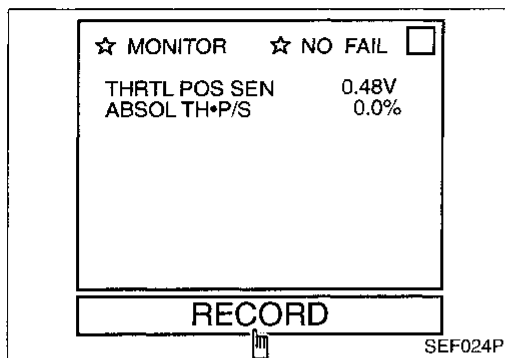


- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT.
- 5) Select "THRTL POS SEN" and "ABSOL TH•P/S" in "DATA MONITOR" mode with CONSULT.
- 6) Press RECORD on CONSULT SCREEN at the same time accelerator pedal is depressed.
- 7) Print out the recorded data and check the following:
 - The voltage when accelerator pedal fully released is approximately 0.35 - 0.65V.
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal fully depressed is approximately 4V.

OR






- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON".
- 4) Check the voltage between ECM terminal ②③ and ②⑤ (ground) and check the following:
 - The voltage when accelerator pedal fully released is approximately 0.35 - 0.65V.
 - The voltage rise is linear in response to accelerator pedal depression.
 - The voltage when accelerator pedal fully depressed is approximately 4V.

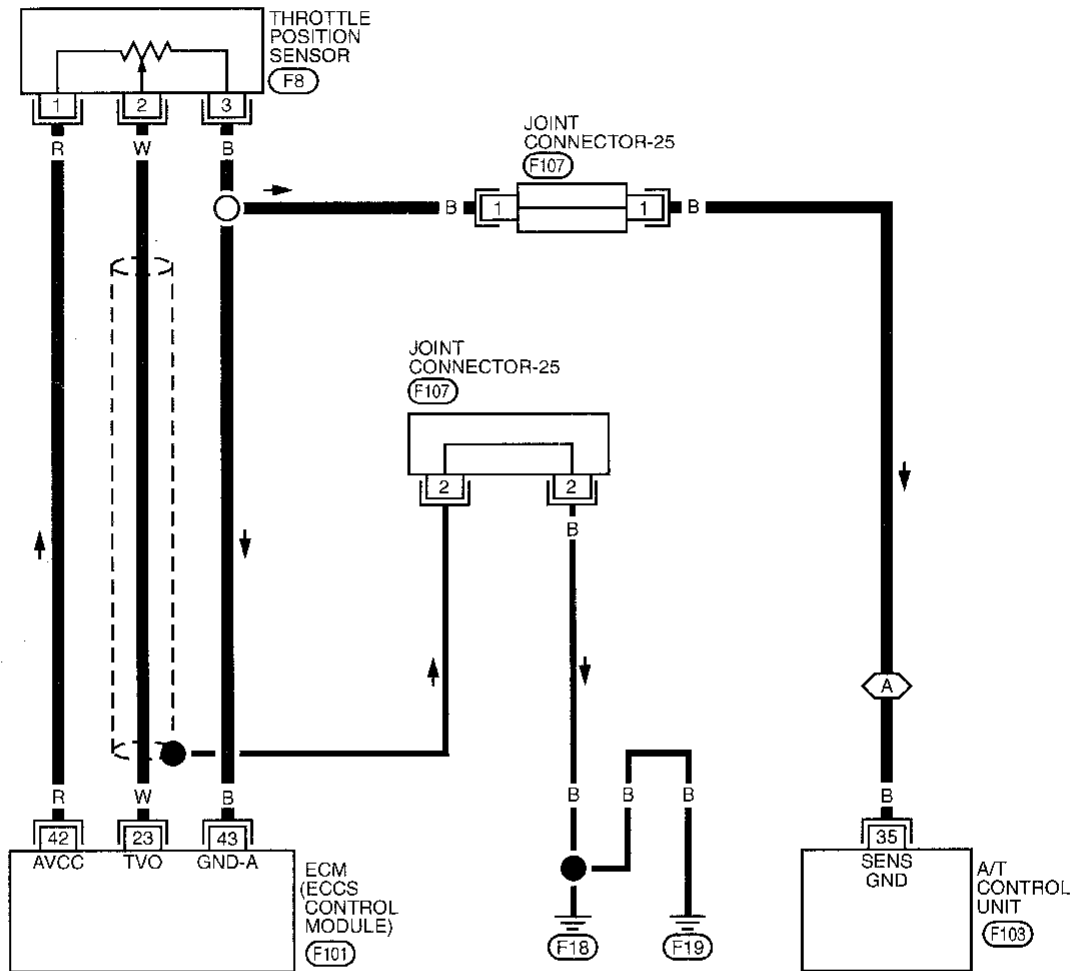


TROUBLE DIAGNOSIS FOR DTC P0120

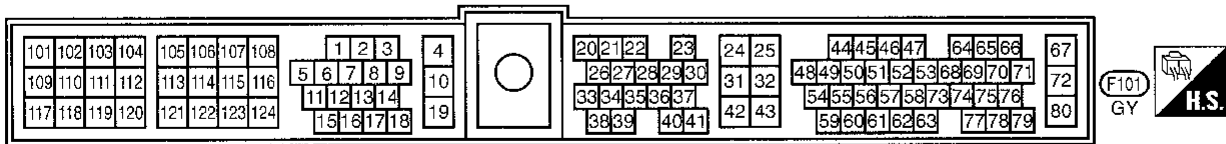
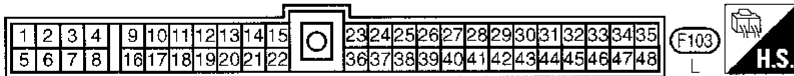
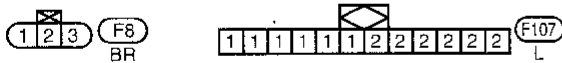
Throttle Position Sensor (DTC: 0403) (Cont'd)

EC-TPS-01

-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : A/T models

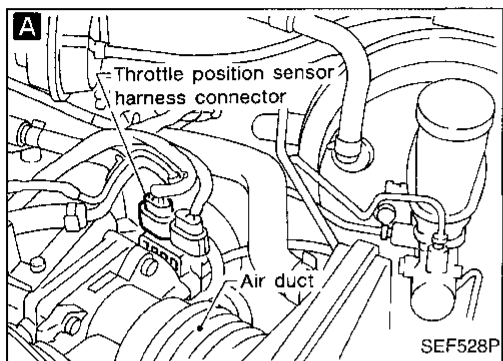


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TROUBLE DIAGNOSIS FOR DTC P0120

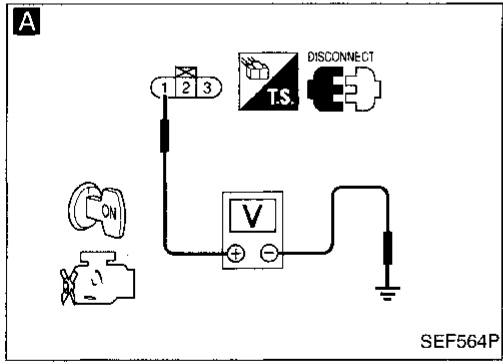
Throttle Position Sensor (DTC: 0403) (Cont'd) DIAGNOSTIC PROCEDURE



INSPECTION START

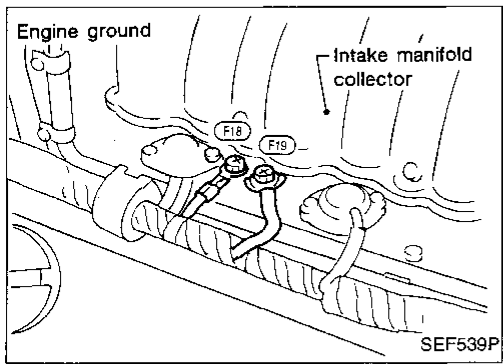
A
CHECK POWER SUPPLY.
1. Turn ignition switch "OFF".
2. Disconnect throttle position sensor harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ① and ground with CONSULT or tester.
Voltage: Approximately 5V

NG → Repair harness or connectors.



B
CHECK GROUND CIRCUIT.
1. Turn ignition switch "OFF".
2. Loosen and retighten ground screw.
3. Check harness continuity between terminal ③ and engine ground.
Continuity should exist.
If OK, check harness for short.

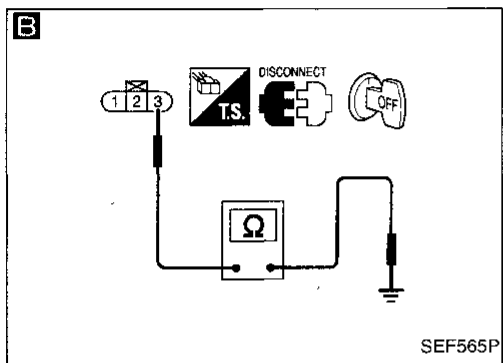
NG → Check the following.
• Joint connector-25
• Harness for open or short between throttle position sensor and ECM
• Harness for open or short between throttle position sensor and A/T control unit
If NG, repair harness or connectors.



C
CHECK INPUT SIGNAL CIRCUIT.
1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ② and terminal ②.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

ADJUST THROTTLE POSITION SENSOR.
Perform "BASIC INSPECTION", EC-70.



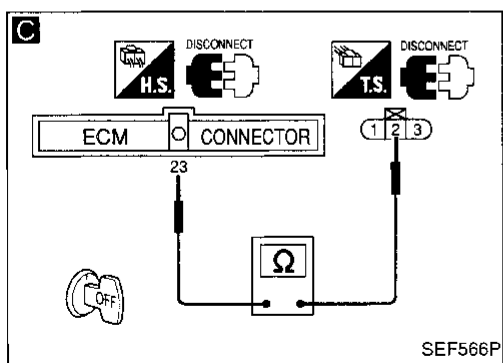
CHECK COMPONENT
(Throttle position sensor).
Refer to "COMPONENT INSPECTION" on next page.

NG → Replace throttle position sensor. To adjust it, perform "BASIC INSPECTION", EC-70.

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector.
Reconnect ECM harness connector and retest.



INSPECTION END

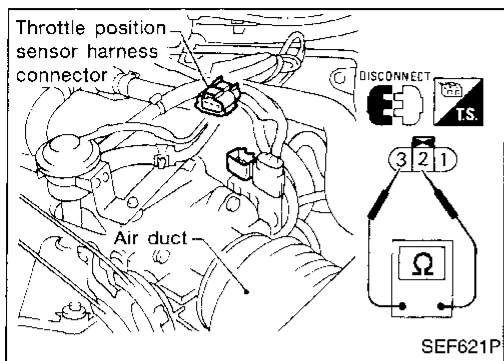
TROUBLE DIAGNOSIS FOR DTC P0120

Throttle Position Sensor (DTC: 0403) (Cont'd)

COMPONENT INSPECTION

Throttle position sensor

1. Start engine and warm it up sufficiently.
2. Turn ignition switch "OFF".
3. Disconnect throttle position sensor harness connector.
4. Make sure that resistance between terminals ② and ③ changes when opening throttle valve manually.



Throttle valve conditions	Resistance at 25°C (77°F)
Completely closed	Approximately 0.5 kΩ
Partially open	0.5 - 4.0 kΩ
Completely open	Approximately 4.0 kΩ

If NG, replace throttle position sensor.

To adjust throttle position sensor, perform "BASIC INSPECTION". (See page EC-70.)

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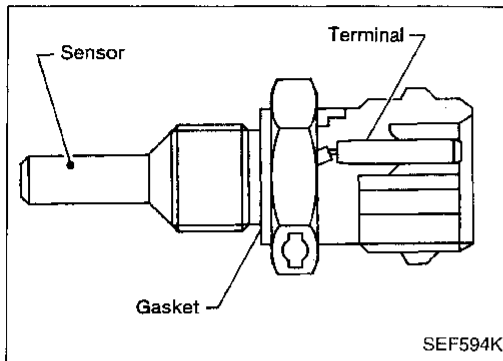
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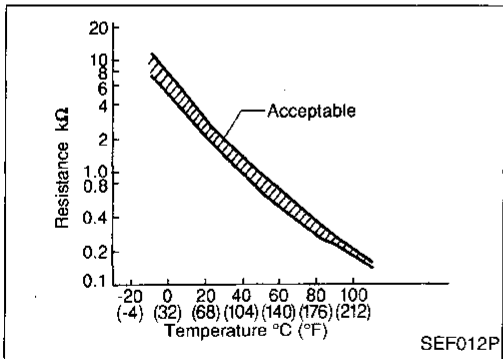
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TROUBLE DIAGNOSIS FOR DTC P0125



Engine Coolant Temperature (ECT) Sensor (DTC: 0908)

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.



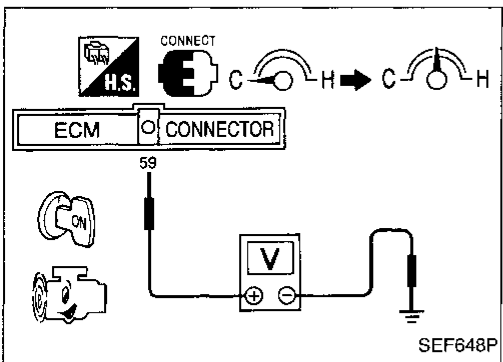
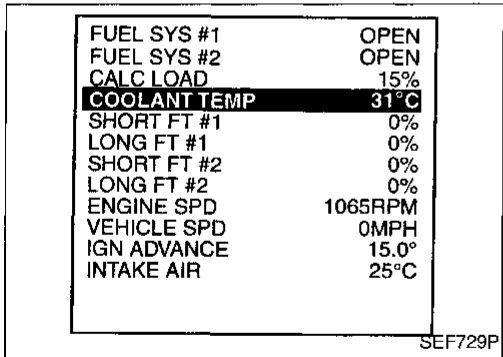
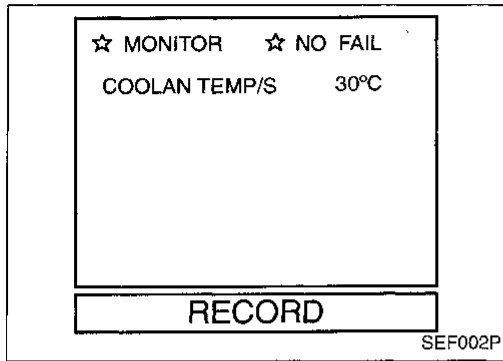
<Reference data>

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 - 1.0
90 (194)	1.0	0.236 - 0.260

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0125 0908	<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

TROUBLE DIAGNOSIS FOR DTC P0125

Engine Coolant Temperature (ECT) Sensor (DTC: 0908) (Cont'd)



OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the engine coolant temperature sensor circuit. During this check, a DTC might not be confirmed.

Note: If both DTC 0103 (P0115) and 0908 (P0125) are displayed, first perform TROUBLE DIAGNOSIS FOR DTC 0103 (P0115). (See EC-125.)



- 1) Turn ignition switch "ON".
- 2) Select "COOLANT TEMP/S" in "DATA MONITOR" mode with CONSULT.
- 3) Start engine and run it at idle speed.
- 4) Check that the engine coolant temperature rises to 25°C (77°F) or more within 15 minutes. (Be careful not to overheat engine.)

OR



- 1) Turn ignition switch "ON".
- 2) Select "MODE 1" with GST.
- 3) Start engine and run it at idle speed.
- 4) Check that the engine coolant temperature rises to 25°C (77°F) or more within 15 minutes. (Be careful not to overheat engine.)

OR






- 1) Turn ignition switch "ON".
- 2) Probe voltage meter between ECM terminal 59 and ground.
- 3) Start engine and run it at idle speed.
- 4) Check that voltage of engine coolant temperature changes to less than 3.3 (V) within 15 minutes. (Be careful not to overheat engine.)

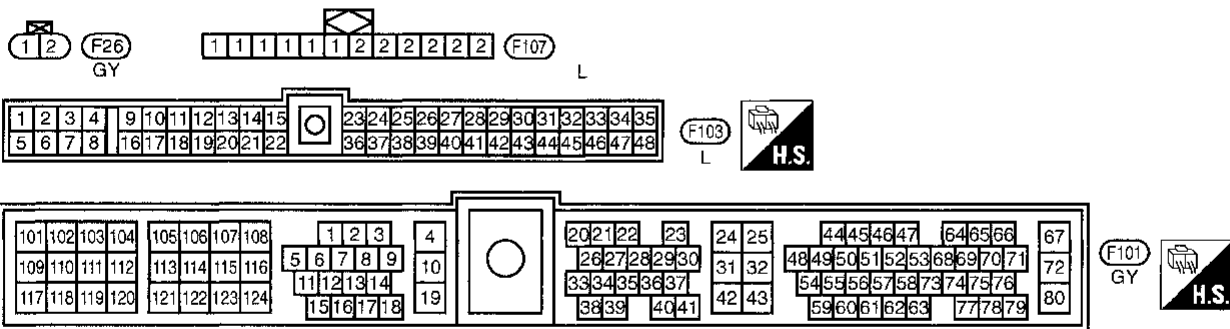
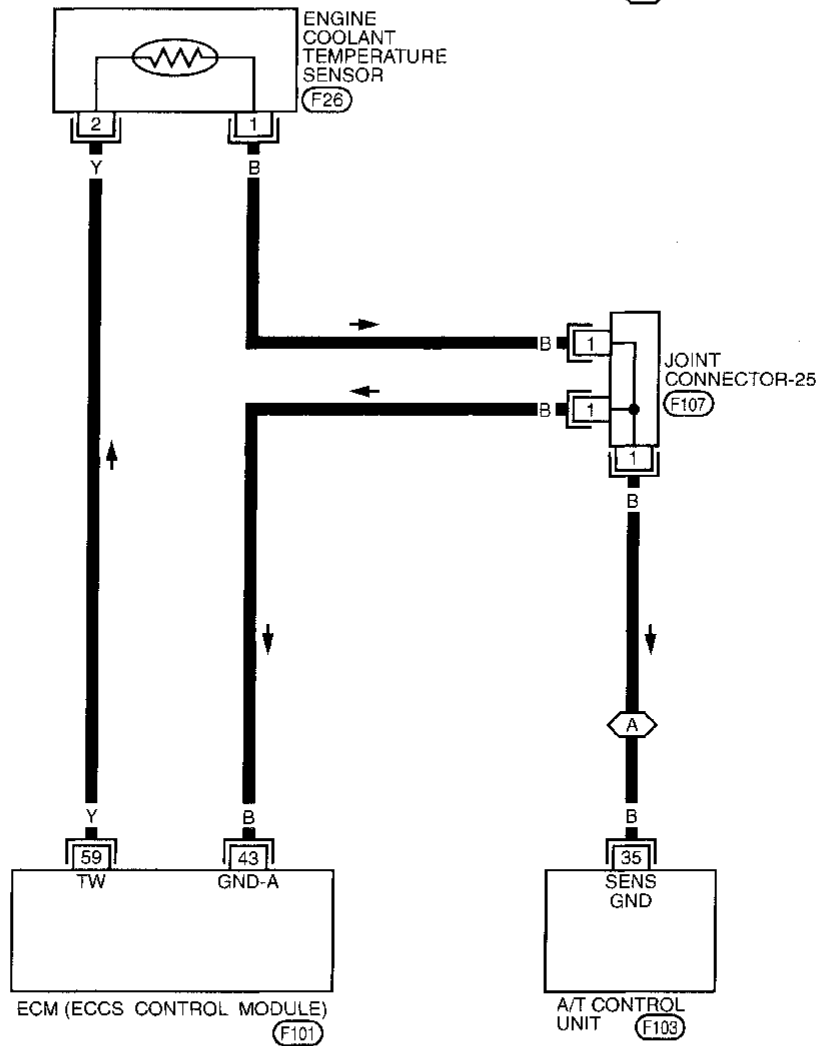
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TROUBLE DIAGNOSIS FOR DTC P0125

Engine Coolant Temperature (ECT) Sensor (DTC: 0908) (Cont'd)

EC-ECTS-01

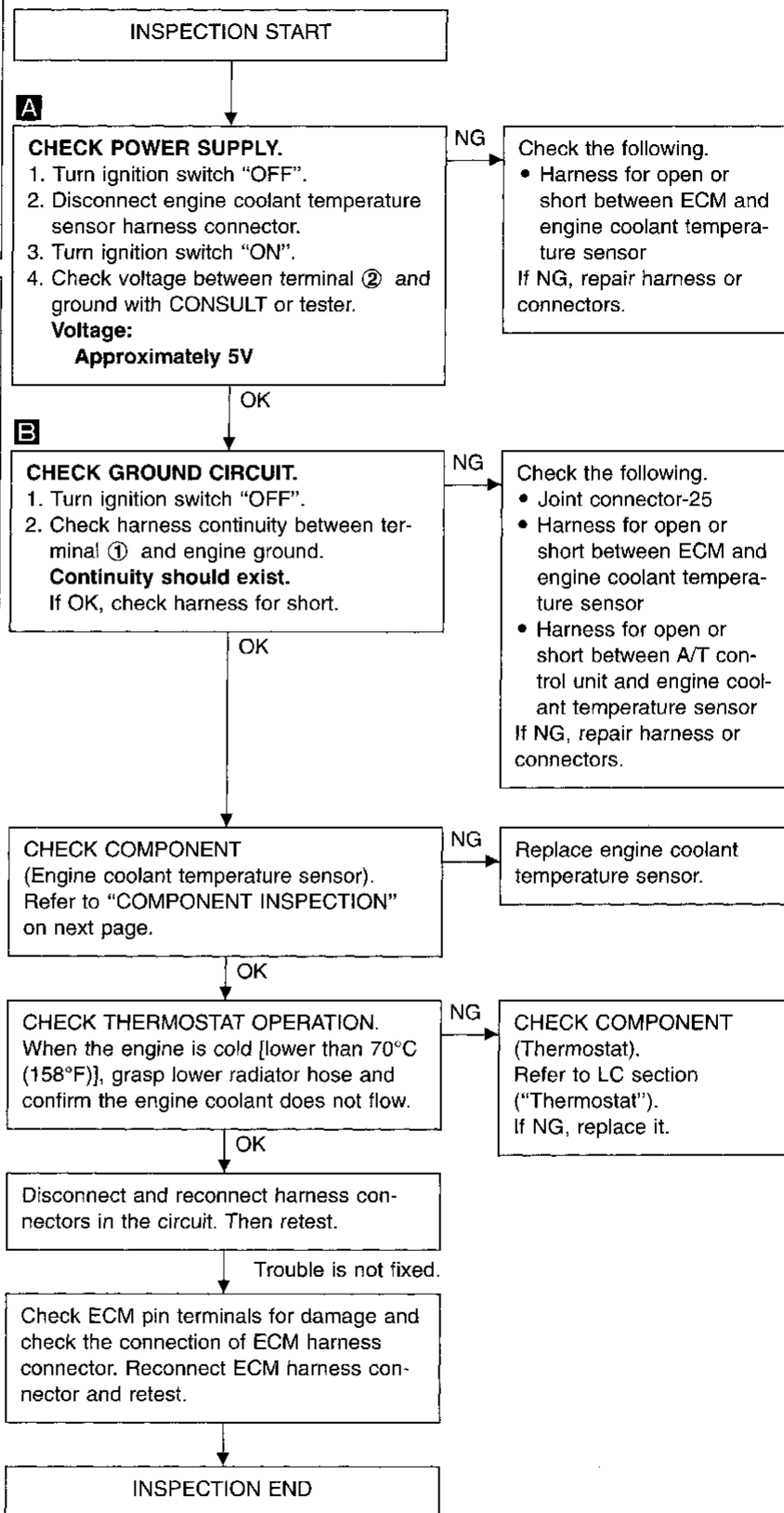
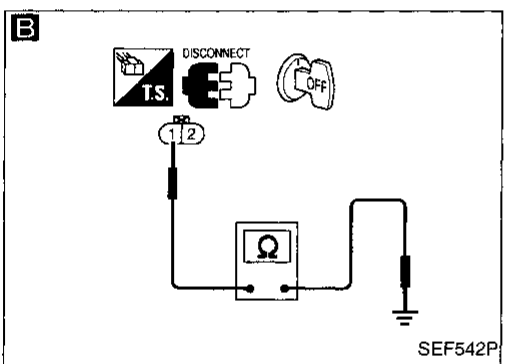
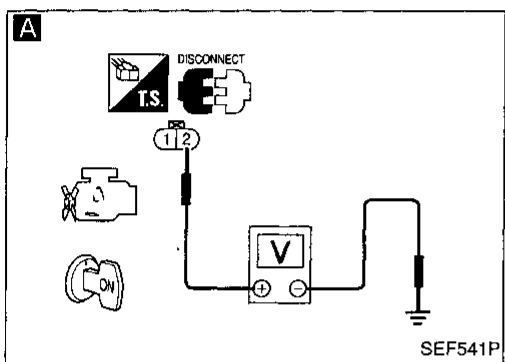
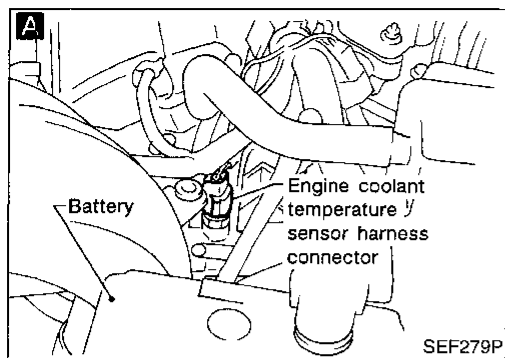
-  : Detectable line for DTC
-  : Non-detectable line for DTC
-  : A/T models



TROUBLE DIAGNOSIS FOR DTC P0125

Engine Coolant Temperature (ECT) Sensor (DTC: 0908) (Cont'd)

DIAGNOSTIC PROCEDURE



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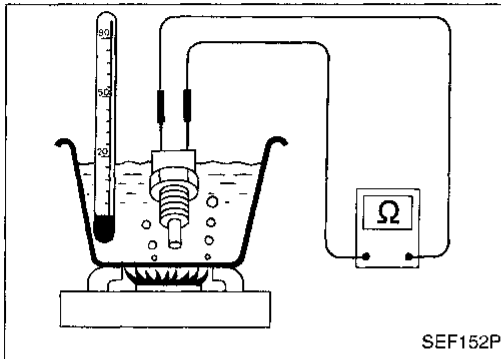
TROUBLE DIAGNOSIS FOR DTC P0125

Engine Coolant Temperature (ECT) Sensor (DTC: 0908) (Cont'd)

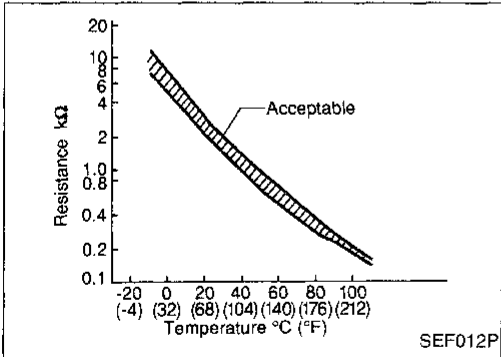
COMPONENT INSPECTION

Engine coolant temperature sensor

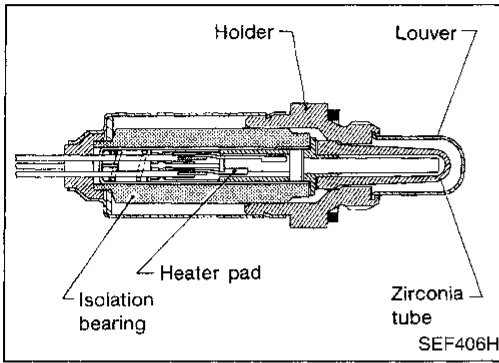
Check resistance as shown in the figure.



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

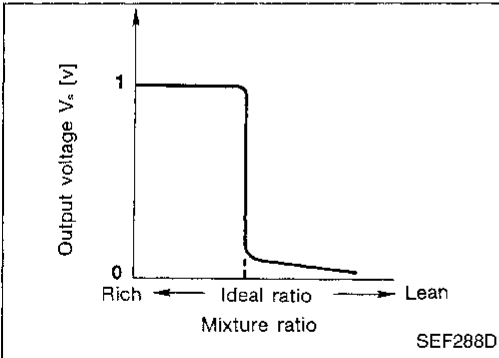


If NG, replace engine coolant temperature sensor.

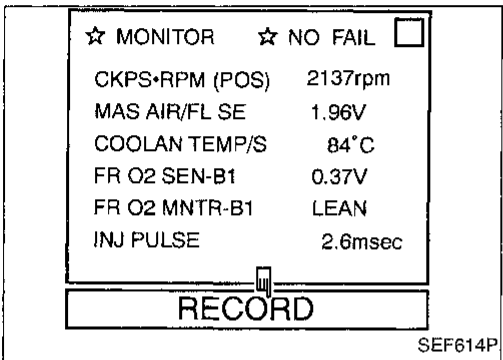


Front Heated Oxygen Sensor (Front HO2S) (Right bank) (DTC: 0503)

The front heated oxygen sensor (right bank) is placed into the front tube (right bank). It detects the amount of oxygen in the exhaust gas compared to the outside air. The front heated oxygen sensor (right bank) 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 front heated oxygen sensor (right bank) 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.



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0130 0503	<ul style="list-style-type: none"> An excessively high voltage from the sensor is sent to ECM. The voltage from the sensor is constantly approx. 0.3V. The maximum and minimum voltages from the sensor are not reached to the specified voltages. It takes more time for the sensor to respond between rich and lean than the specified time. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Front heated oxygen sensor (right bank) Fuel pressure Injectors Intake air leaks



OVERALL FUNCTION CHECK

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

- Start engine and warm it up sufficiently.
 - Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT, and select "FR O2 SEN-B1" and "FR O2 MNTR-B1".
 - Hold engine speed at 2,000 rpm under no load during the following steps.
 - Touch "RECORD" on CONSULT screen.
 - Check the following.
 - "FR O2 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:

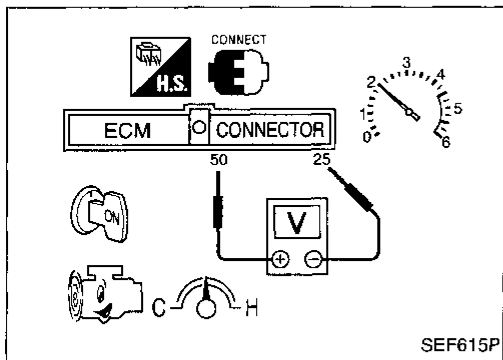
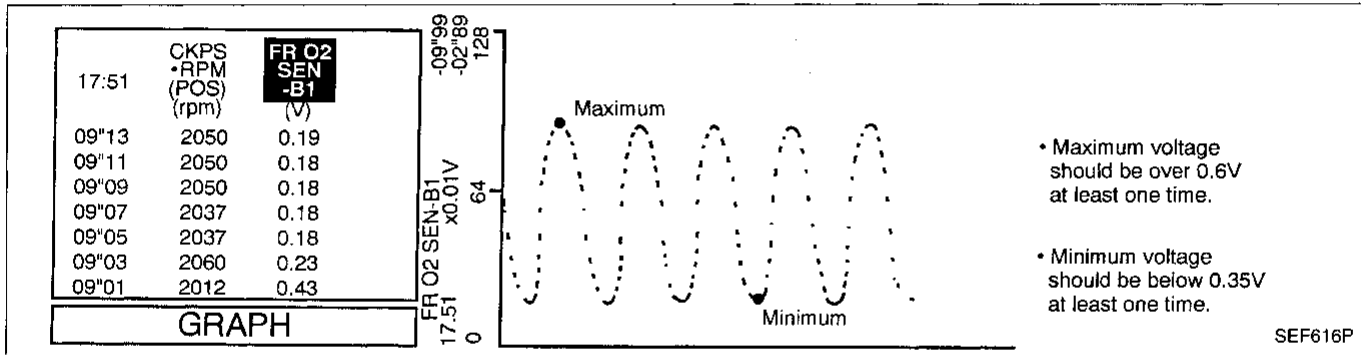
cycle | 1 | 2 | 3 | 4 | 5 |
FR O2 MNTR-B1 R-L-R-L-R-L-R-L-R-L-R

R = "FR O2 MNTR-B1", "RICH"
L = "FR O2 MNTR-B1", "LEAN"

TROUBLE DIAGNOSIS FOR DTC P0130

Front Heated Oxygen Sensor (Front HO2S) (Right bank) (DTC: 0503) (Cont'd)

- "FR O2 SEN-B1" voltage goes above 0.6V at least once.
- "FR O2 SEN-B1" voltage goes below 0.35V at least once.
- The voltage never exceeds 1.0V.



OR

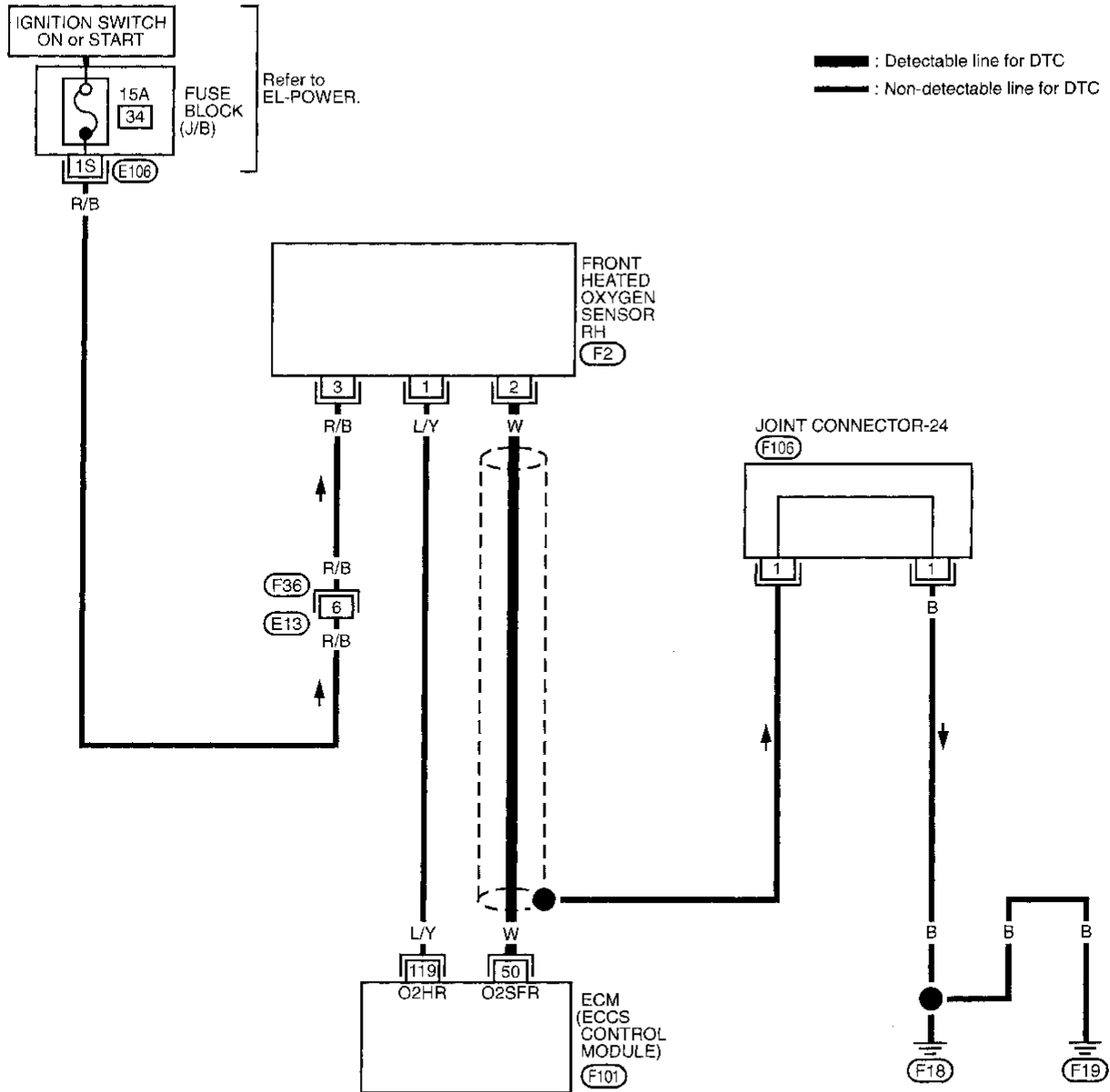


- 1) Start engine and warm it up sufficiently.
- 2) Set voltmeter probes between ECM terminal ⑤⑩ (sensor signal) and ②⑤ (engine ground).
- 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - Malfunction indicator lamp goes on more than 5 times within 10 seconds in Diagnostic Test Mode II (FRONT HEATED OXYGEN SENSOR MONITOR).
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.35V at least one time.
 - The voltage never exceeds 1.0V.

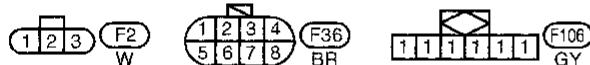
TROUBLE DIAGNOSIS FOR DTC P0130

Front Heated Oxygen Sensor (Front HO2S) (Right bank) (DTC: 0503) (Cont'd)

EC-FRO2RH-01

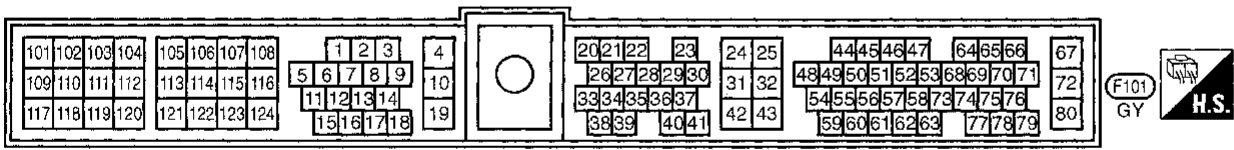


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- EL
- IDX



Refer to last page (Foldout page).

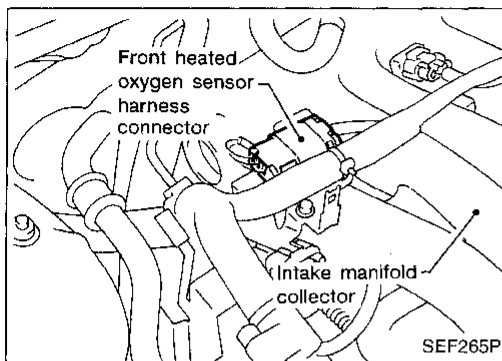
E106



TROUBLE DIAGNOSIS FOR DTC P0130

Front Heated Oxygen Sensor (Front HO2S) (Right bank) (DTC: 0503) (Cont'd)

DIAGNOSTIC PROCEDURE



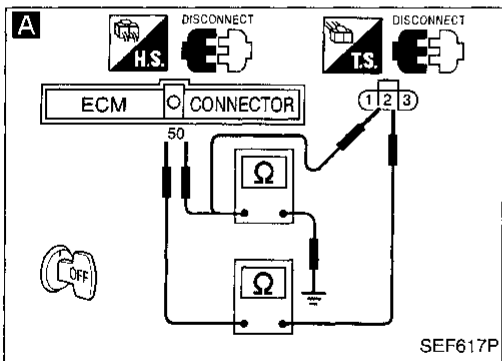
INSPECTION START

A

CHECK INPUT SIGNAL CIRCUIT.

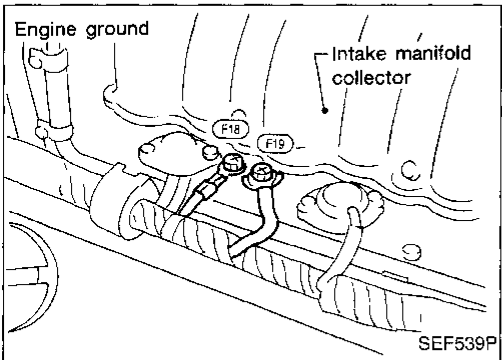
1. Turn ignition switch "OFF".
2. Disconnect front heated oxygen sensor (right bank) harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal ⑤ and terminal ②. **Continuity should exist.**
4. Check harness continuity between ECM terminal ⑥ (or terminal ②) and ground. **Continuity should not exist.** If OK, check harness for short.

NG → Repair harness or connectors.



OK

Loosen and retighten engine ground screws.

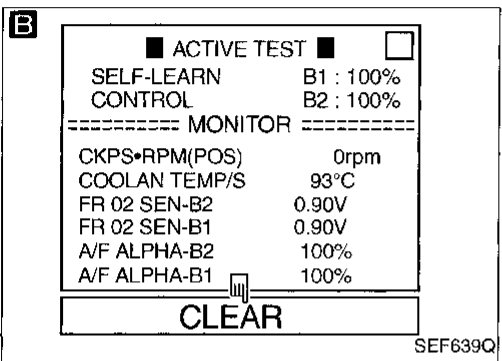


B

CLEAR THE SELF-LEARNING DATA

1. Start engine and warm it up sufficiently.
2. Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode with CONSULT.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed. **Are the DTCs P0171, P0172 detected? Is it difficult to start engine?**

Yes → Go to "TROUBLE DIAGNOSIS FOR DTC 0114, 0115". (See page EC-162, 167.)



OR

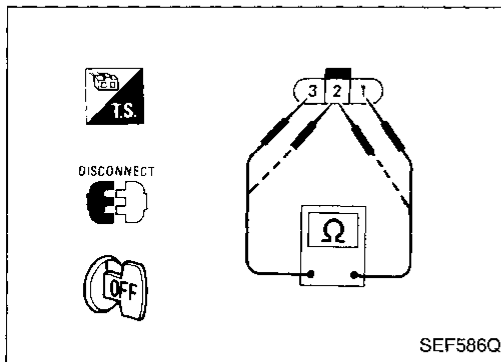
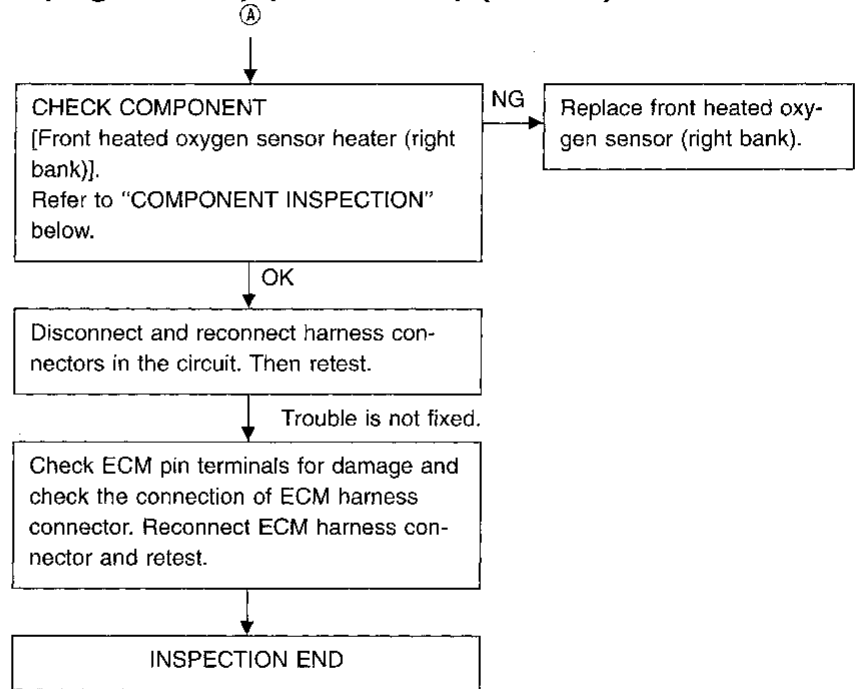
2. Turn ignition switch "OFF".
3. Disconnect mass air flow sensor harness connector, and restart and run engine for at least 3 seconds at idle speed.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure diagnostic trouble code No. 0102 is displayed in Diagnostic Test Mode II.
6. Erase the diagnostic test mode II (Self-diagnostic results) memory. Make sure diagnostic trouble code No. 0505 is displayed in Diagnostic Test Mode II.
7. Run engine for at least 10 minutes at idle speed. **Are the DTCs 0114, 0115 detected? Is it difficult to start engine?**

No

Ⓐ

TROUBLE DIAGNOSIS FOR DTC P0130

Front Heated Oxygen Sensor (Front HO2S) (Right bank) (DTC: 0503) (Cont'd)



COMPONENT INSPECTION

Front heated oxygen sensor heater

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 front heated oxygen sensor.

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.

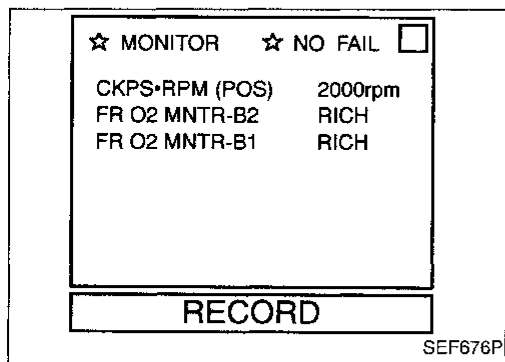
TROUBLE DIAGNOSIS FOR DTC P0130, P0150

Closed Loop Control (DTC: 0307, 0308)

★ The closed loop control has the one trip detection logic.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0130 0307	<ul style="list-style-type: none"> The closed loop control function for right bank does not operate even when vehicle is driving in the specified condition. 	<ul style="list-style-type: none"> The front heated oxygen sensor (right bank) circuit is open or shorted. Front heated oxygen sensor (right bank) Front heated oxygen sensor heater (right bank)
P0150* 0308	<ul style="list-style-type: none"> The closed loop control function for left bank does not operate even when vehicle is driving in the specified condition. 	<ul style="list-style-type: none"> The front heated oxygen sensor (left bank) circuit is open or shorted. Front heated oxygen sensor (left bank) Front heated oxygen sensor heater (left bank)

*: Using CONSULT, "P0130" will be displayed in this case.



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.



- 1) Start engine and warm it up sufficiently.
 - 2) Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT, and select "FRO2 MNTR-B1(B2)".
 - 3) Hold engine speed at 2,000 rpm under no load during the following steps.
 - 4) Touch "RECORD" on CONSULT screen.
 - 5) Check the following.
 - "FR O2 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:

cycle | 1 | 2 | 3 | 4 | 5 |
 FR O2 MNTR-B1(B2) R-L-R-L-R-L-R-L-R

R = "FR O2 MNTR-B1(B2)", "RICH"

L = "FR O2 MNTR-B1(B2)", "LEAN"

OR



- 1) Start engine and warm it up sufficiently.
- 2) Make sure that malfunction indicator lamp goes on more than 5 times within 10 seconds while keeping at 2,000 rpm in Diagnostic Test Mode II (Front heated oxygen sensor monitor).

TROUBLE DIAGNOSIS FOR DTC P0130, P0150

Closed Loop Control (DTC: 0307, 0308) (Cont'd)

DIAGNOSTIC PROCEDURE

For right bank

Refer to TROUBLE DIAGNOSIS FOR DTC P0130. (See page EC-139.)

Refer to TROUBLE DIAGNOSIS FOR DTC P0135. (See page EC-146.)

For left bank

Refer to TROUBLE DIAGNOSIS FOR DTC P0150. (See page EC-154.)

Refer to TROUBLE DIAGNOSIS FOR DTC P0155. (See page EC-159.)

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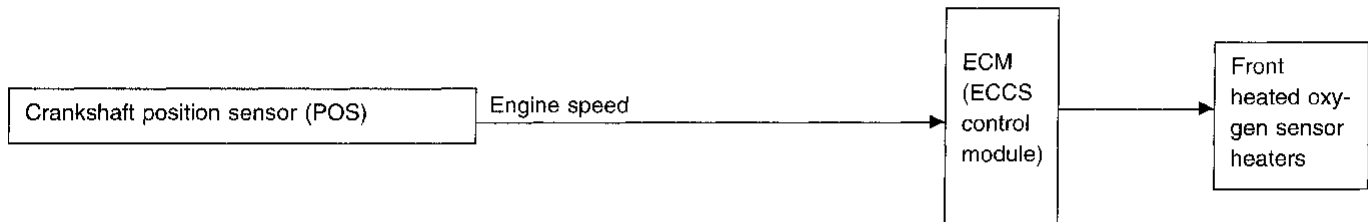
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TROUBLE DIAGNOSIS FOR DTC P0135

Front Heated Oxygen Sensor Heater (Right bank) (DTC: 0901)

SYSTEM DESCRIPTION



The ECM performs ON/OFF control of the front heated oxygen sensor heaters corresponding to the engine speed.

OPERATION

Engine speed rpm	Front heated oxygen sensor heaters
Above 3,600	OFF
Below 3,600	ON

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0135 0901	<ul style="list-style-type: none"> The current amperage in the front heated oxygen sensor heater (Right bank) circuit is out of the normal range. (The improper voltage drop signal is sent to ECM through the front heated oxygen sensor heater.) 	<ul style="list-style-type: none"> Harness or connectors (The front heated oxygen sensor heater circuit is open or shorted.) Front heated oxygen sensor heater (Right bank)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 2) Start engine and run it for at least 5 seconds at idle speed.

OR



- 1) Start engine and run it for at least 5 seconds at idle speed.
- 2) Select "MODE 3" with GST.

OR

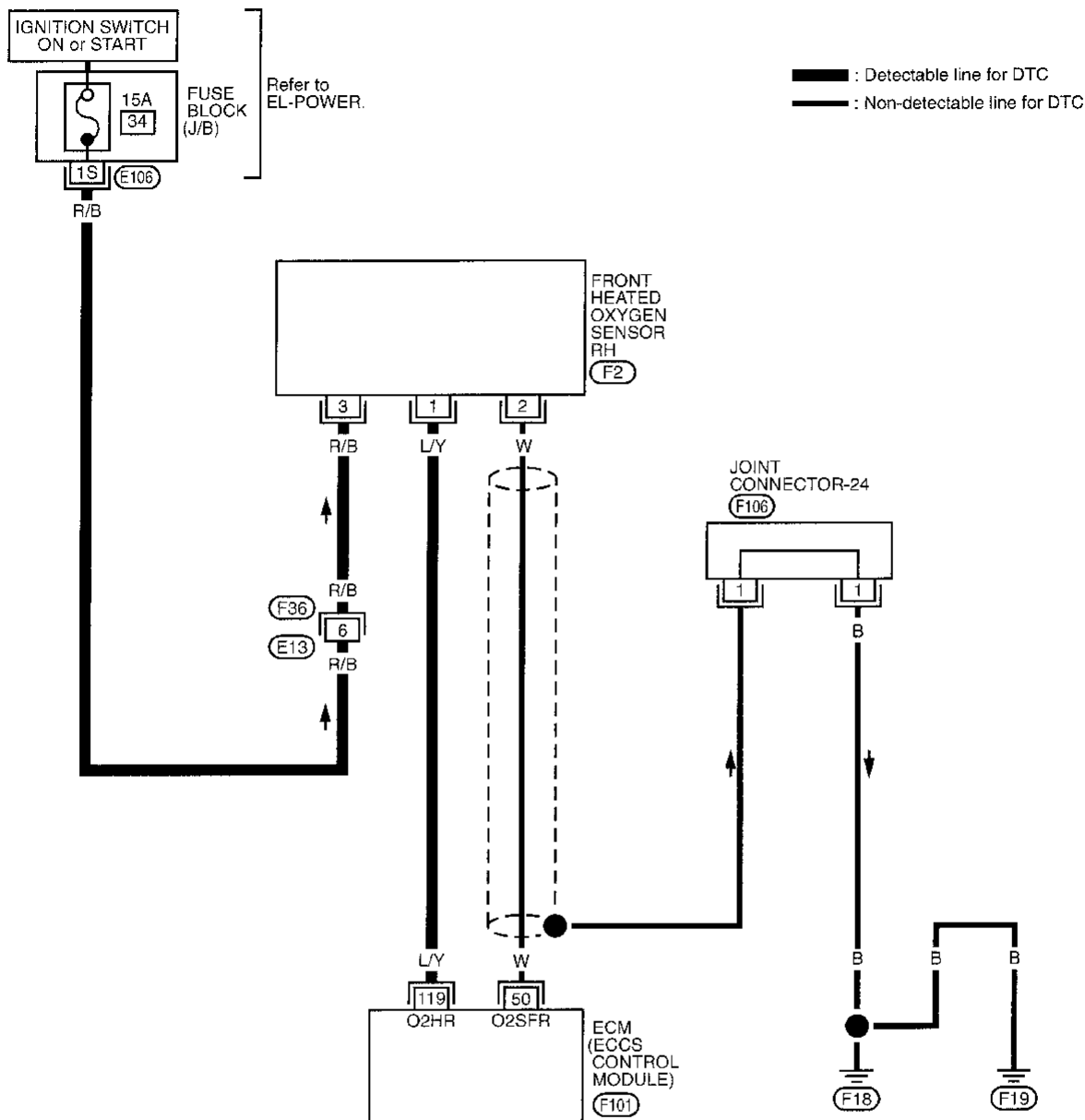


- 1) Start engine and run it for at least 5 seconds at idle speed.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0135

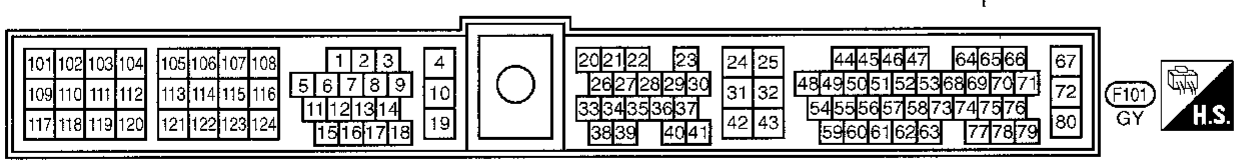
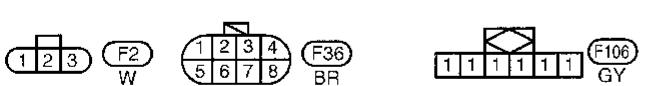
Front Heated Oxygen Sensor Heater (Right bank) (DTC: 0901) (Cont'd)

EC-FO2H-R-01



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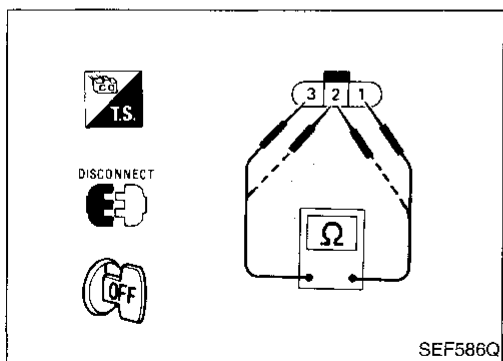
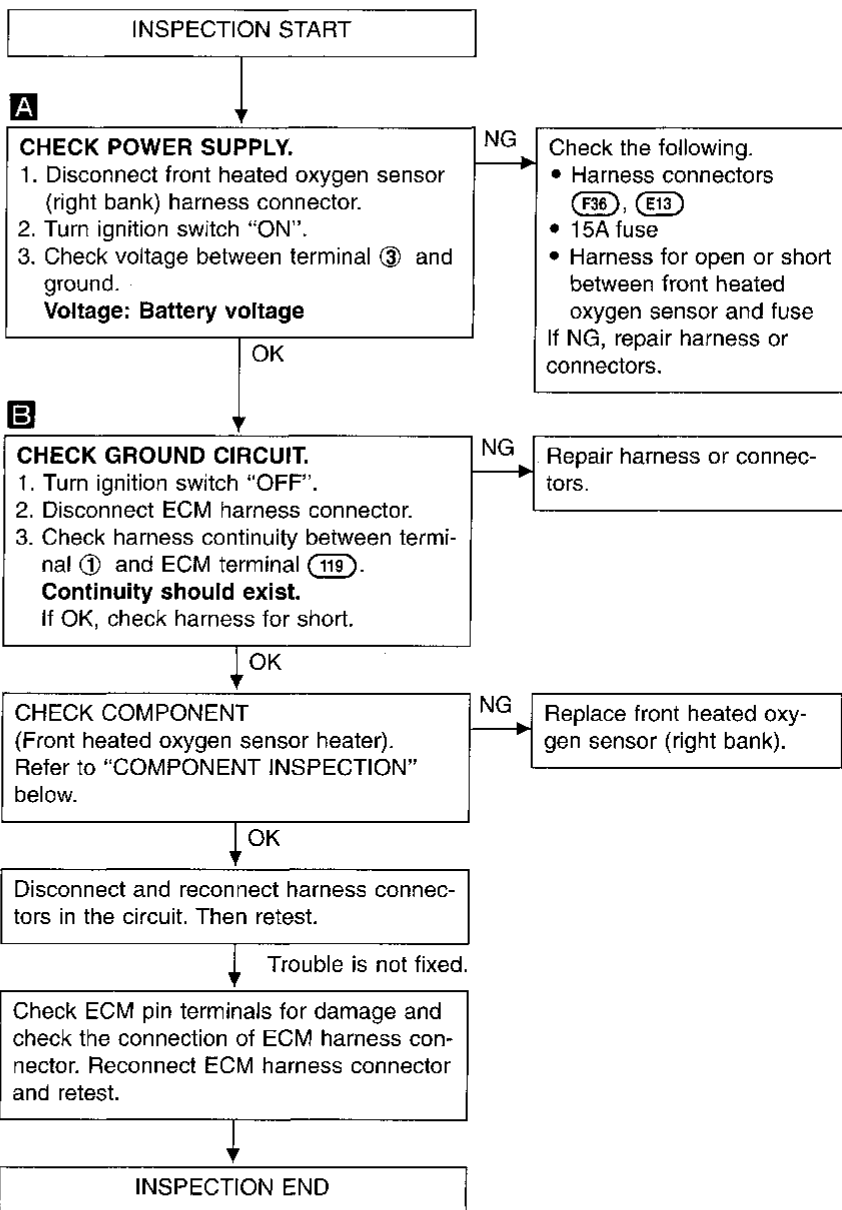
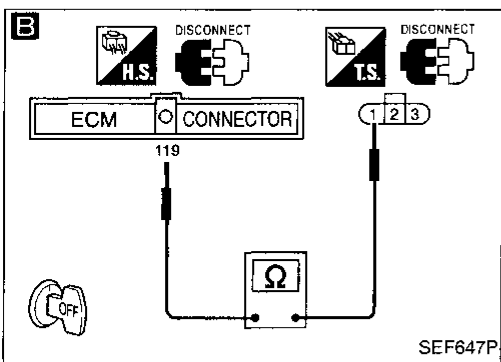
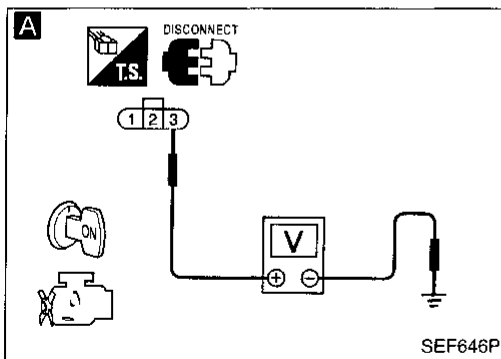
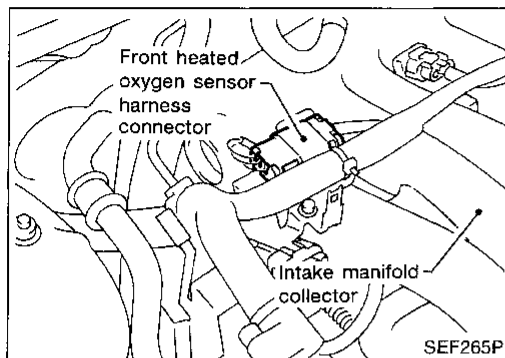
Refer to last page (Foldout page).
 (E106)



TROUBLE DIAGNOSIS FOR DTC P0135

Front Heated Oxygen Sensor Heater (Right bank) (DTC: 0901) (Cont'd)

DIAGNOSTIC PROCEDURE



COMPONENT INSPECTION

Front heated oxygen sensor heater

Check resistance between terminals ③ and ①.

Resistance: 2.3 - 4.3Ω at 25°C (77°F)

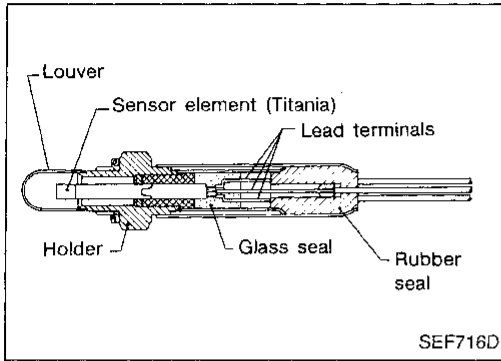
Check continuity between terminals ② and ①, ③ and ②.

Continuity should not exist.

If NG, replace the front heated oxygen sensor.

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.



**Rear Heated Oxygen Sensor (Rear HO2S)
(DTC: 0707)**

The rear heated oxygen sensor (Rear HO2S), after three way catalyst, monitors the oxygen level in the exhaust gas.

Even if switching characteristics of the front heated oxygen sensor 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 titania. The electrical resistance of ceramic titania drastically changes at the ideal air-fuel ratio.

The output voltage of the sensor, depending on its resistance, is approximately 0 to 2.2V.

Under normal conditions the rear heated oxygen sensor is not used for engine control operation.

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ON-BOARD DIAGNOSIS LOGIC

The rear heated oxygen sensor has a much longer switching time between rich and lean than the front heated oxygen sensor. 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 the sensor's voltage value and the switching response during the various driving condition such as fuel-cut.

MT
AT
FA

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0136 0707	<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.) Rear heated oxygen sensor
	<ul style="list-style-type: none"> The maximum and minimum voltages from the sensor are not reached to the specified voltages. It takes more time for the sensor to respond between rich and lean than the specified time. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is shorted.) Rear heated oxygen sensor Fuel pressure Injectors Intake air leaks

RA
BR
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RS

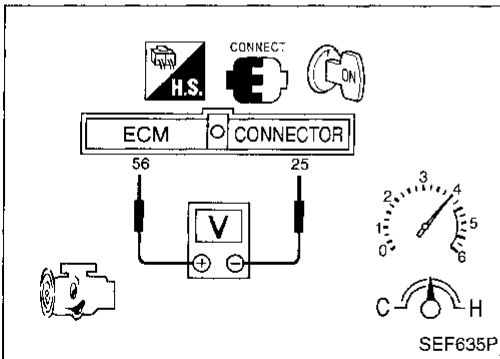
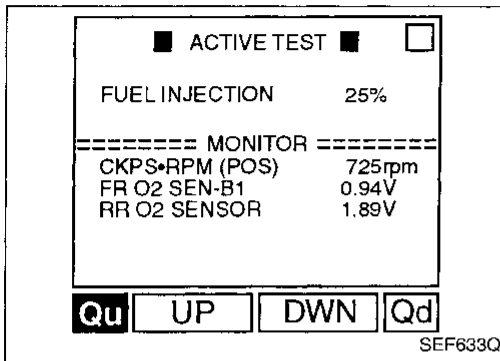
BT
HA
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IDX

TROUBLE DIAGNOSIS FOR DTC P0136

Rear Heated Oxygen Sensor (Rear HO2S) (DTC: 0707) (Cont'd)

OVERALL FUNCTION CHECK

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



- 1) Start engine and warm it up sufficiently.
- 2) Select "FUEL INJECTION" in "ACTIVE TEST" mode, and select "RR O2 SENSOR" as the monitor item with CONSULT.
- 3) Check "RR O2 SENSOR" at idle speed when adjusting "FUEL INJECTION" to $\pm 25\%$.
"RR O2 SENSOR" should be above 0.6V at least once when the "FUEL INJECTION" is +25%.
"RR O2 SENSOR" should be below 0.55V at least once when the "FUEL INJECTION" is -25%.

OR

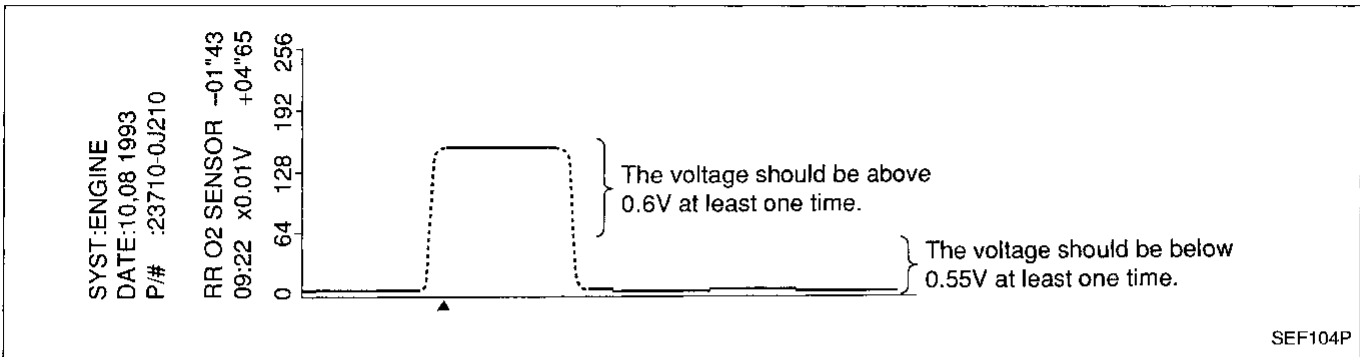
- 1) Start engine and warm it up sufficiently.
- 2) Set voltmeter probes between ECM terminals ⑤⑥ (sensor signal) and ②⑤ (engine ground).
- 3) Check the voltage when racing up to 4,000 rpm under no load at least 10 times.
(depress and release accelerator pedal as soon as possible)

The voltage should be above 0.6V and below 0.55V at least once during this procedure.

If the voltage can be confirmed in step 3, step 4 is not necessary.

- 4) 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.

The voltage should be above 0.6V and below 0.55V at least once during this procedure.

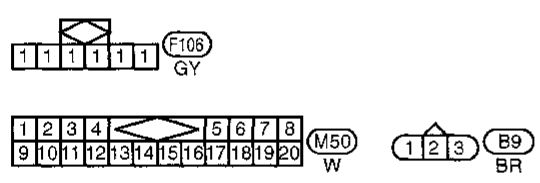
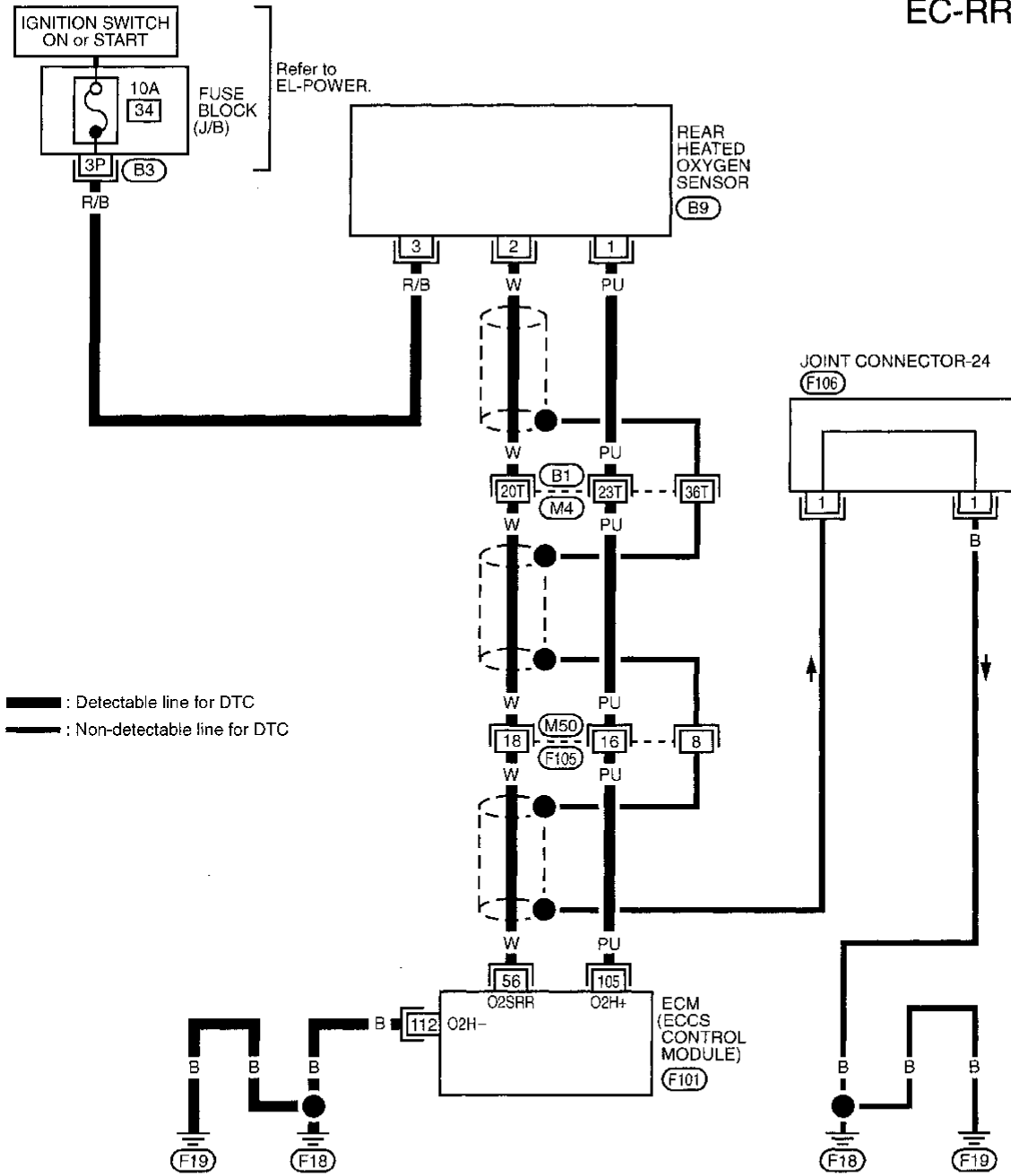


Note: After starting the engine, the output voltage of the rear heated oxygen sensor indicates higher voltage (approx. 5V at highest) than the normal operating range for about 7 seconds. This is due to checking for open circuits in rear heated oxygen sensor by on-board diagnosis. Therefore, if you measure the voltage (at ECM terminal ⑤⑥) during this diagnosis, the higher voltage will appear. (CONSULT will also show the higher voltage, GST may show approx. 0V.) This is not a malfunction even though it is out of the normal range.

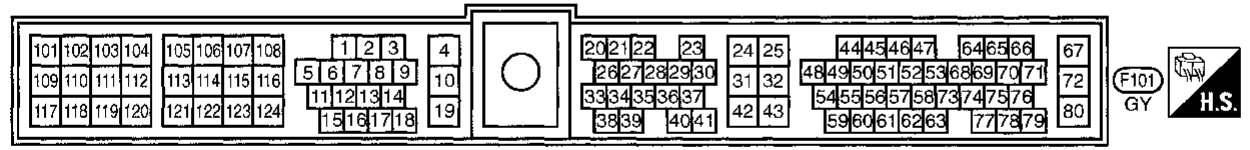
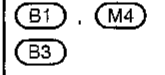
TROUBLE DIAGNOSIS FOR DTC P0136

Rear Heated Oxygen Sensor (Rear HO2S) (DTC: 0707) (Cont'd)

EC-RRO2-01



Refer to last page (Foldout page).

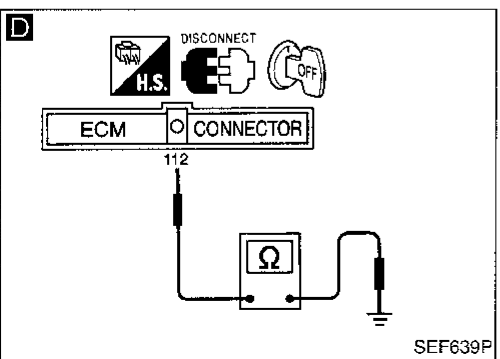
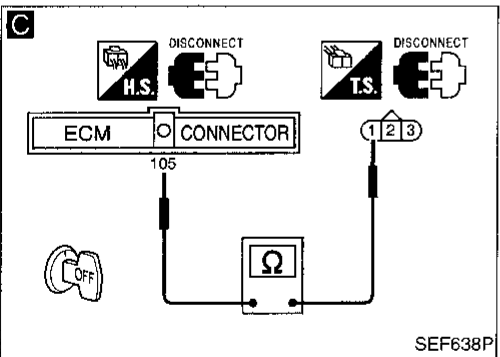
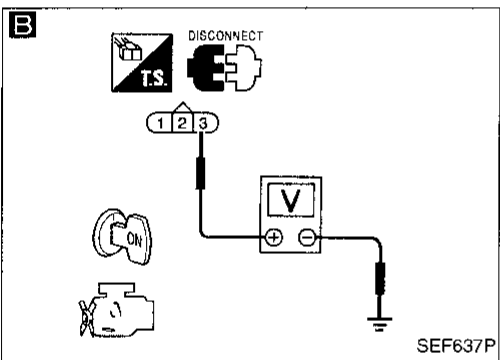
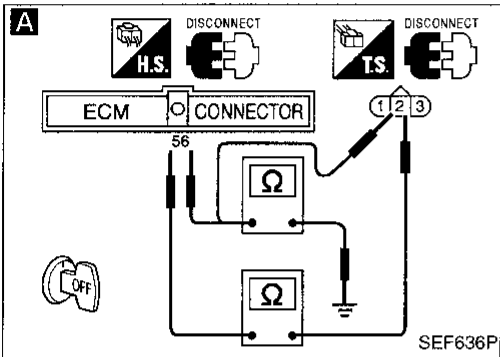
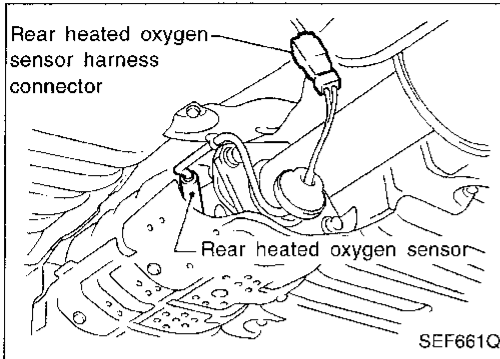


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TROUBLE DIAGNOSIS FOR DTC P0136

Rear Heated Oxygen Sensor (Rear HO2S) (DTC: 0707) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A
CHECK INPUT SIGNAL CIRCUIT.
1. Turn ignition switch "OFF".
2. Disconnect rear heated oxygen sensor harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal ⑤ and terminal ② .
Continuity should exist.
4. Check harness continuity between ECM terminal ⑥ (or terminal ②) and ground.
Continuity should not exist.
If OK, check harness for short.

NG → Check the following.
• Harness connectors
 (F105), (M50)
• Harness connectors
 (M4), (B1)
If NG, repair harness or connectors.

OK
Loosen and retighten ground screws.

B
CHECK POWER SUPPLY.
1. Disconnect rear heated oxygen sensor harness connector.
2. Turn ignition switch "ON".
3. Check voltage between terminal ③ and ground.
Voltage: Battery voltage

NG → Check the following.
• 10A fuse
• Harness for open or short between fuse and rear heated oxygen sensor
If NG, repair harness or connectors.

C
CHECK GROUND CIRCUIT.
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between terminal ① and ECM terminal ⑩⑤ .
Continuity should exist.
If OK, check harness for short.

NG → Check the following.
• Harness connectors
 (F105), (M50)
• Harness connectors
 (M4), (B1)
• Harness for open or short between rear heated oxygen sensor and ECM
If NG, repair harness or connectors.

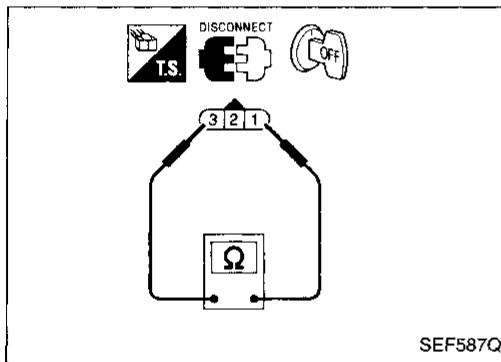
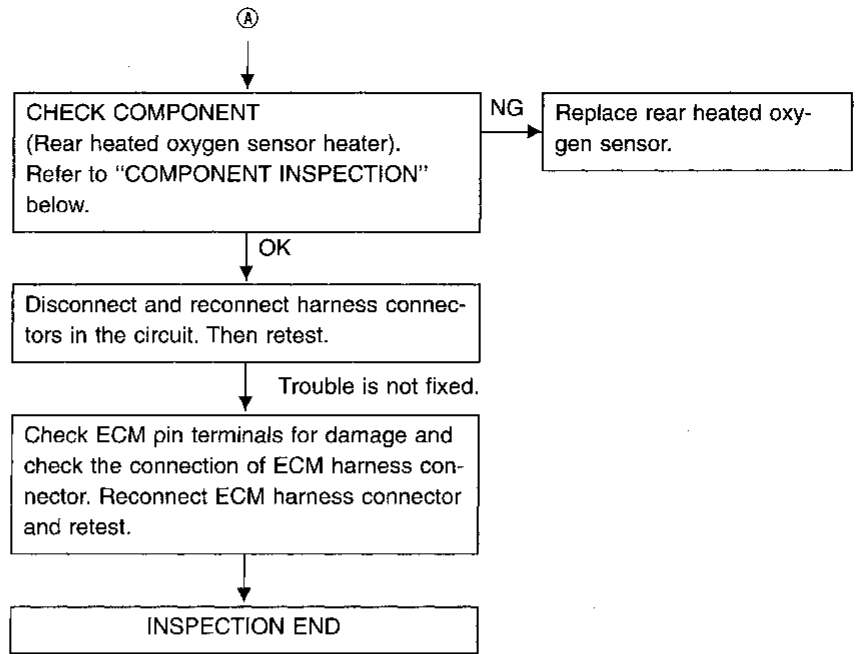
D
CHECK GROUND CIRCUIT.
Check harness continuity between ECM terminal ⑪② and ground.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

OK
A

TROUBLE DIAGNOSIS FOR DTC P0136

Rear Heated Oxygen Sensor (Rear HO2S) (DTC: 0707) (Cont'd)



COMPONENT INSPECTION

Rear heated oxygen sensor heater

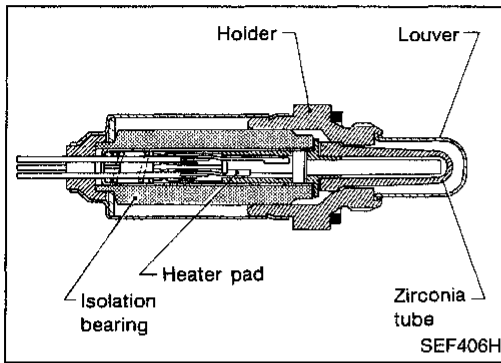
Check resistance between terminals ③ and ①.

Resistance: 5.2 - 8.2Ω at 25°C (77°F)

If NG, replace the rear heated oxygen sensor.

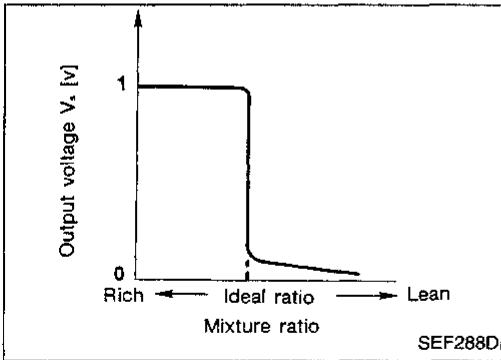
CAUTION:

- 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.

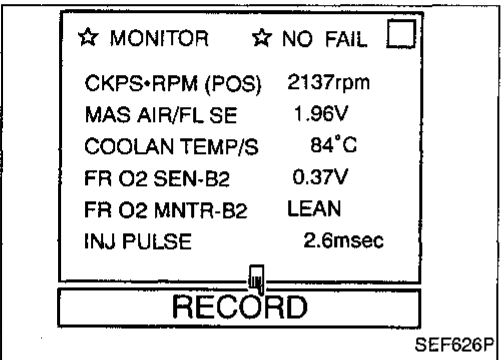


Front Heated Oxygen Sensor (Front HO2S) (Left bank) (DTC: 0303)

The front heated oxygen sensor (left bank) is placed into the front tube (left bank). It detects the amount of oxygen in the exhaust gas compared to the outside air. The front heated oxygen sensor (left bank) 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 front heated oxygen sensor (left bank) 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.



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0150 0303	<ul style="list-style-type: none"> • An excessively high voltage from the sensor is sent to ECM. • The voltage from the sensor is constantly approx. 0.3V. • The maximum and minimum voltages from the sensor are not reached to the specified voltages. • It takes more time for the sensor to respond between rich and lean than the specified time. 	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • Front heated oxygen sensor (left bank) • Fuel pressure • Injectors • Intake air leaks



OVERALL FUNCTION CHECK

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

- 1) Start engine and warm it up sufficiently.
- 2) Select "MANU TRIG" and "HI SPEED" in "DATA MONITOR" mode with CONSULT, and select "FR O2 SEN-B2" and "FR O2 MNTR-B2".
- 3) Hold engine speed at 2,000 rpm under no load during the following steps.
- 4) Touch "RECORD" on CONSULT screen.
- 5) Check the following.
 - "FR O2 MNTR-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:

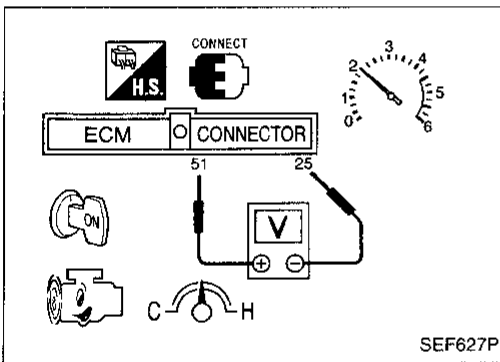
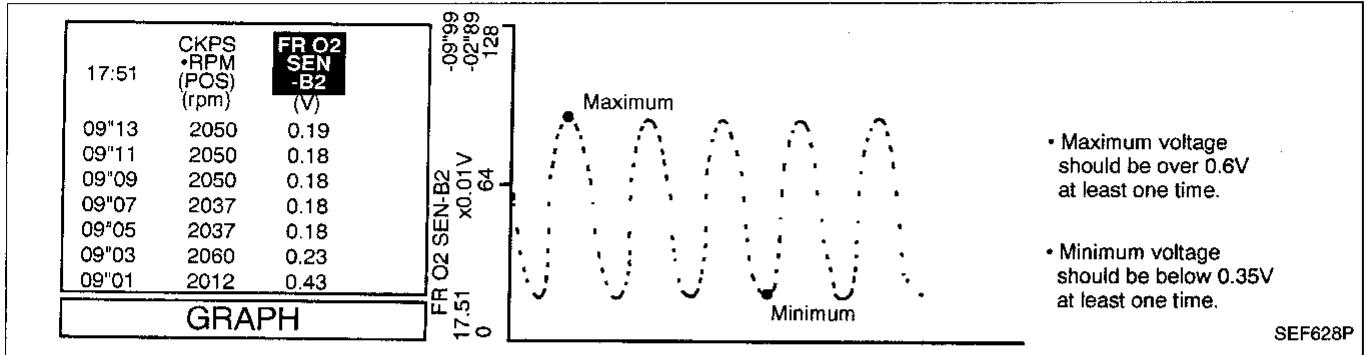
cycle | 1 | 2 | 3 | 4 | 5 |
 FR O2 MNTR-B2 R-L-R-L-R-L-R-L-R-L-R

R = "FR O2 MNTR-B2", "RICH"
 L = "FR O2 MNTR-B2", "LEAN"

TROUBLE DIAGNOSIS FOR DTC P0150

Front Heated Oxygen Sensor (Front HO2S) (Left bank) (DTC: 0303) (Cont'd)

- "FR O2 SEN-B2" voltage goes above 0.6V at least once.
- "FR O2 SEN-B2" voltage goes below 0.35V at least once.
- The voltage never exceeds 1.0V.

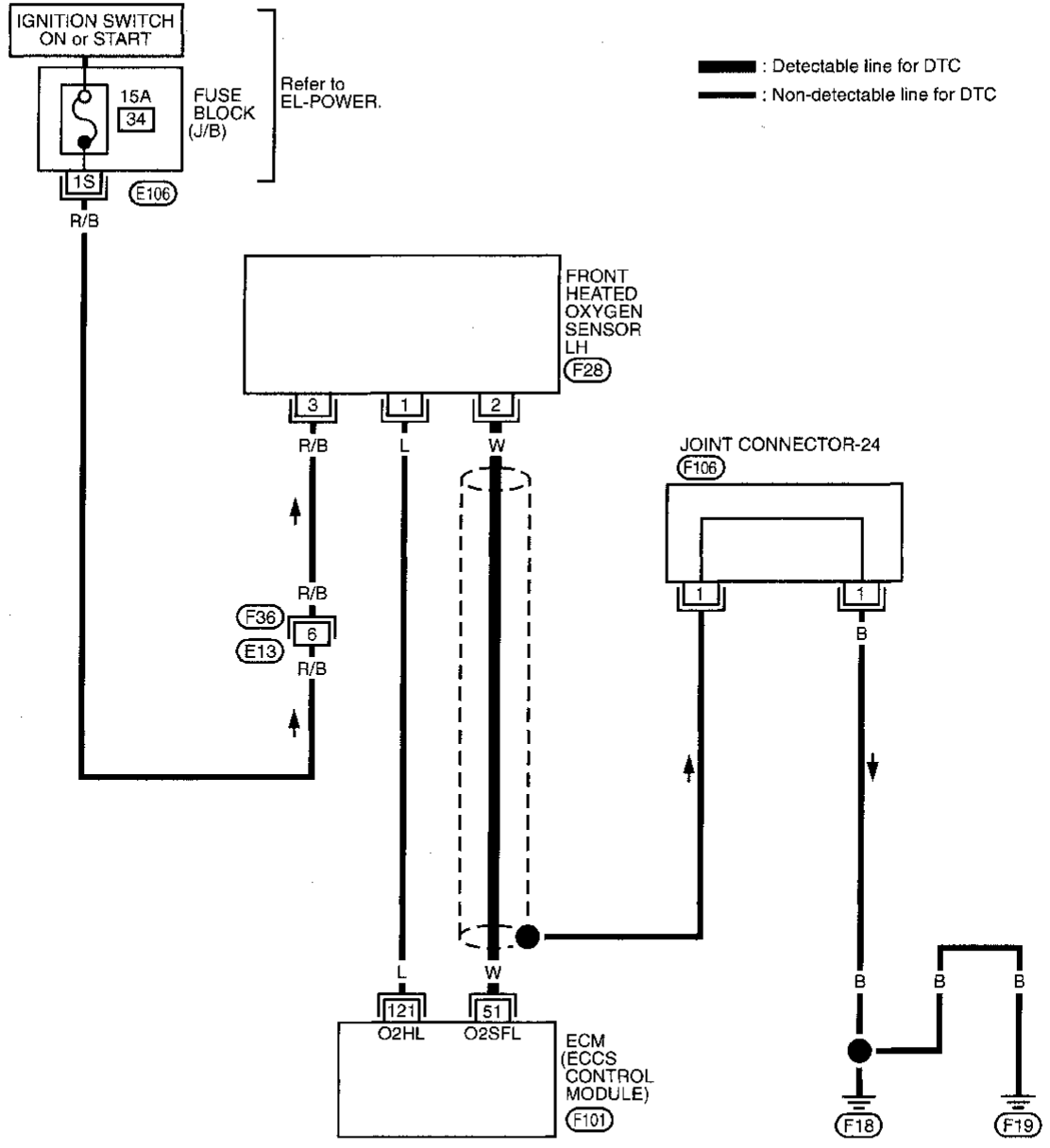


- OR
- 1) Start engine and warm it up sufficiently.
 - 2) Set voltmeter probes between ECM terminal ⑤ (sensor signal) and ②⑤ (engine ground).
 - 3) Check the following with engine speed held at 2,000 rpm constant under no load.
 - Malfunction indicator lamp goes on more than 5 times within 10 seconds in Diagnostic Test Mode II (FRONT HEATED OXYGEN SENSOR MONITOR).
 - The maximum voltage is over 0.6V at least one time.
 - The minimum voltage is below 0.35V at least one time.
 - The voltage never exceeds 1.0V.

TROUBLE DIAGNOSIS FOR DTC P0150

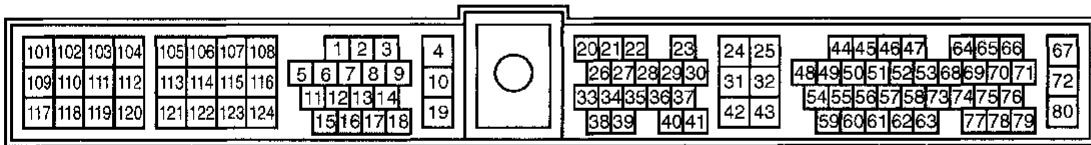
Front Heated Oxygen Sensor (Front HO2S) (Left bank) (DTC: 0303) (Cont'd)

EC-FRO2LH-01



Refer to last page (Foldout page).

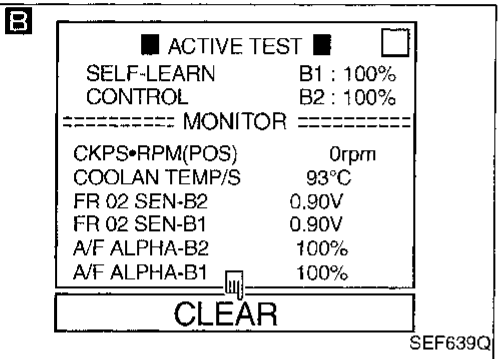
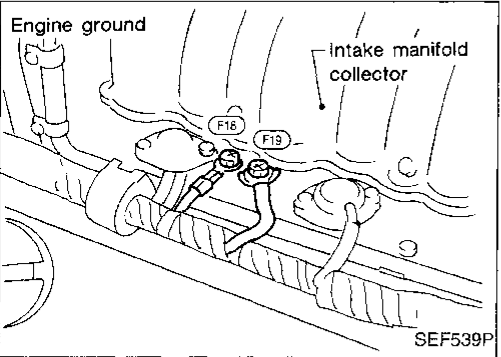
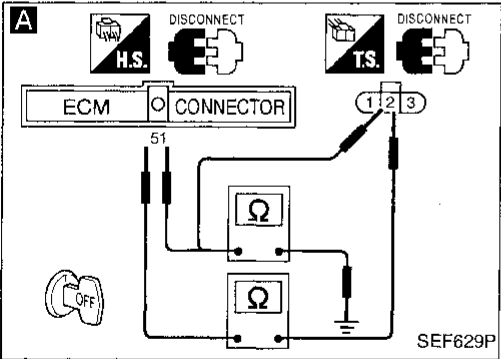
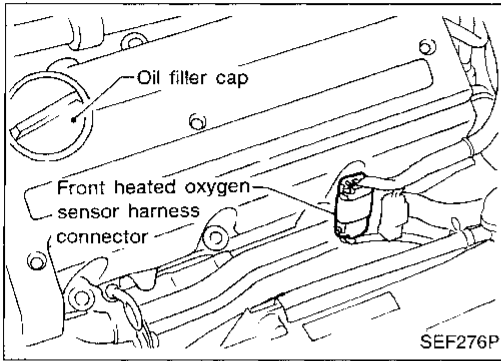
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TROUBLE DIAGNOSIS FOR DTC P0150

Front Heated Oxygen Sensor (Front HO2S) (Left bank) (DTC: 0303) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A

CHECK INPUT SIGNAL CIRCUIT.

1. Turn ignition switch "OFF".
2. Disconnect front heated oxygen sensor (left bank) harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal ⑤ and terminal ②.
Continuity should exist.
4. Check harness continuity between ECM terminal ⑥ (or terminal ②) and ground.
Continuity should not exist.
If OK, check harness for short.

NG → Repair harness or connectors.

OK

Loosen and retighten engine ground screws.

B

CLEAR THE SELF-LEARNING DATA

1. Start engine and warm it up sufficiently.
2. Select "SELF-LEARNING CONT" in "ACTIVE TEST" mode with CONSULT.
3. Clear the self-learning control coefficient by touching "CLEAR".
4. Run engine for at least 10 minutes at idle speed.
Are the DTCs P0174, P0175 detected? Is it difficult to start engine?

Yes → Go to "TROUBLE DIAGNOSIS FOR DTC P0174, P0175". (See page EC-172, 177.)

OR

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.
4. Stop engine and reconnect mass air flow sensor harness connector.
5. Make sure diagnostic trouble code No. 0102 is displayed in Diagnostic Test Mode II.
6. Erase the diagnostic test mode II (Self-diagnostic results) memory. Make sure diagnostic trouble code No. 0505 is displayed in Diagnostic Test Mode II.
7. Run engine for at least 10 minutes at idle speed.
Are the DTCs 0209, 0210 detected? Is it difficult to start engine?

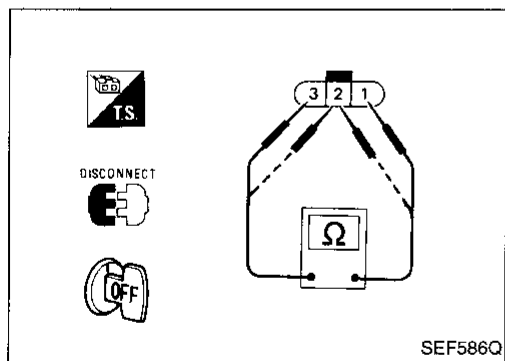
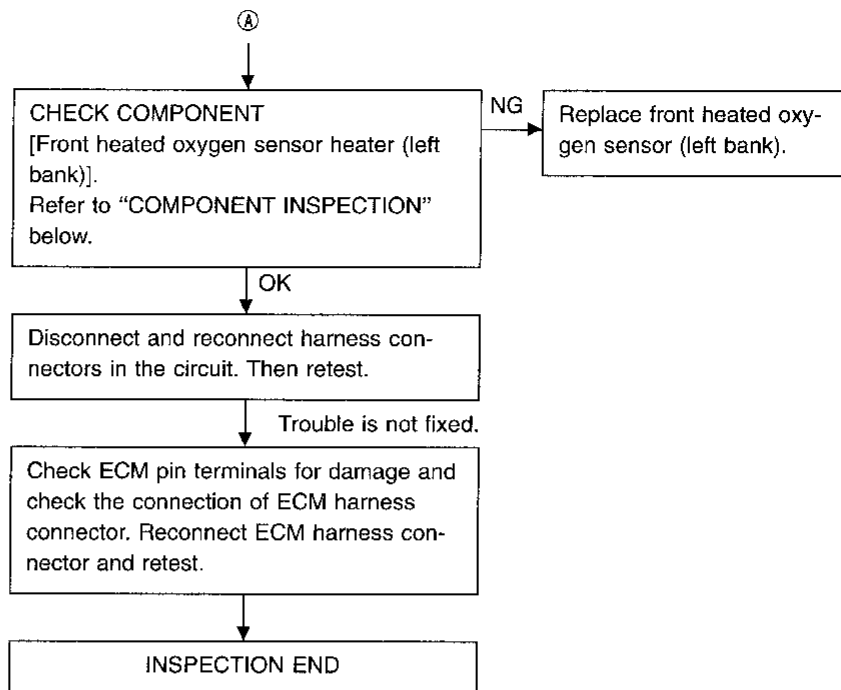
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TROUBLE DIAGNOSIS FOR DTC P0150

Front Heated Oxygen Sensor (Front HO2S) (Left bank) (DTC: 0303) (Cont'd)



COMPONENT INSPECTION

Front heated oxygen sensor heater

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 front heated oxygen sensor.

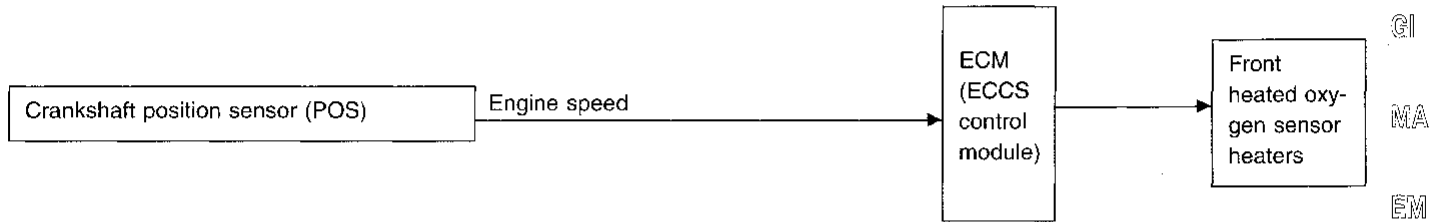
CAUTION:

- 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.

TROUBLE DIAGNOSIS FOR DTC P0155

Front Heated Oxygen Sensor Heater (Left bank) (DTC: 1001)

SYSTEM DESCRIPTION




The ECM performs ON/OFF control of the front heated oxygen sensor heaters corresponding to the engine speed.

OPERATION


Engine speed rpm	Front heated oxygen sensor heaters
Above 3,600	OFF
Below 3,600	ON

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0155 1001	<ul style="list-style-type: none"> The current amperage in the front heated oxygen sensor heater (Left bank) circuit is out of the normal range. (The improper voltage drop signal is sent to ECM through the front heated oxygen sensor heater.) 	<ul style="list-style-type: none"> Harness or connectors (The front heated oxygen sensor heater circuit is open or shorted.) Front heated oxygen sensor heater (Left bank)


DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

-  1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
2) Start engine and run it for at least 5 seconds at idle speed.

OR

-  1) Start engine and run it for at least 5 seconds at idle speed.
2) Select "MODE 3" with GST.

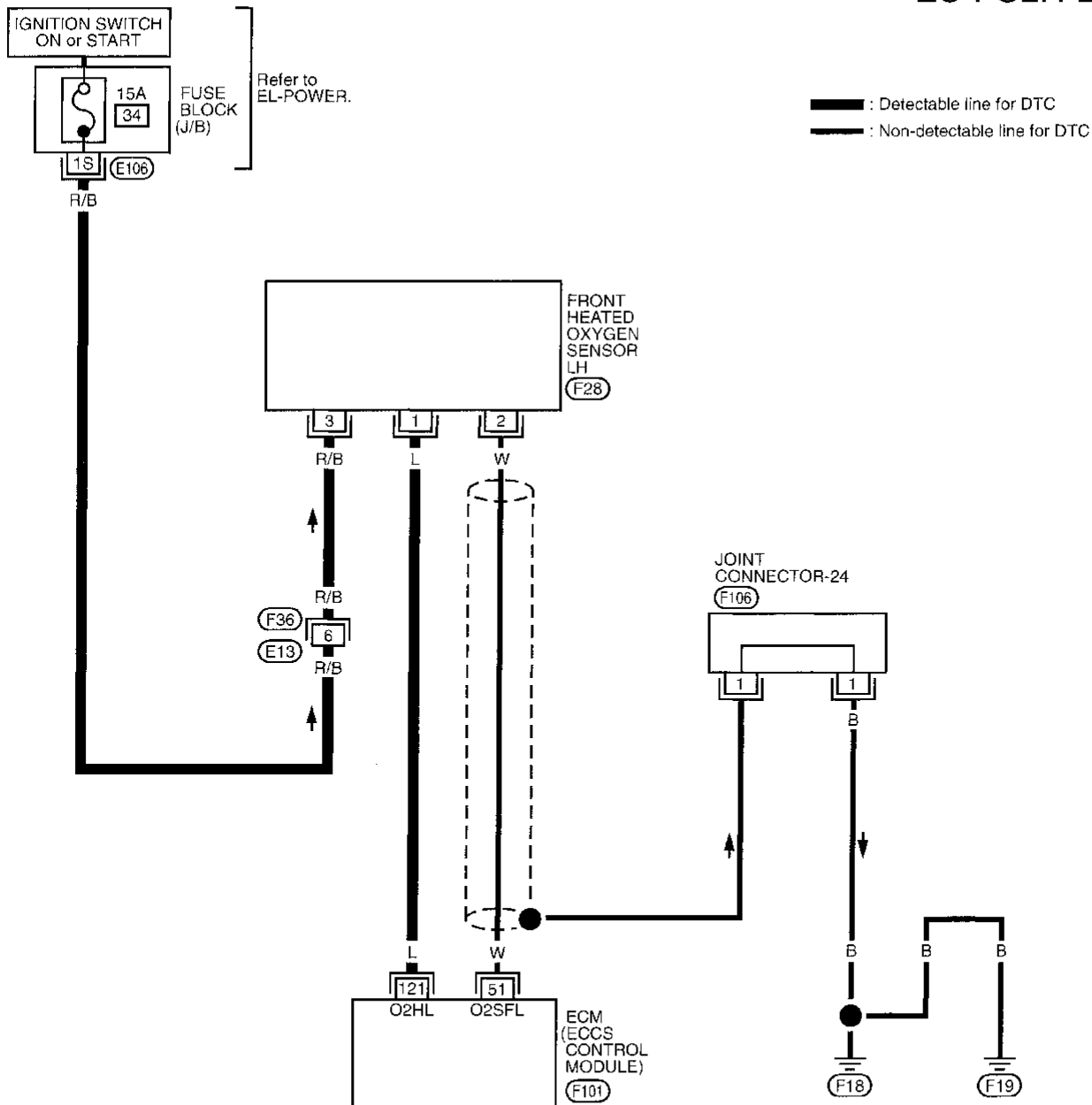
OR

-  1) Start engine and run it for at least 5 seconds at idle speed.
2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

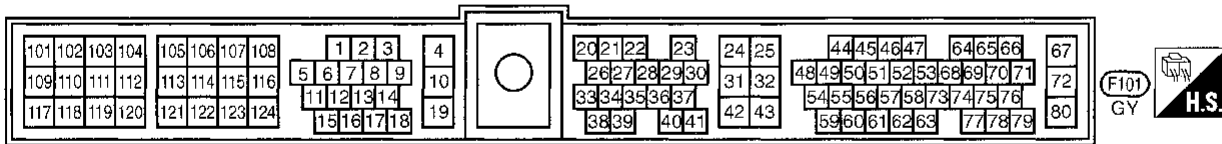
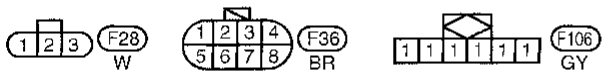
TROUBLE DIAGNOSIS FOR DTC P0155

Front Heated Oxygen Sensor Heater (Left bank) (DTC: 1001) (Cont'd)

EC-FO2H-L-01



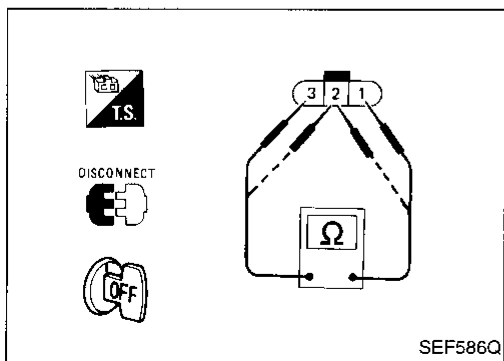
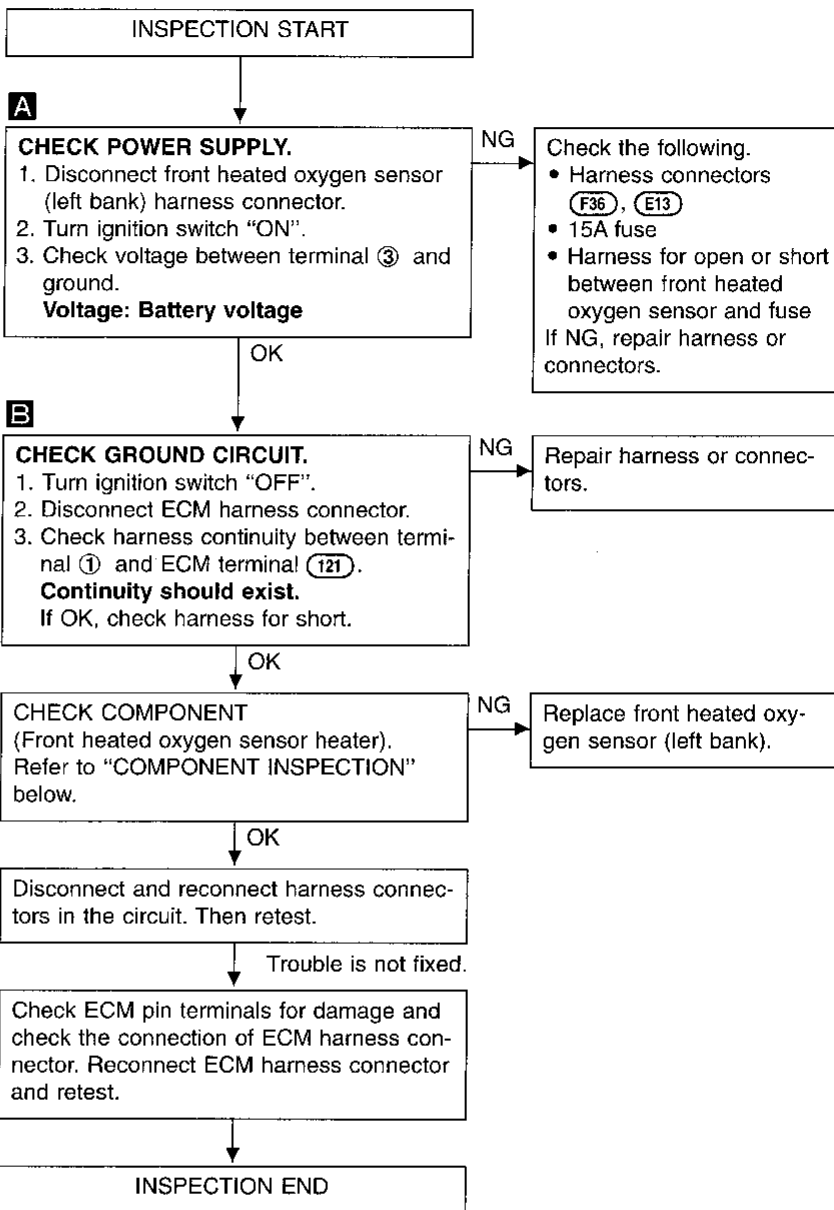
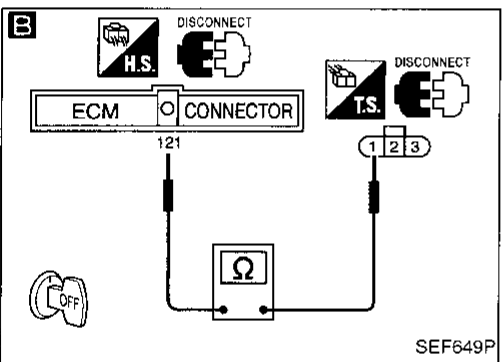
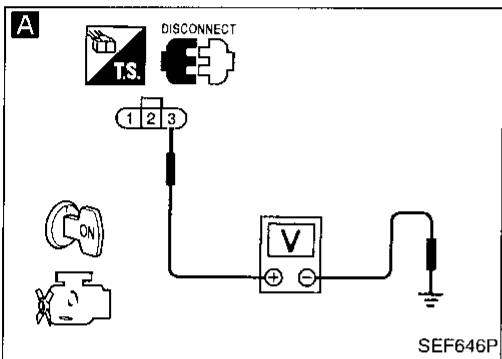
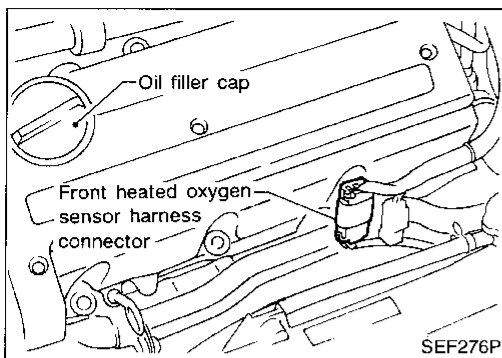
Refer to last page (Foldout page).



TROUBLE DIAGNOSIS FOR DTC P0155

Front Heated Oxygen Sensor Heater (Left bank) (DTC: 1001) (Cont'd)

DIAGNOSTIC PROCEDURE



COMPONENT INSPECTION

Front heated oxygen sensor heater

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 front heated oxygen sensor.

CAUTION:

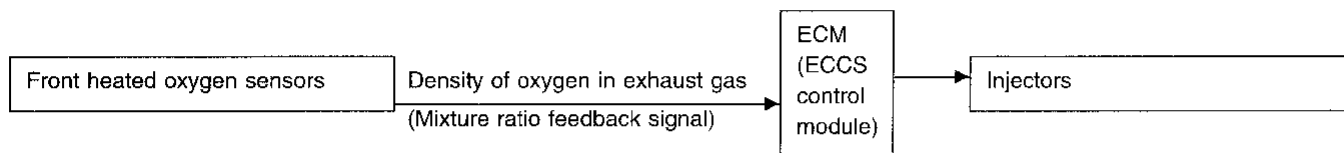
- Discard any heated oxygen sensor which has been dropped from a height of more than 0.5 m (19.7 in) onto a hard surface such as a concrete floor; use a new one.

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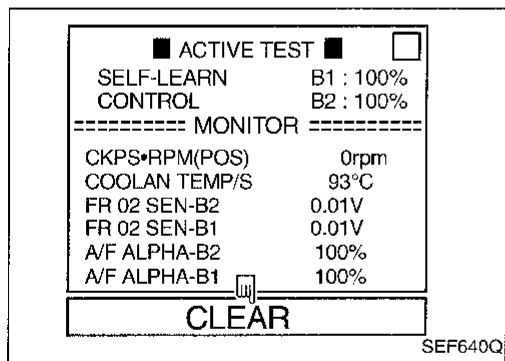
Fuel Injection System Function (Right bank) (Lean side) (DTC: 0115)

ON-BOARD DIAGNOSIS LOGIC

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 front heated oxygen sensors. 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 light up the MIL (2 trip detection logic).



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0171 0115	<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 • Front heated oxygen sensor (right bank) • Injectors (right bank) • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor



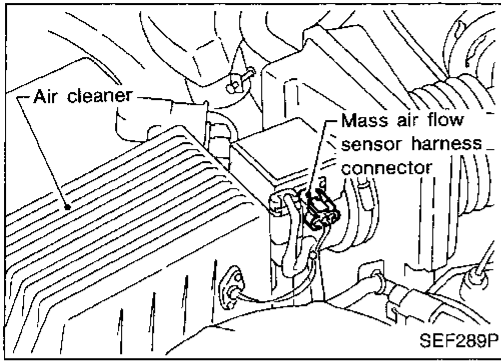
DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE (Overall)

- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "SELF-LEARN CONTROL" in "ACTIVE TEST" mode with CONSULT.
- 4) Clear the self-learning control coefficient by touching "CLEAR".
- 5) Select "DATA MONITOR" mode with CONSULT.
- 6) Start engine again and run it for at least 10 minutes at idle speed.
The DTC P0171 should be detected at this stage, if a malfunction exists.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.

OR

TROUBLE DIAGNOSIS FOR DTC P0171

Fuel Injection System Function (Right bank) (Lean side) (DTC: 0115) (Cont'd)



- 1) Disconnect mass air flow sensor harness connector.
- 2) Start engine and run it for at least 3 seconds at idle speed.
- 3) Stop engine and reconnect mass air flow sensor harness connector.
- 4) Turn ignition switch "ON".
- 5) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0102 is detected.
- 6) Erase the DTC 0102 by changing from Diagnostic Test Mode II to Diagnostic Test Mode I.
- 7) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0505 is detected.
- 8) Start engine again and run it for at least 10 minutes at idle speed.

The DTC 0115 should be detected at this stage, if a malfunction exists.

- 9) If it is difficult to start engine at step 8, the fuel injection system also has a malfunction.

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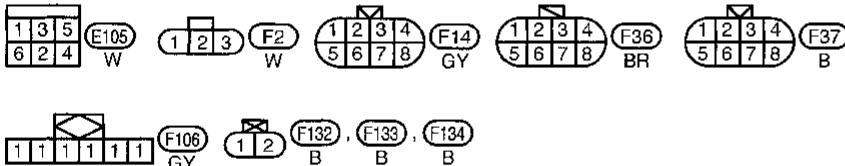
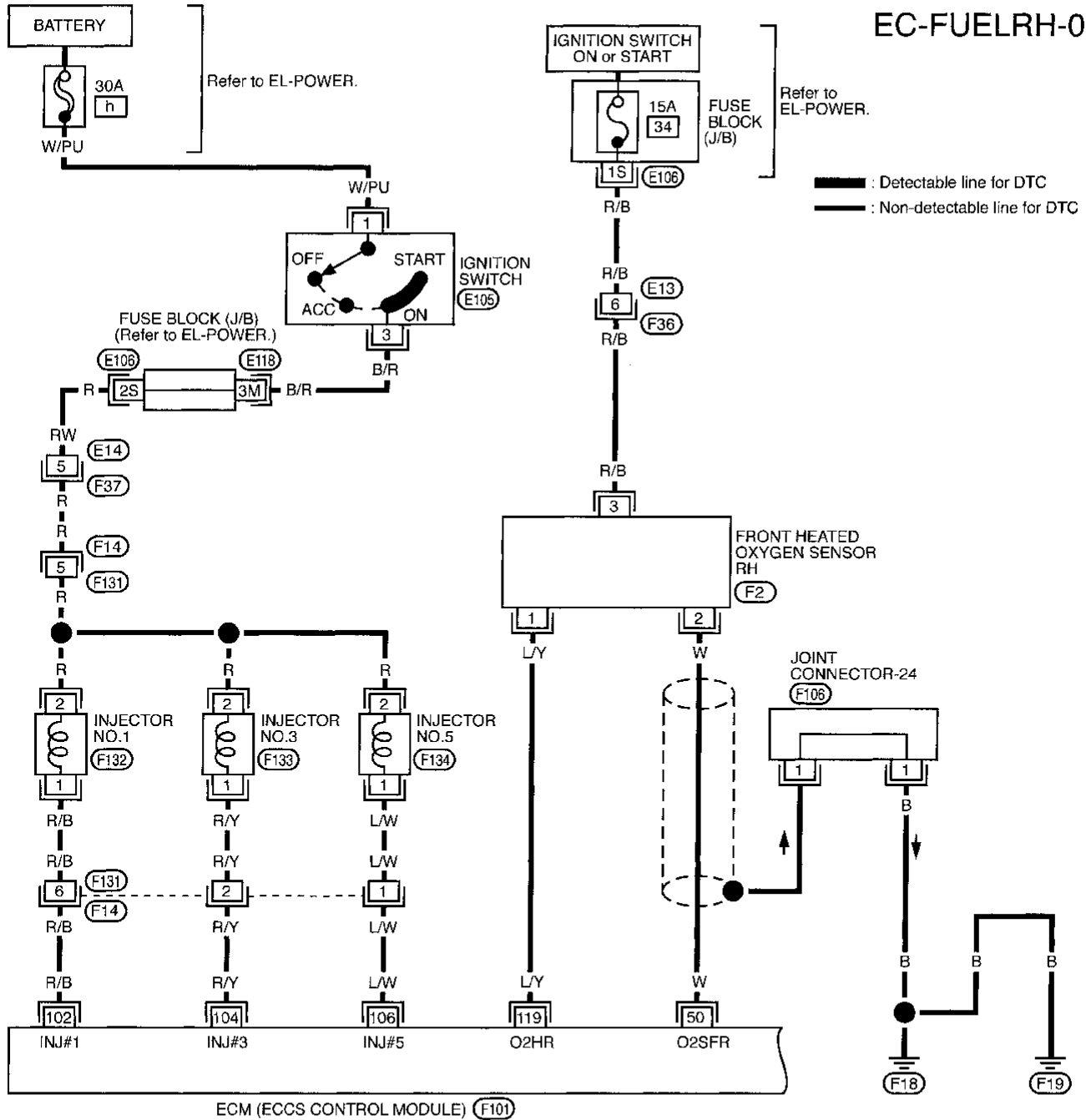
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TROUBLE DIAGNOSIS FOR DTC P0171

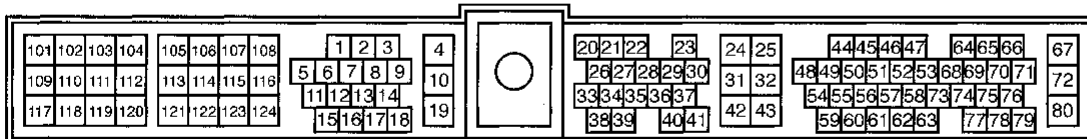
Fuel Injection System Function (Right bank) (Lean side) (DTC: 0115) (Cont'd)

EC-FUELRH-01



Refer to last page (Foldout page).

E106
E118

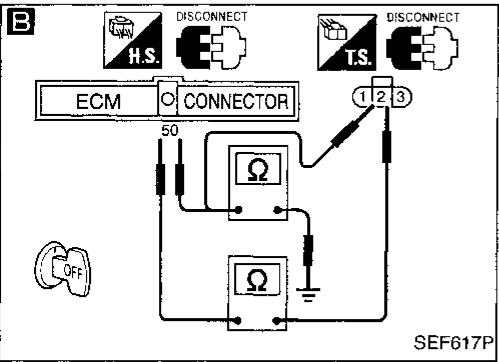
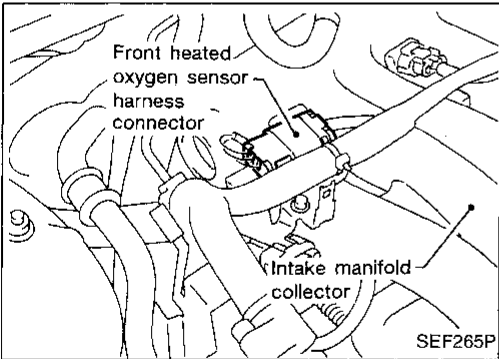
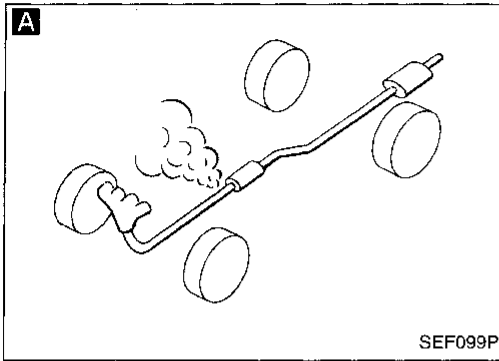


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TROUBLE DIAGNOSIS FOR DTC P0171

Fuel Injection System Function (Right bank) (Lean side) (DTC: 0115) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A
CHECK EXHAUST AIR LEAK.
Start engine and run it at idle. Listen for an exhaust air leak before three way catalyst.

NG → Repair or replace.

OK
CHECK FOR INTAKE AIR LEAK.
Start engine and run it at idle. Listen for an intake air leak after the mass air flow sensor.

NG → Repair or replace.

B
CHECK FRONT HEATED OXYGEN SENSOR (RIGHT BANK).
1. Turn ignition switch "OFF".
2. Disconnect front heated oxygen sensor (right bank) harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal 50 and terminal 2. **Continuity should exist.**
4. Check harness continuity between ECM terminal 50 (or terminal 2) and ground. **Continuity should not exist.**
If OK, check harness for short.

NG → Repair harness or connectors.

OK

CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. Refer to EC-27.
2. Install fuel pressure gauge and check fuel pressure.
At idle:
Approx. 235 kPa (2.4 kg/cm², 34 psi)
A few seconds after ignition switch is turned OFF to ON:
Approx. 294 kPa (3.0 kg/cm², 43 psi)

NG → Check fuel pump and circuit. Refer to EC-339.

OK

CHECK MASS AIR FLOW SENSOR.
Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
2.0 - 6.0 g_m/sec: at idling
7.0 - 20.0 g_m/sec: at 2,500 rpm
OR
Check "mass air flow" in MODE 1 with GST.
2.0 - 6.0 g_m/sec: at idling
7.0 - 20.0 g_m/sec: at 2,500 rpm

NG → Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-108.

OK

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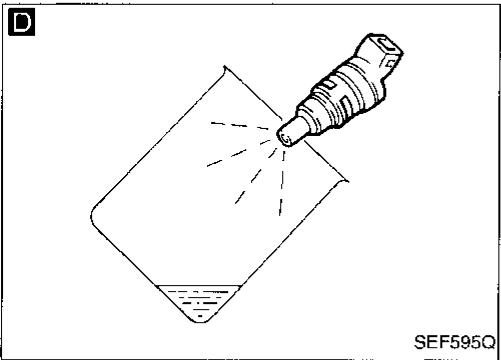
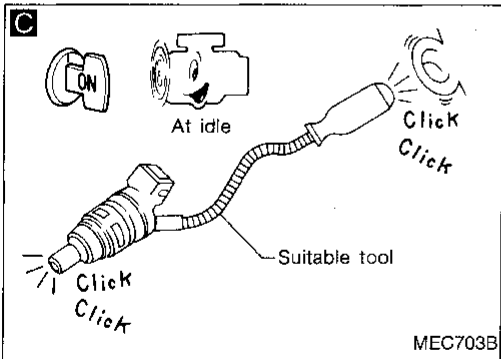
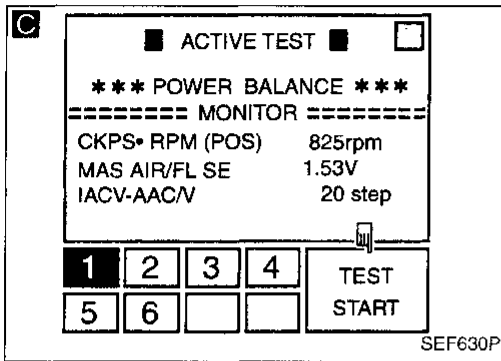
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TROUBLE DIAGNOSIS FOR DTC P0171

Fuel Injection System Function (Right bank) (Lean side) (DTC: 0115) (Cont'd)



C

CHECK FUNCTION OF INJECTORS (RIGHT BANK).

1. Install all parts removed.
2. Start engine.
3. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
4. Make sure that each circuit produces a momentary engine speed drop.

OR

3. Listen to each injector operating sound. **Clicking noise should be heard.**

NG → Perform TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS, "Injectors", EC-333. Repair harness or connectors.

OK → Confirm that the engine is cooled down and there are no fire hazards near the vehicle.

1. Turn ignition switch "OFF".
2. Disconnect injector harness connectors on left bank.
3. Remove injector gallery on right bank. Refer to EC-28. Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors on right bank should remain connected.

D

1. Disconnect all ignition coil harness connectors.
2. Crank engine for about 3 seconds. Make sure that fuel sprays out from injectors.

NG → Replace injectors from which fuel does not spray out.

OK → Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

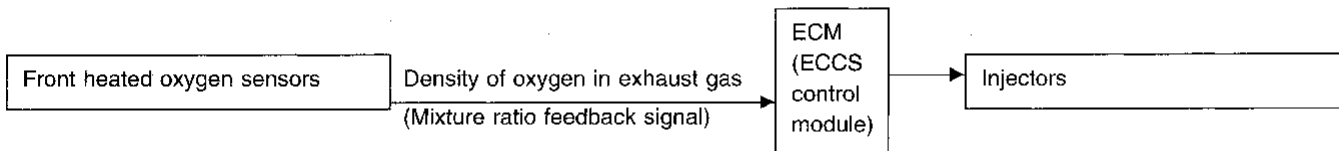
INSPECTION END

Fuel Injection System Function (Right bank)
(Rich side) (DTC: 0114)

ON-BOARD DIAGNOSIS LOGIC

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 front heated oxygen sensors. 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 light up the MIL (2 trip detection logic).

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Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0172 0114	<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"> Front heated oxygen sensor (right bank) Injectors (right bank) Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor

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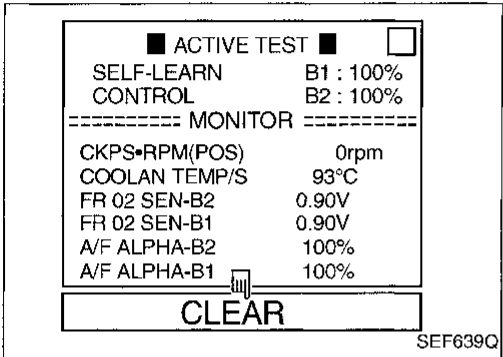
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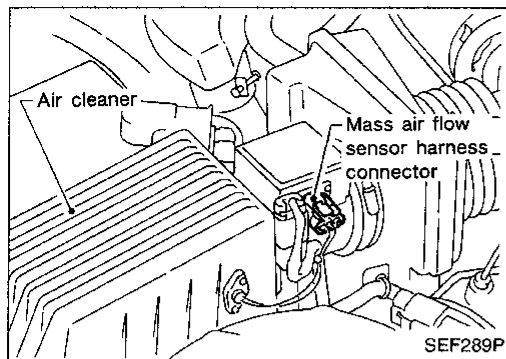
DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE (Overall)

- Start engine and warm it up sufficiently.
- Turn ignition switch "OFF" and wait at least 5 seconds.
- Turn ignition switch "ON" and select "SELF-LEARN CONTROL" in "ACTIVE TEST" mode with CONSULT.
- Clear the self-learning control coefficient by touching "CLEAR".
- Select "DATA MONITOR" mode with CONSULT.
- Start engine again and run it for at least 10 minutes at idle speed.
The DTC P0172 should be detected at this stage, if a malfunction exists.
- If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.

OR

TROUBLE DIAGNOSIS FOR DTC P0172

Fuel Injection System Function (Right bank) (Rich side) (DTC: 0114) (Cont'd)

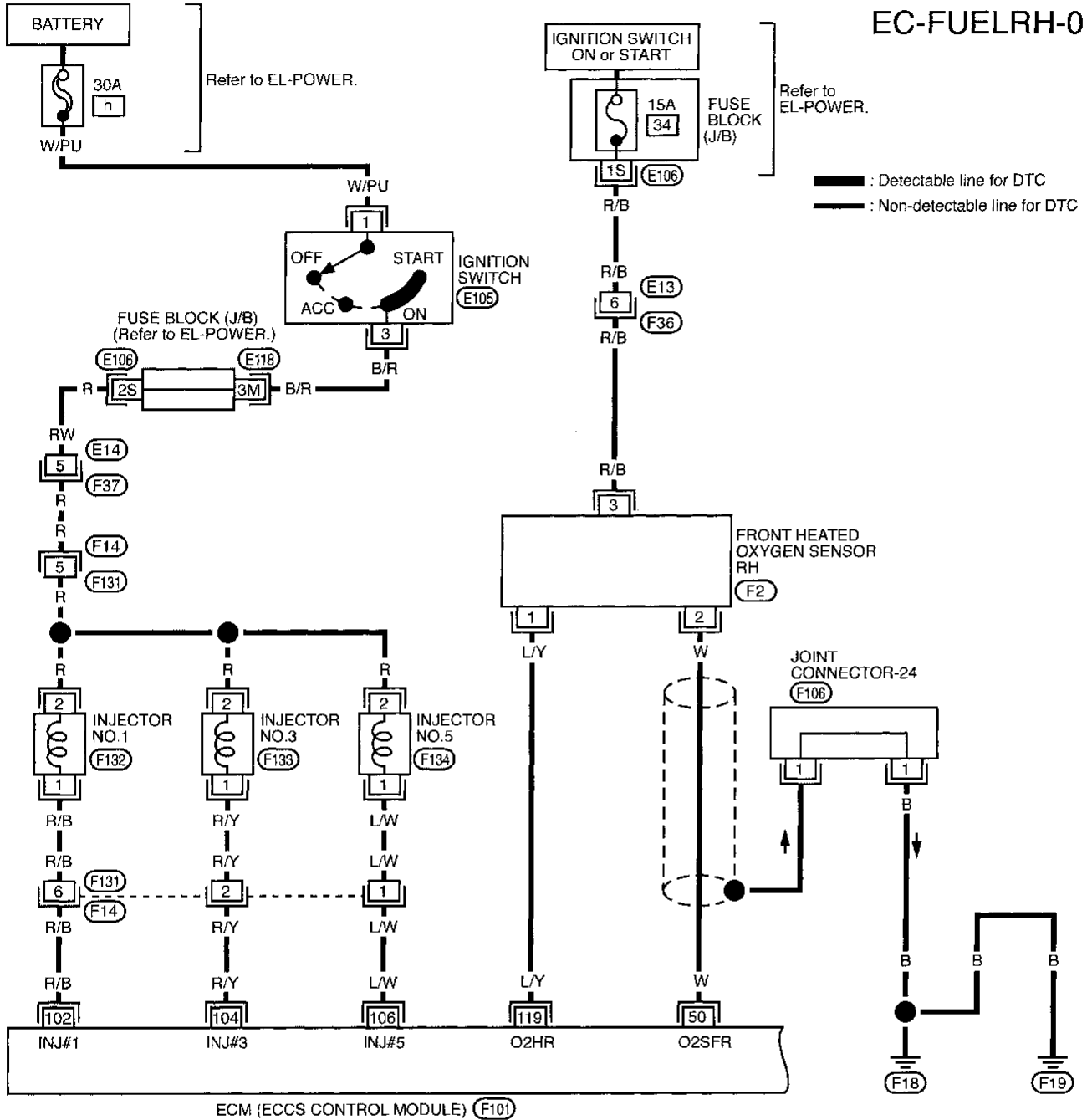


- 1) Disconnect mass air flow sensor harness connector.
- 2) Start engine and run it for at least 3 seconds at idle speed.
- 3) Stop engine and reconnect mass air flow sensor harness connector.
- 4) Turn ignition switch "ON".
- 5) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0102 is detected.
- 6) Erase the DTC 0102 by changing from Diagnostic Test Mode II to Diagnostic Test Mode I.
- 7) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0505 is detected.
- 8) Start engine again and run it for at least 10 minutes at idle speed.
The DTC 0114 should be detected at this stage, if a malfunction exists.
- 9) If it is difficult to start engine at step 8, the fuel injection system also has a malfunction.

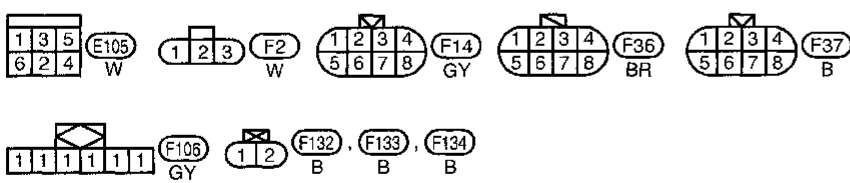
TROUBLE DIAGNOSIS FOR DTC P0172

Fuel Injection System Function (Right bank) (Rich side) (DTC: 0114) (Cont'd)

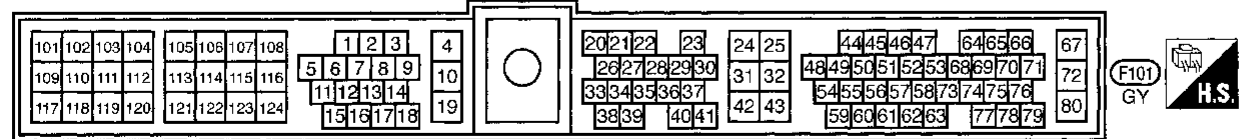
EC-FUELRH-01



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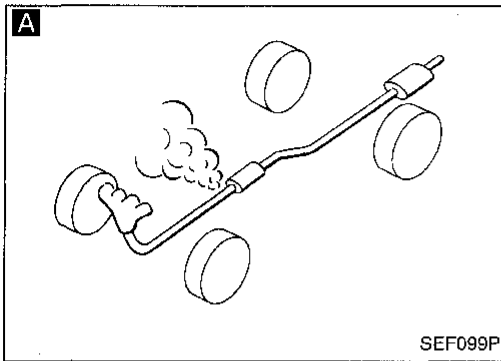
Refer to last page (Foldout page).



TROUBLE DIAGNOSIS FOR DTC P0172

Fuel Injection System Function (Right bank) (Rich side) (DTC: 0114) (Cont'd)

DIAGNOSTIC PROCEDURE

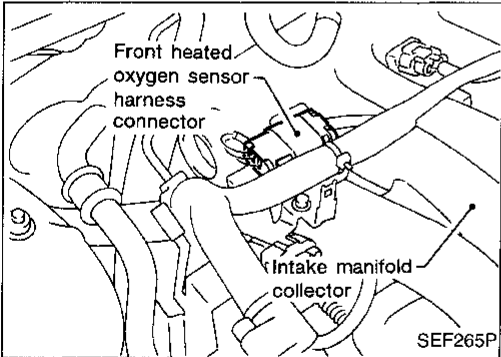


INSPECTION START

A
CHECK FOR EXHAUST AIR LEAK.
Start engine and run it at idle. Listen for an exhaust air leak before the three way catalyst.

NG → Repair or replace.

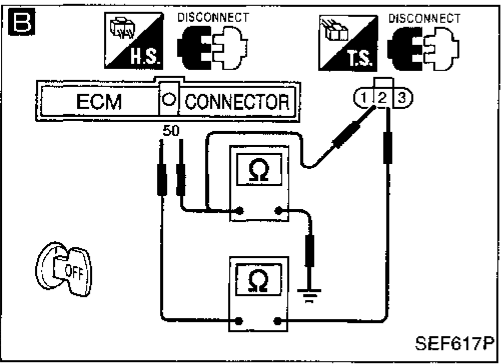
OK



B
CHECK FRONT HEATED OXYGEN SENSOR (RIGHT BANK).
1. Turn ignition switch "OFF".
2. Disconnect front heated oxygen sensor (right bank) harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal ⑤ and terminal ②. **Continuity should exist.**
4. Check harness continuity between ECM terminal ⑥ (or terminal ②) and ground. **Continuity should not exist.**
If OK, check harness for short.

NG → Repair harness or connectors.

OK



CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. Refer to EC-27.
2. Install fuel pressure gauge and check fuel pressure.
At idle:
Approx. 235 kPa
(2.4 kg/cm², 34 psi)
A few seconds after ignition switch is turned OFF to ON:
Approx. 294 kPa
(3.0 kg/cm², 43 psi)

NG → Check fuel pump and circuit. Refer to EC-339.

OK

CHECK MASS AIR FLOW SENSOR.
Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
2.0 - 6.0 g/m/sec: at idling
7.0 - 20.0 g/m/sec: at 2,500 rpm
OR
Check "mass air flow" in MODE 1 with GST.
2.0 - 6.0 g/m/sec: at idling
7.0 - 20.0 g/m/sec: at 2,500 rpm

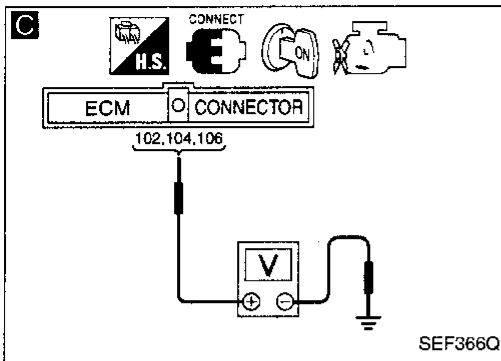
NG → Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-108.

OK

Ⓐ

TROUBLE DIAGNOSIS FOR DTC P0172

Fuel Injection System Function (Right bank) (Rich side) (DTC: 0114) (Cont'd)



C

CHECK INJECTORS (RIGHT BANK).

1. Turn ignition switch "ON".
2. Check voltage between ECM terminals (102), (104), (106) and ground with CONSULT or tester.
Battery voltage should exist.
3. Turn ignition switch "OFF".

NG

Perform TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS, "Injectors", EC-333. Repair harness or connectors.

OK

Remove injector assembly. Refer to EC-28. Keep fuel hose and all injectors connected to injector gallery.

Confirm that the engine is cooled down and there are no fire hazards near the vehicle.

1. Disconnect all injector harness connectors.
2. Disconnect all ignition coil harness connectors.
3. Crank engine for about 3 seconds. Make sure fuel does not drip from injector.

Drips

Replace the injectors from which fuel is dripping.

Does not drip.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

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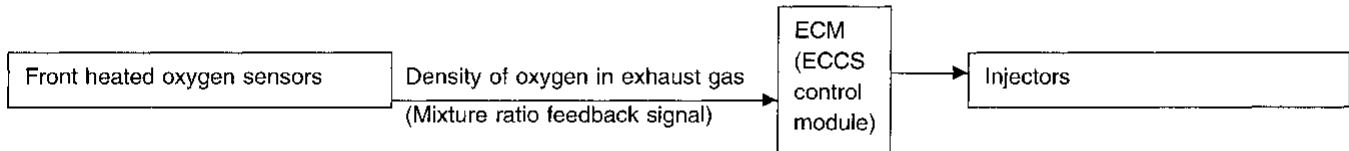
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TROUBLE DIAGNOSIS FOR DTC P0174

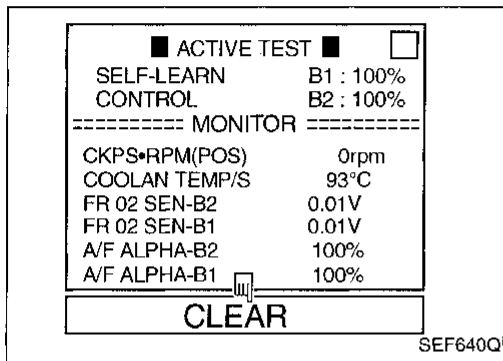
Fuel Injection System Function (Left bank) (Lean side) (DTC: 0210)

ON-BOARD DIAGNOSIS LOGIC

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 front heated oxygen sensors. 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 light up the MIL (2 trip detection logic).



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0174 0210	<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 • Front heated oxygen sensor (left bank) • Injectors (left bank) • Exhaust gas leaks • Incorrect fuel pressure • Lack of fuel • Mass air flow sensor



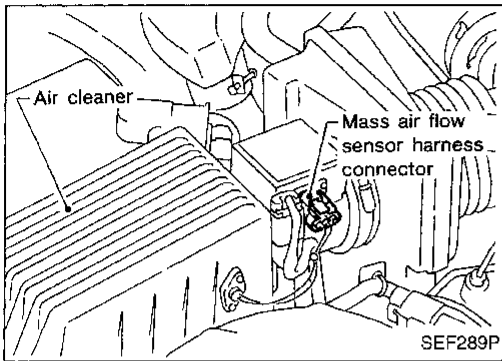
DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE (Overall)

- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "SELF-LEARN CONTROL" in "ACTIVE TEST" mode with CONSULT.
- 4) Clear the self-learning control coefficient by touching "CLEAR".
- 5) Select "DATA MONITOR" mode with CONSULT.
- 6) Start engine again and run it for at least 10 minutes at idle speed.
The DTC P0174 should be detected at this stage, if a malfunction exists.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.

OR

TROUBLE DIAGNOSIS FOR DTC P0174

Fuel Injection System Function (Left bank) (Lean side) (DTC: 0210) (Cont'd)



- 1) Disconnect mass air flow sensor harness connector.
- 2) Start engine and run it for at least 3 seconds at idle speed.
- 3) Stop engine and reconnect mass air flow sensor harness connector.
- 4) Turn ignition switch "ON".
- 5) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0102 is detected.
- 6) Erase the DTC 0102 by changing from Diagnostic Test Mode II to Diagnostic Test Mode I.
- 7) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0505 is detected.
- 8) Start engine again and run it for at least 10 minutes at idle speed.

The DTC 0210 should be detected at this stage, if a malfunction exists.

- 9) If it is difficult to start engine at step 8, the fuel injection system also has a malfunction.

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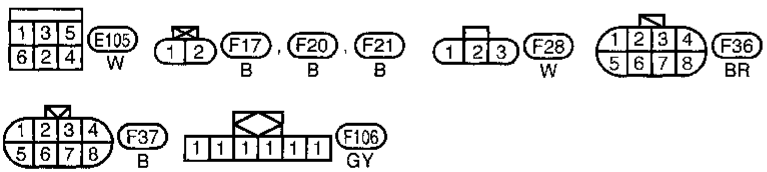
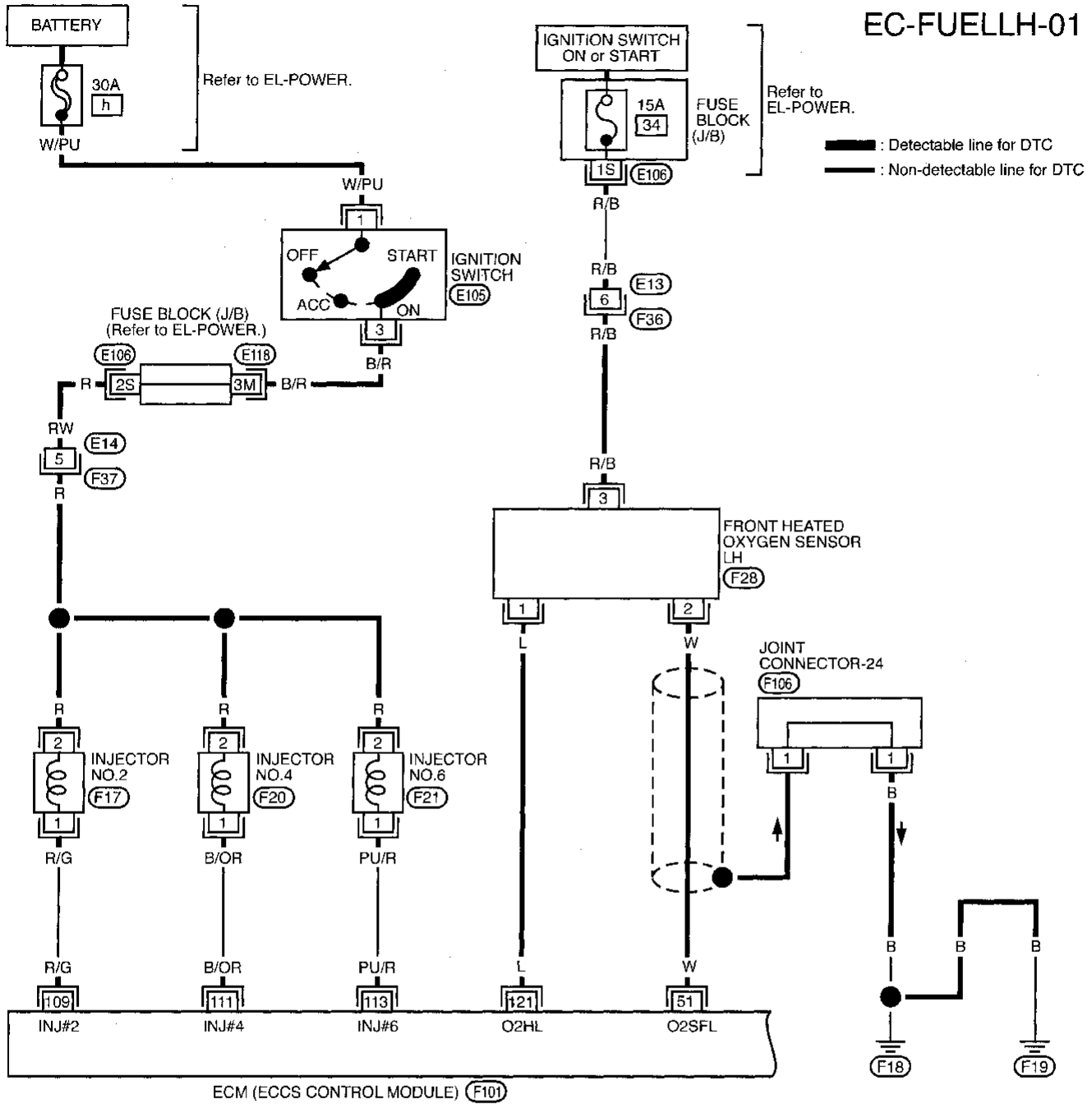
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TROUBLE DIAGNOSIS FOR DTC P0174

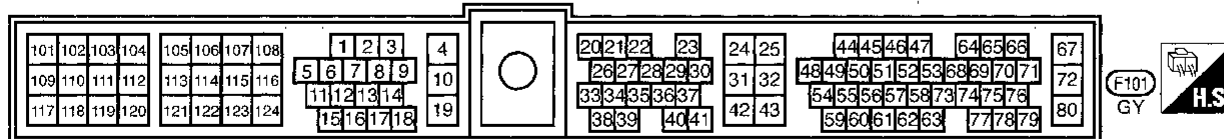
Fuel Injection System Function (Left bank) (Lean side) (DTC: 0210) (Cont'd)

EC-FUELLH-01



Refer to last page (Foldout page).

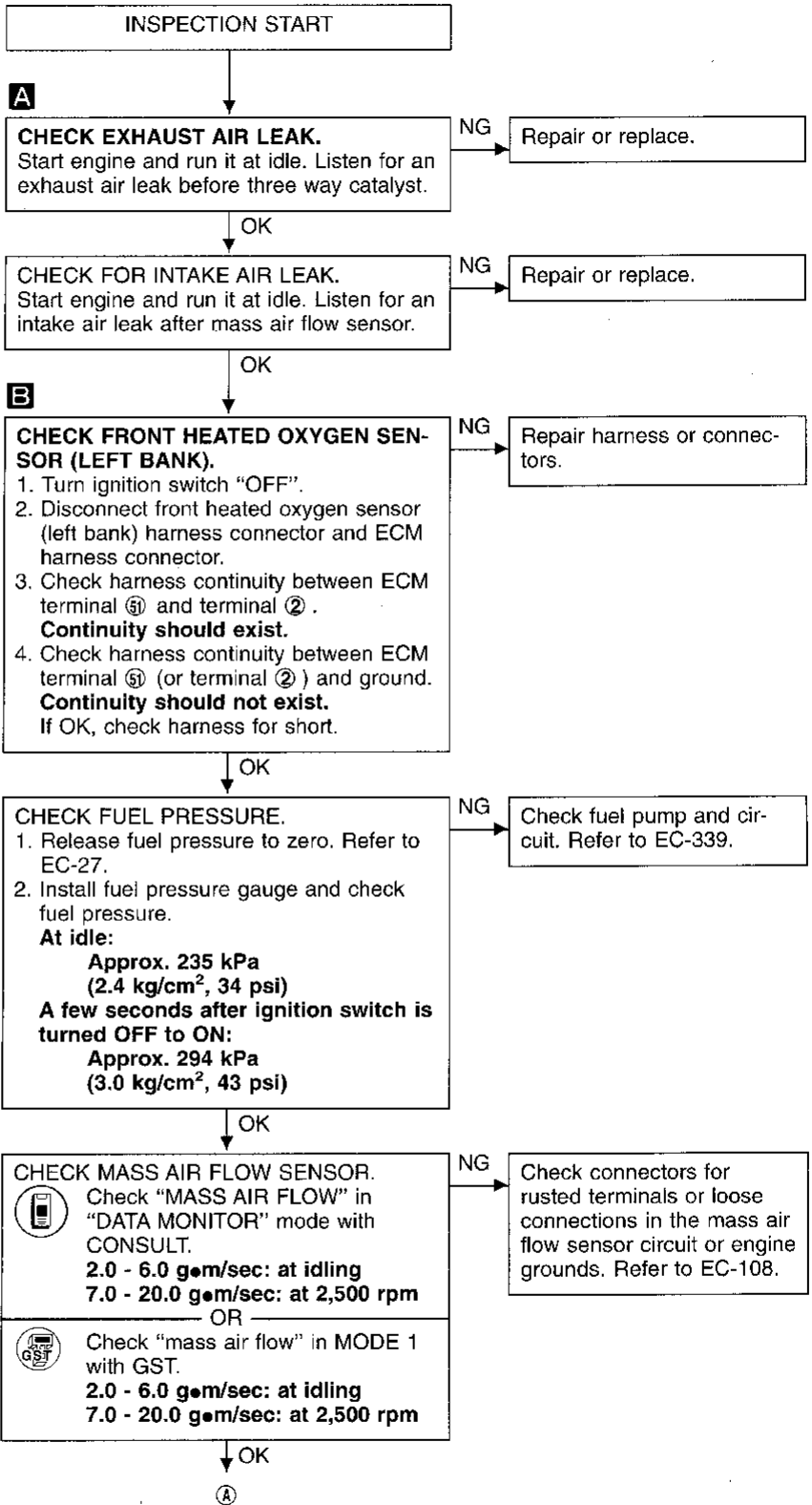
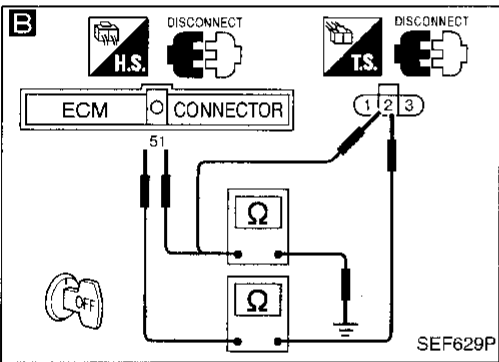
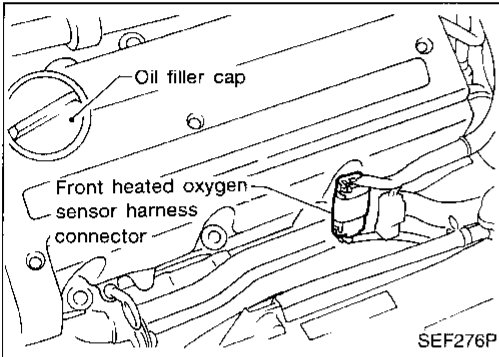
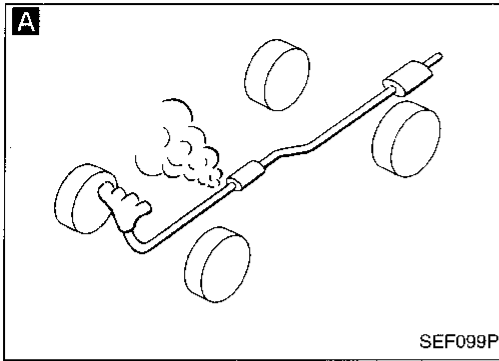
E106
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TROUBLE DIAGNOSIS FOR DTC P0174

Fuel Injection System Function (Left bank) (Lean side) (DTC: 0210) (Cont'd)

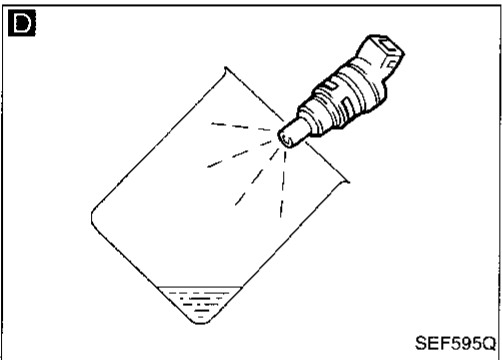
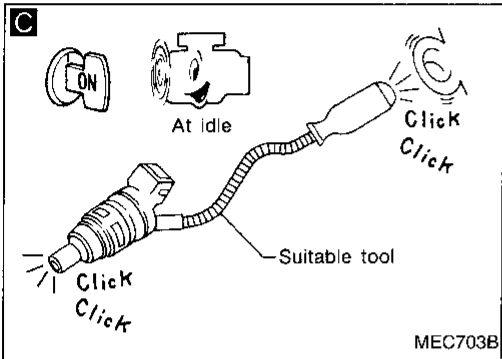
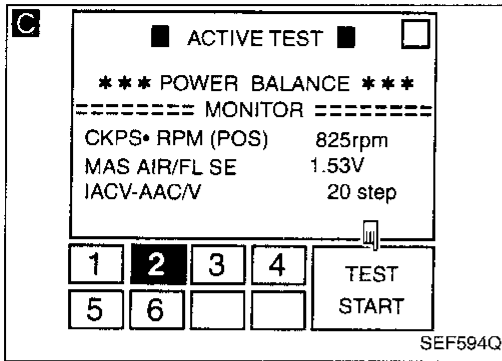
DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR DTC P0174

Fuel Injection System Function (Left bank) (Lean side) (DTC: 0210) (Cont'd)



C

CHECK FUNCTION OF INJECTORS (LEFT BANK).

1. Install all parts removed.
2. Start engine.
3. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
4. Make sure that each circuit produces a momentary engine speed drop.

OR

3. Listen to each injector operating sound.
Clicking noise should be heard.

NG → Perform TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS, "Injectors", EC-333. Repair harness or connectors.

OK → Confirm that the engine is cooled down and there are no fire hazards near the vehicle.

1. Turn ignition switch "OFF".
2. Disconnect injector harness connectors on right bank.
3. Remove injector gallery on left bank. Refer to EC-28. Keep fuel hose and all injectors connected to injector gallery. The injector harness connectors on left bank should remain connected.

D

1. Disconnect all ignition coil harness connectors.
2. Crank engine for about 3 seconds. Make sure that fuel sprays out from injector.

NG → Replace injectors from which fuel does not spray out.

OK → Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

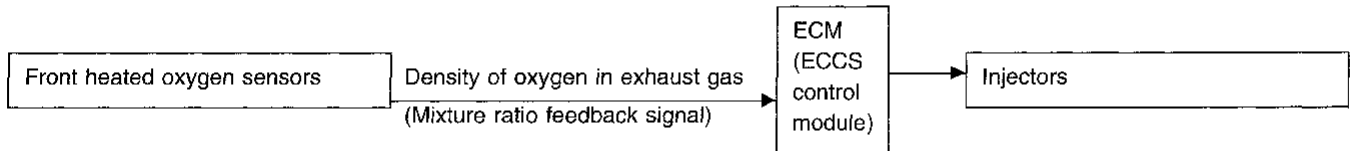
INSPECTION END

TROUBLE DIAGNOSIS FOR DTC P0175

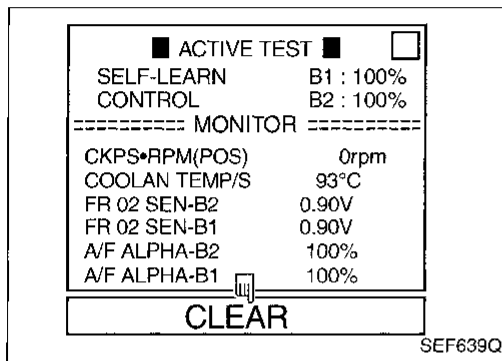
Fuel Injection System Function (Left bank) (Rich side) (DTC: 0209)

ON-BOARD DIAGNOSIS LOGIC

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 front heated oxygen sensors. 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 light up the MIL (2 trip detection logic).



Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0175 0209	<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"> Front heated oxygen sensor (left bank) Injectors (left bank) Exhaust gas leaks Incorrect fuel pressure Mass air flow sensor



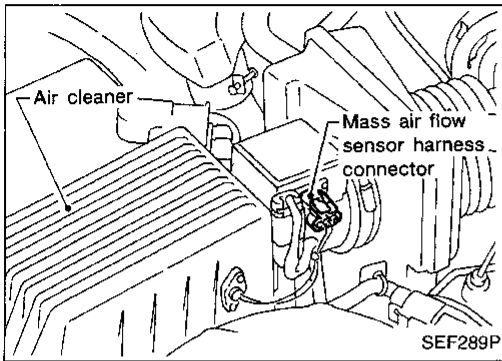
DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE (Overall)

- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "SELF-LEARN CONTROL" in "ACTIVE TEST" mode with CONSULT.
- 4) Clear the self-learning control coefficient by touching "CLEAR".
- 5) Select "DATA MONITOR" mode with CONSULT.
- 6) Start engine again and run it for at least 10 minutes at idle speed.
The DTC P0175 should be detected at this stage, if a malfunction exists.
- 7) If it is difficult to start engine at step 6, the fuel injection system has a malfunction, too.

OR

TROUBLE DIAGNOSIS FOR DTC P0175

Fuel Injection System Function (Left bank) (Rich side) (DTC: 0209) (Cont'd)

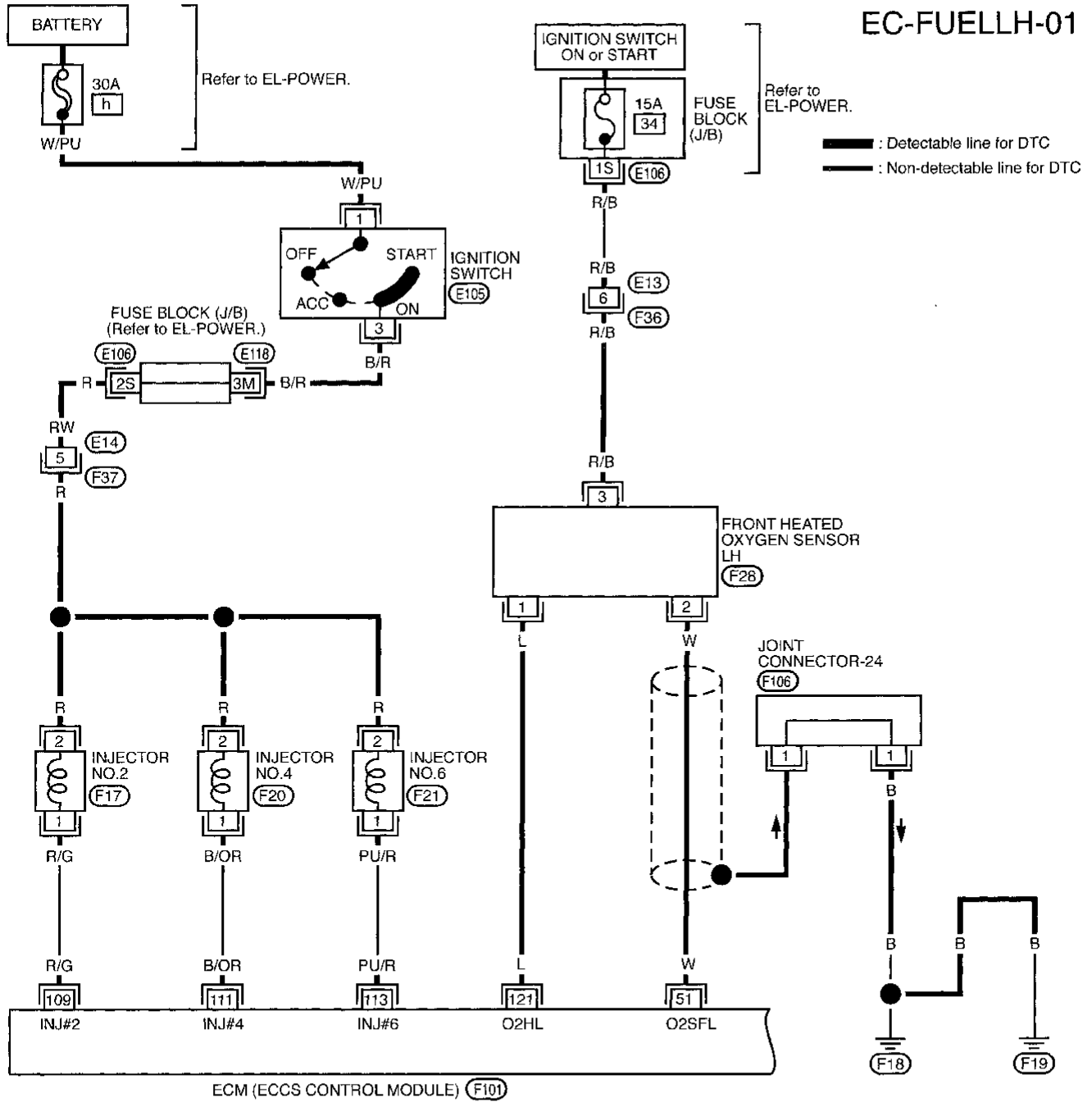


- 1) Disconnect mass air flow sensor harness connector.
- 2) Start engine and run it for at least 3 seconds at idle speed.
- 3) Stop engine and reconnect mass air flow sensor harness connector.
- 4) Turn ignition switch "ON".
- 5) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0102 is detected.
- 6) Erase the DTC 0102 by changing from Diagnostic Test Mode II to Diagnostic Test Mode I.
- 7) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. Make sure DTC 0505 is detected.
- 8) Start engine again and run it for at least 10 minutes at idle speed.
The DTC 0209 should be detected at this stage, if a malfunction exists.
- 9) If it is difficult to start engine at step 8, the fuel injection system also has a malfunction.

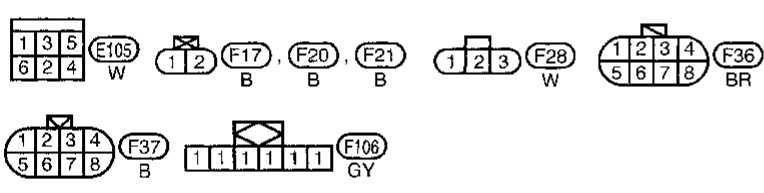
TROUBLE DIAGNOSIS FOR DTC P0175

Fuel Injection System Function (Left bank) (Rich side) (DTC: 0209) (Cont'd)

EC-FUELLH-01

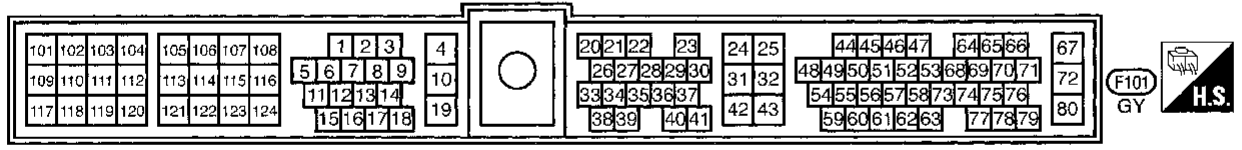


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Refer to last page (Foldout page).

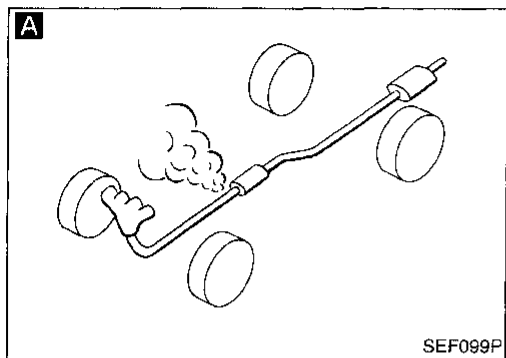
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TROUBLE DIAGNOSIS FOR DTC P0175

Fuel Injection System Function (Left bank) (Rich side) (DTC: 0209) (Cont'd)

DIAGNOSTIC PROCEDURE

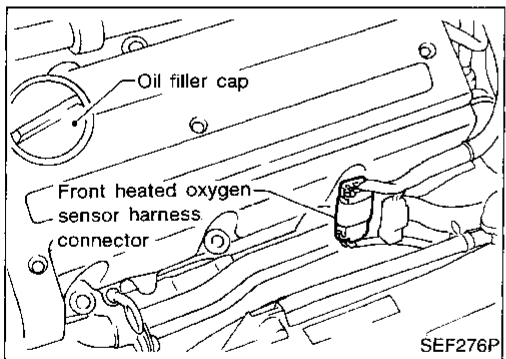


INSPECTION START

A
CHECK FOR EXHAUST AIR LEAK.
Start engine and run it at idle. Listen for an exhaust air leak before the three way catalyst.

NG → Repair or replace.

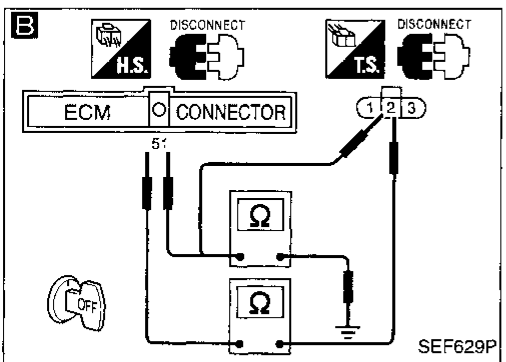
OK



B
CHECK FRONT HEATED OXYGEN SENSOR (LEFT BANK).
1. Turn ignition switch "OFF".
2. Disconnect front heated oxygen sensor (left bank) harness connector and ECM harness connector.
3. Check harness continuity between ECM terminal ⑤ and terminal ②. **Continuity should exist.**
4. Check harness continuity between ECM terminal ⑤ (or terminal ②) and ground. **Continuity should not exist.**
If OK, check harness for short.

NG → Repair harness or connectors.

OK



CHECK FUEL PRESSURE.
1. Release fuel pressure to zero. Refer to EC-27.
2. Install fuel pressure gauge and check fuel pressure.
At idle:
Approx. 235 kPa
(2.4 kg/cm², 34 psi)
A few seconds after ignition switch is turned OFF to ON:
Approx. 294 kPa
(3.0 kg/cm², 43 psi)

NG → Check fuel pump and circuit. Refer to EC-339.

OK

CHECK MASS AIR FLOW SENSOR.
Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
OR
Check "mass air flow" in MODE 1 with GST.
2.0 - 6.0 g/m/sec: at idling
7.0 - 20.0 g/m/sec: at 2,500 rpm

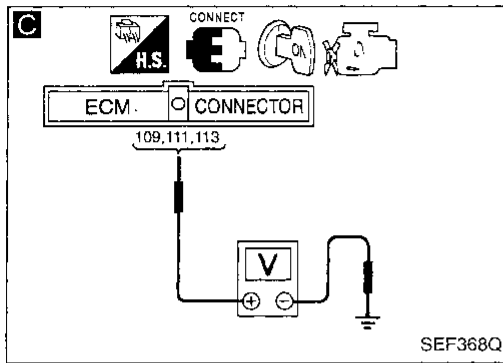
NG → Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-108.

OK

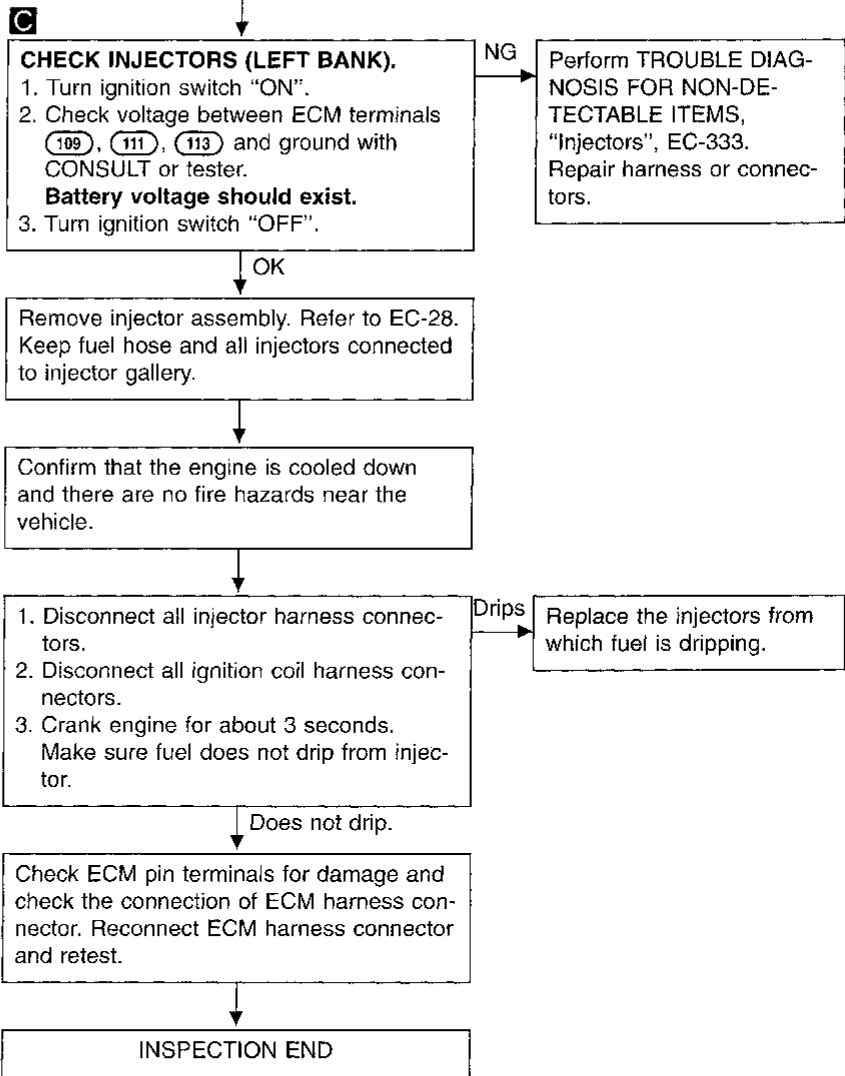
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TROUBLE DIAGNOSIS FOR DTC P0175

Fuel Injection System Function (Left bank) (Rich side) (DTC: 0209) (Cont'd)



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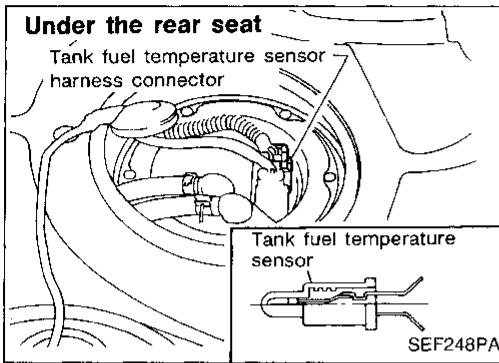
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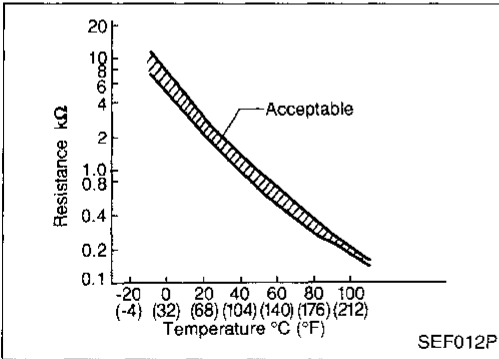
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TROUBLE DIAGNOSIS FOR DTC P0180



Tank Fuel Temperature Sensor (0402)

The tank fuel 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

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Causes)
P0180 0402	<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.) Tank fuel temperature sensor

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Wait at least 12 seconds.

OR



- 1) Turn ignition switch "ON" and wait at least 12 seconds.
- 2) Select "MODE 3" with GST.

OR

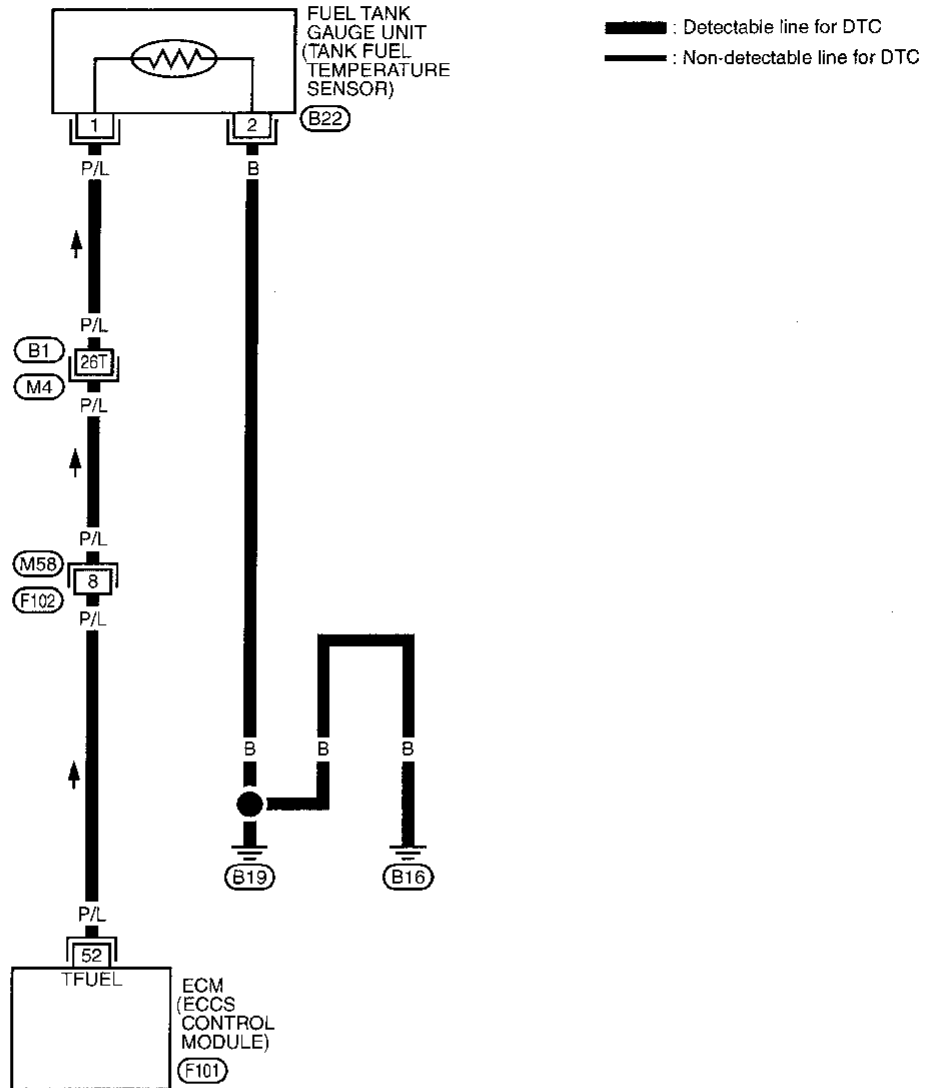


- 1) Turn ignition switch "ON" and wait at least 12 seconds.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

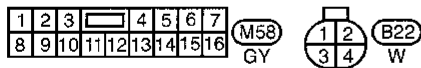
TROUBLE DIAGNOSIS FOR DTC P0180

Tank Fuel Temperature Sensor (0402) (Cont'd)

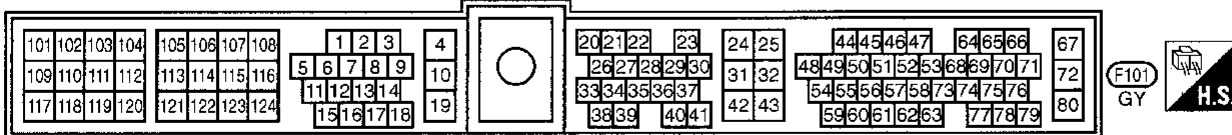
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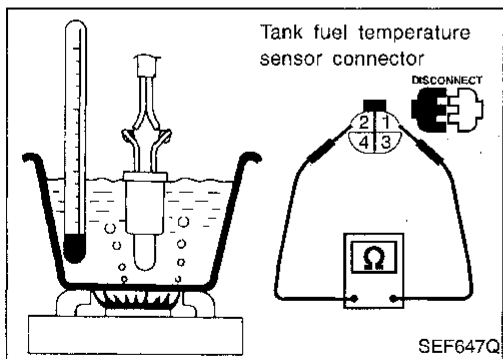
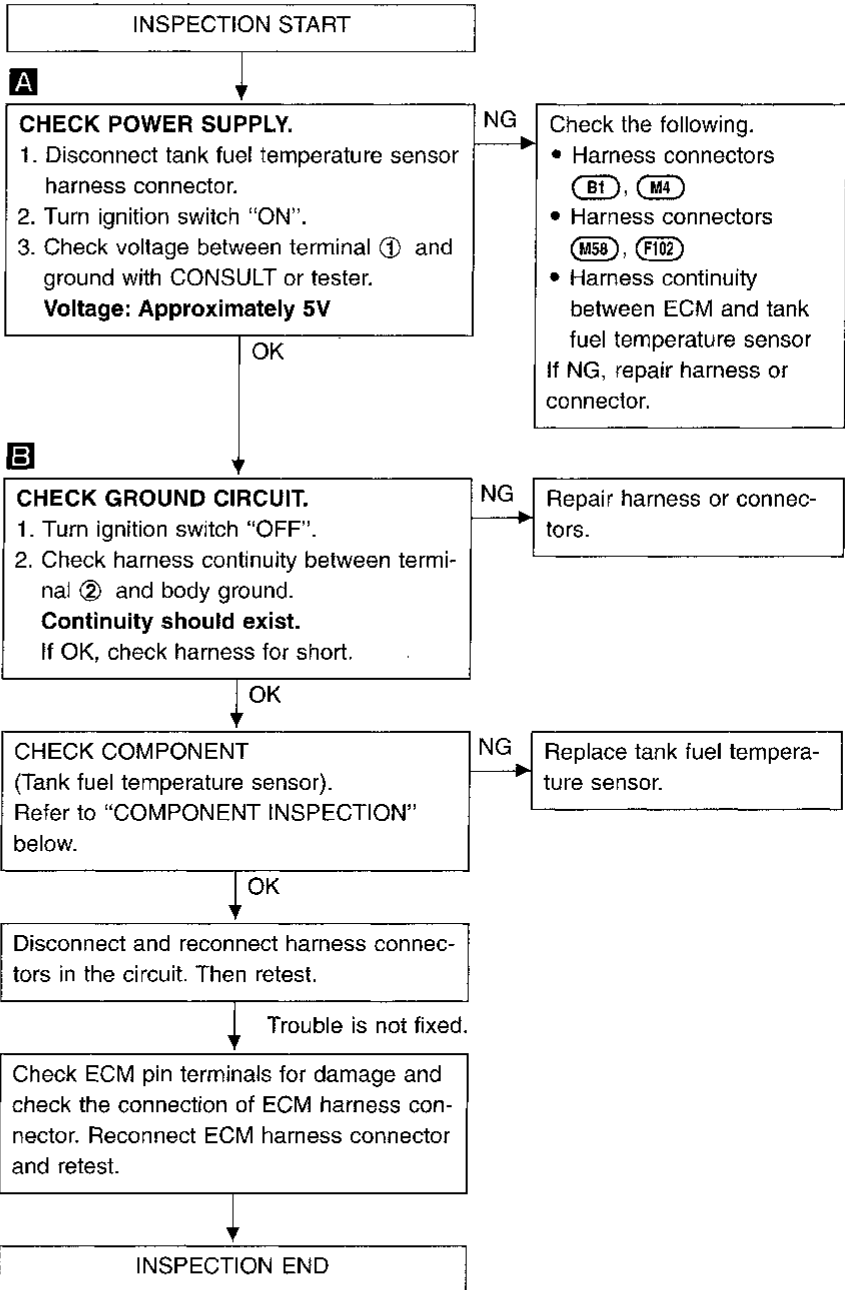
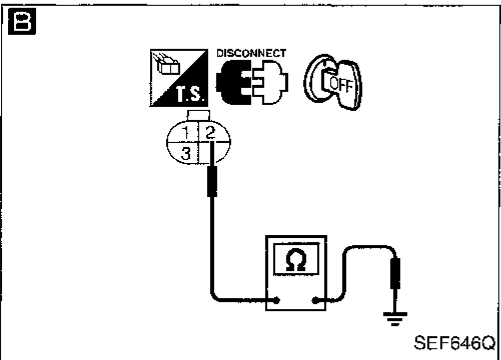
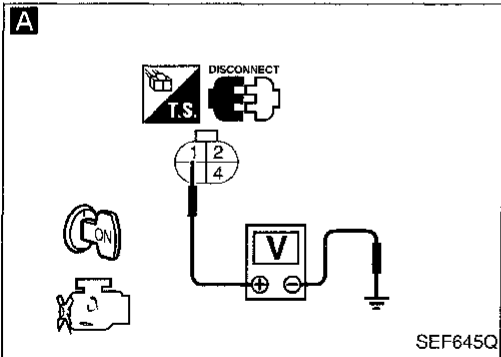
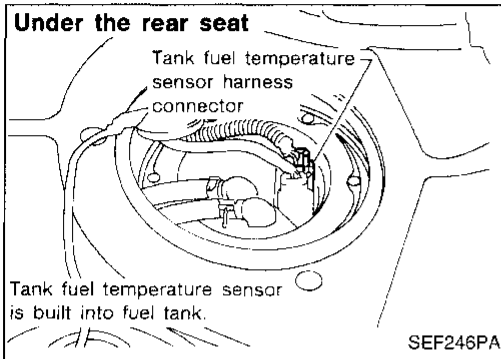


Refer to last page (Foldout page).



TROUBLE DIAGNOSIS FOR DTC P0180

Tank Fuel Temperature Sensor (0402) (Cont'd) DIAGNOSTIC PROCEDURE



COMPONENT INSPECTION

Tank fuel temperature sensor

Check resistance as shown in the figure.

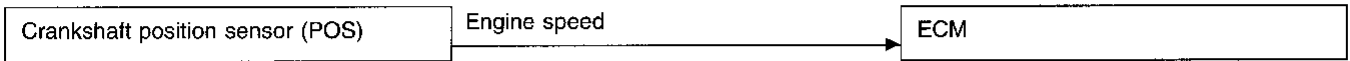
Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace tank fuel temperature sensor.

No. 1 - 6 Cylinder Misfire, Multiple Cylinder Misfire (DTC: 0701 - 0603)

ON-BOARD DIAGNOSIS LOGIC

If misfire occurs, the engine speed will fluctuate. If the fluctuation is detected by the crankshaft position sensor (POS), the misfire is diagnosed. The misfire detection logic consists of the following two conditions.



1. One Trip Detection Logic (Three Way Catalyst Damage)

When a misfire is detected which will overheat and damage the three way catalyst, the malfunction indicator lamp (MIL) will start blinking; even during the first trip. In this condition, ECM monitors the misfire every 200 engine revolutions.

If the misfire frequency decreases to a level that will not damage the three way catalyst, the MIL will change from blinking to lighting up.


(After the first trip detection, the MIL will light up from engine starting. If a misfire is detected that will cause three way catalyst damage, the MIL will start blinking.)

2. Two Trip Detection Logic (Exhaust quality deterioration)


When a misfire that will not damage the three way catalyst (but will affect exhaust emission) occurs, the malfunction indicator lamp will light up based on the second consecutive trip detection logic. In this condition, ECM monitors the misfire for each 1,000 revolutions of the engine.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0300 (0701)	• Multiple cylinders misfire.	<ul style="list-style-type: none"> • Improper spark plug • Insufficient compression • Incorrect fuel pressure • EGR valve • The injector circuit is open or shorted. • Injectors • Intake air leaks • The ignition secondary circuit is open or shorted. • Lack of fuel • Magnetized signal plate (flywheel)
P0301 (0608)	• No. 1 cylinder misfires.	
P0302 (0607)	• No. 2 cylinder misfires.	
P0303 (0606)	• No. 3 cylinder misfires.	
P0304 (0605)	• No. 4 cylinder misfires.	
P0305 (0604)	• No. 5 cylinder misfires.	
P0306 (0603)	• No. 6 cylinder misfires.	


DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE (Overall)

-  1) Turn ignition switch "ON", and select "DATA MONITOR" mode with CONSULT.
 2) Start engine and warm it up sufficiently.
 3) Turn ignition switch "OFF" and wait at least 5 seconds.
 4) Start engine again and drive at 1,500 - 3,000 rpm for at least 8 minutes.

OR

-  1) Start engine and warm it up sufficiently.
 2) Turn ignition switch "OFF" and wait at least 5 seconds.
 3) Start engine again and drive at 1,500 - 3,000 rpm for at least 8 minutes.
 4) Select "MODE 3" with GST.

OR

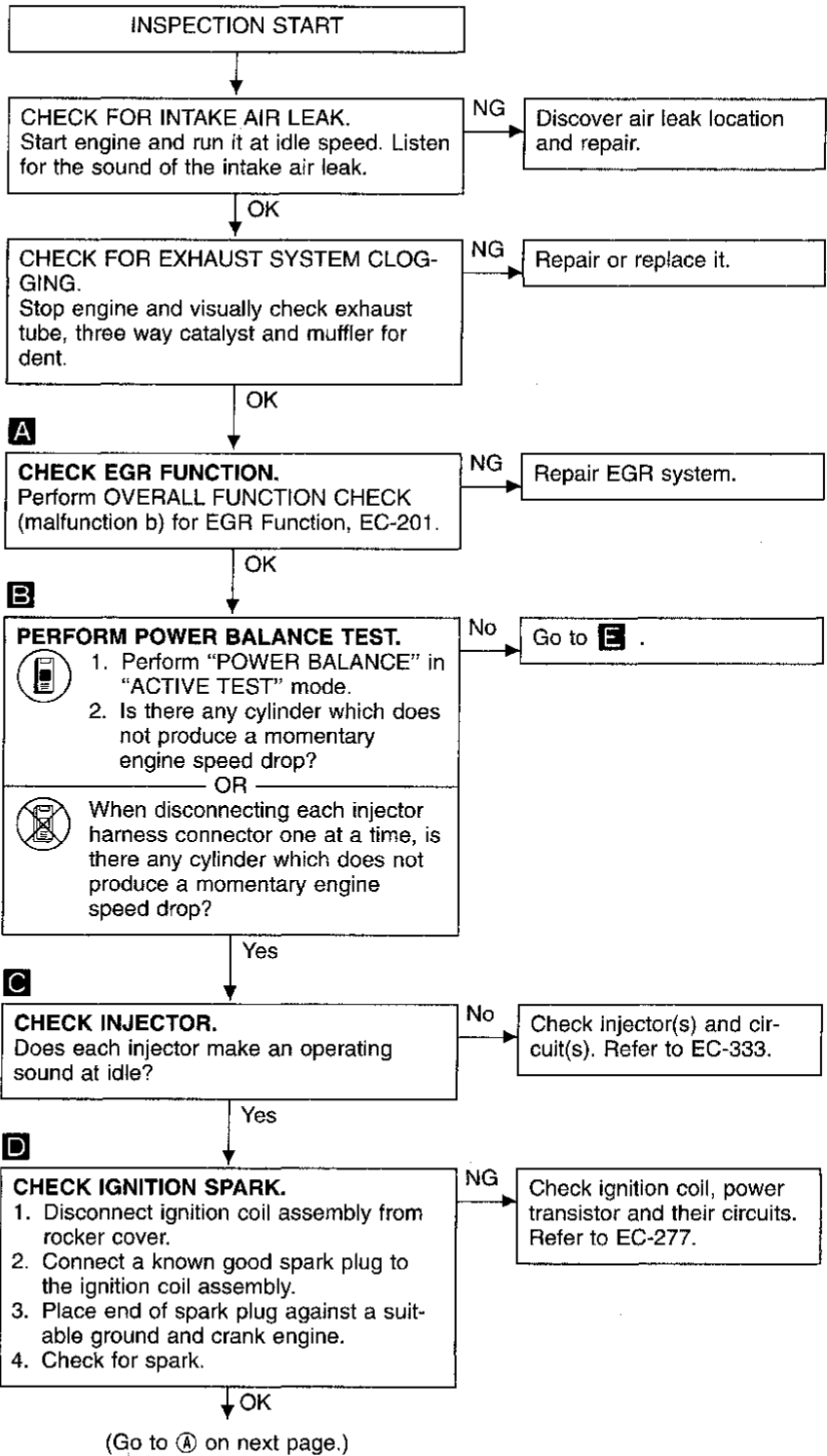
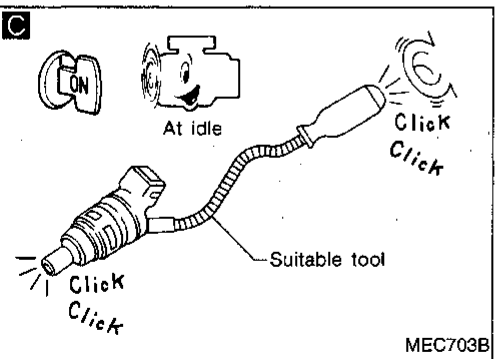
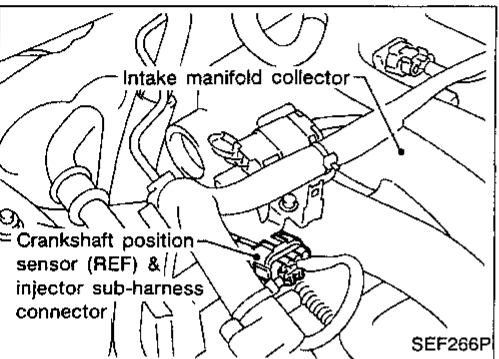
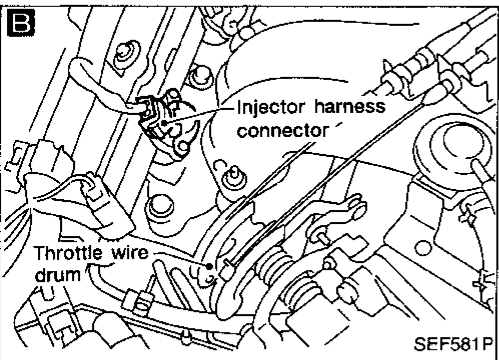
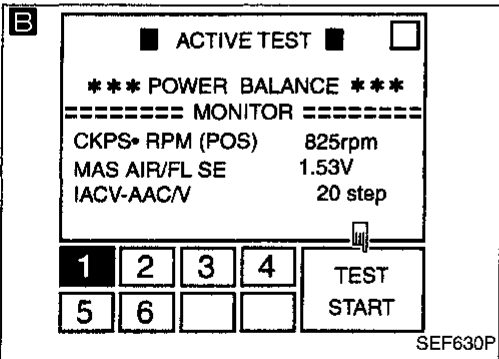
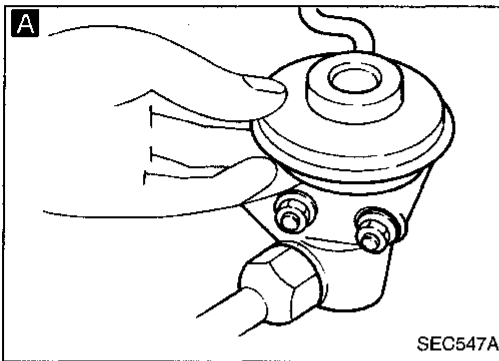
-  1) Start engine and warm it up sufficiently.
 2) Turn ignition switch "OFF" and wait at least 5 seconds.
 3) Start engine again and drive at 1,500 - 3,000 rpm for at least 8 minutes.
 4) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
 5) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

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TROUBLE DIAGNOSIS FOR DTC P0300 - P0306

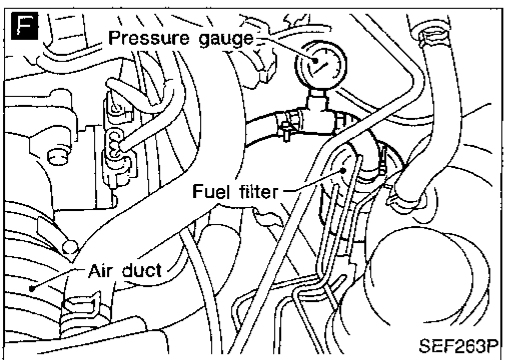
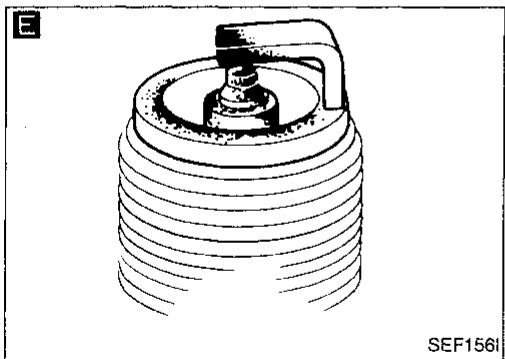
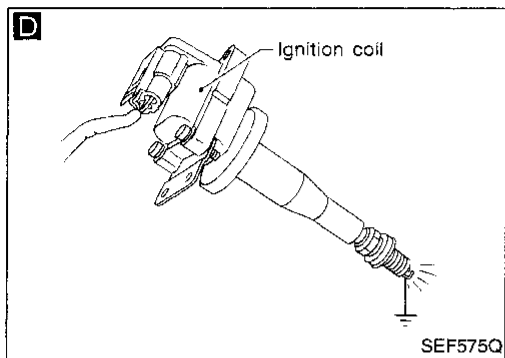
No. 1 - 6 Cylinder Misfire, Multiple Cylinder Misfire (DTC: 0701 - 0603) (Cont'd)

DIAGNOSTIC PROCEDURE



TROUBLE DIAGNOSIS FOR DTC P0300 - P0306

No. 1 - 6 Cylinder Misfire, Multiple Cylinder Misfire (DTC: 0701 - 0603) (Cont'd)



E **CHECK SPARK PLUGS.**
Remove the spark plugs and check for fouling, etc.

NG → Repair or replace spark plug(s).

OK ↓

F **CHECK FUEL PRESSURE.**
1. Release fuel pressure to zero. Refer to EC-27.
2. Install fuel pressure gauge and check fuel pressure.
At idle:
Approx. 235 kPa
(2.4 kg/cm², 34 psi)

NG → Check fuel pump and circuit.

OK ↓

CHECK COMPRESSION PRESSURE.
• Check compression pressure.
Standard:
kPa (kg/cm², psi)/300 rpm
1,275 (13.0, 185)
Minimum:
kPa (kg/cm², psi)/300 rpm
981 (10.0, 142)
Difference between each cylinder:
kPa (kg/cm², psi)/300 rpm
98 (1.0, 14)

NG → Check pistons, piston rings, valves, valve seats and cylinder head gaskets.

OK ↓

CHECK IGNITION TIMING.
Perform "BASIC INSPECTION", EC-70.

NG → Adjust ignition timing.

OK ↓

CHECK MASS AIR FLOW SENSOR.
Check "MASS AIR FLOW" in "DATA MONITOR" mode with CONSULT.
2.0 - 6.0 gm/sec: at idling
7.0 - 20.0 gm/sec: at 2,500 rpm
OR
Check "mass air flow" in MODE 1 with GST.
2.0 - 6.0 gm/sec: at idling
7.0 - 20.0 gm/sec: at 2,500 rpm

NG → Check connectors for rusted terminals or loose connections in the mass air flow sensor circuit or engine grounds. Refer to EC-108. If NG, repair or replace it.

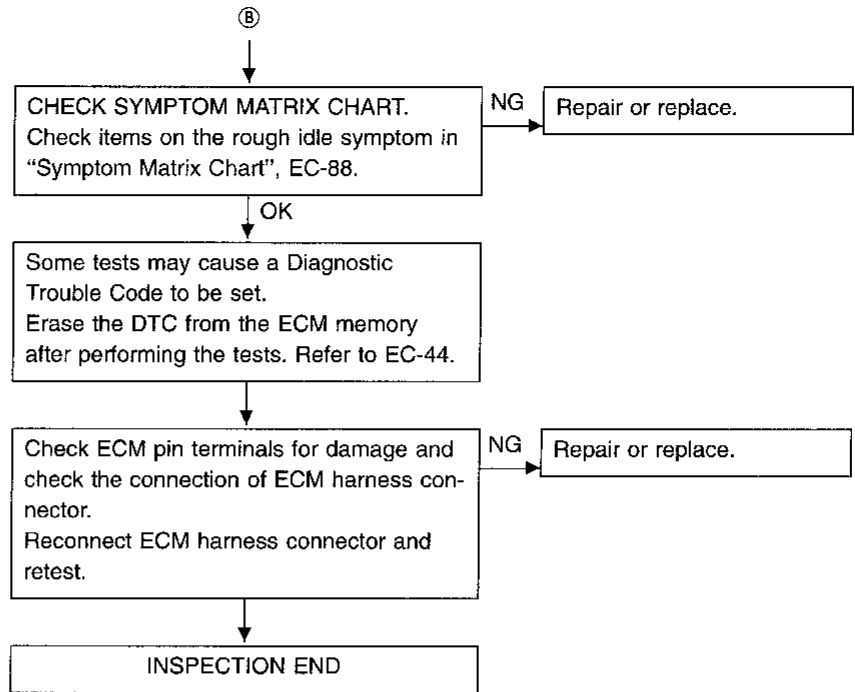
OK ↓

(Go to ⑧ on next page.)

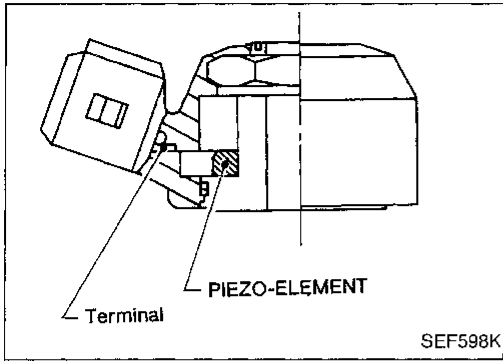
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TROUBLE DIAGNOSIS FOR DTC P0300 - P0306

No. 1 - 6 Cylinder Misfire, Multiple Cylinder Misfire (DTC: 0701 - 0603) (Cont'd)



TROUBLE DIAGNOSIS FOR DTC P0325



Knock Sensor (KS) (DTC: 0304)

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 is not stored in the ECM for the knock sensor.
The MIL will not light for knock sensor malfunction.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0325 0304	<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

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 2) Start engine and run it for at least 5 seconds at idle speed.

OR



- 1) Start engine and run it for at least 5 seconds at idle speed.
- 2) Select "MODE 3" with GST.

OR

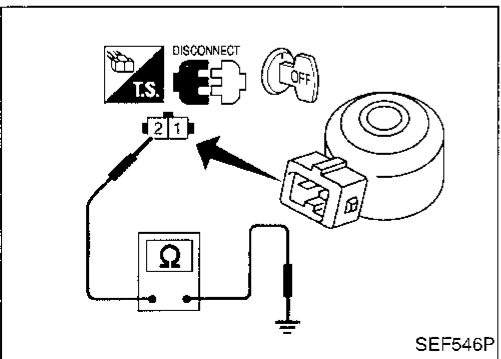
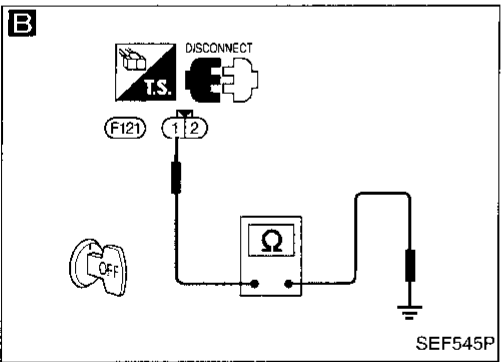
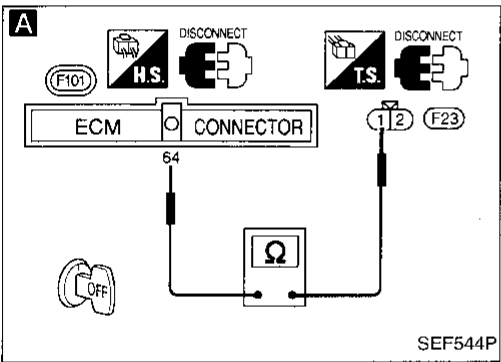
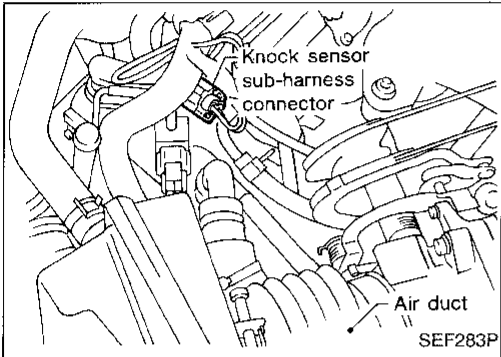
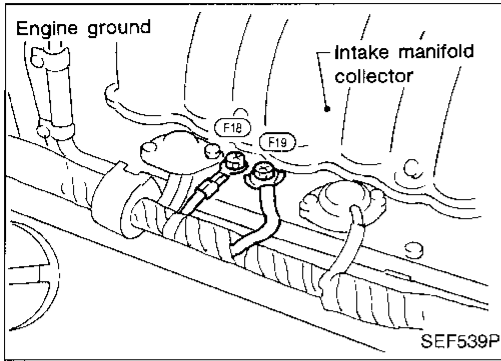


- 1) Start engine and run it for at least 5 seconds at idle speed.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0325

Knock Sensor (KS) (DTC: 0304) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

Loosen and retighten engine ground screws.

A
CHECK INPUT SIGNAL CIRCUIT-1.
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector and knock sensor sub-harness connector.
3. Check harness continuity between terminal ① and ECM terminal ④.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

B
CHECK INPUT SIGNAL CIRCUIT-2.
Check harness continuity between terminal ① and engine ground.
Continuity should exist.
If OK, check harness for short.
It is necessary to use an ohmmeter which can measure more than 10 MΩ.

NG → Check the following.
• Harness for open or short between knock sensor sub-harness connector and knock sensor
If NG, repair harness or connectors.
• Knock sensor (Component inspection)
If NG, replace knock sensor.

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

COMPONENT INSPECTION

Knock sensor

1. Disconnect knock sensor harness connector.
2. Check resistance between terminal ② and ground.

Approximately 500 - 620 kΩ [at 25°C (77°F)]

- It is necessary to use an ohmmeter which can measure more than 10 MΩ.

CAUTION:

Do not use any knock sensors that have been dropped or physically damaged. Use a new one.

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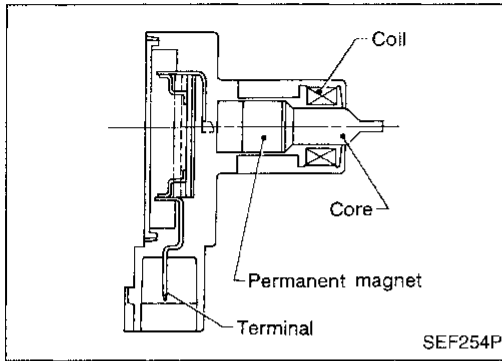
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Crankshaft Position Sensor (CKPS) (POS) (DTC: 0802)

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate (flywheel). It detects the crankshaft position signal (1° signal).

The sensor consists of a permanent magnet, core and coil.

When engine is running, the gap between the sensor and the gear teeth (cogs) will periodically change. Permeability near the sensor also changes.

Due to the permeability change, the magnetic flux near the core is changed. Therefore, the voltage signal generated in the coil is changed.

The ECM receives the voltage signal and detects the crankshaft position signal (1° signal).

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0335 0802	<ul style="list-style-type: none"> • 1° signal is not sent to ECM for the first few seconds during engine cranking. • 1° signal is not sent to ECM during engine running. 	<ul style="list-style-type: none"> • Harness or connectors (The crankshaft position sensor (POS) circuit is open or shorted.) • Crankshaft position sensor (POS) • Starter motor (Refer to EL section.) • Starting system circuit (Refer to EL section.) • Dead (Weak) battery

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

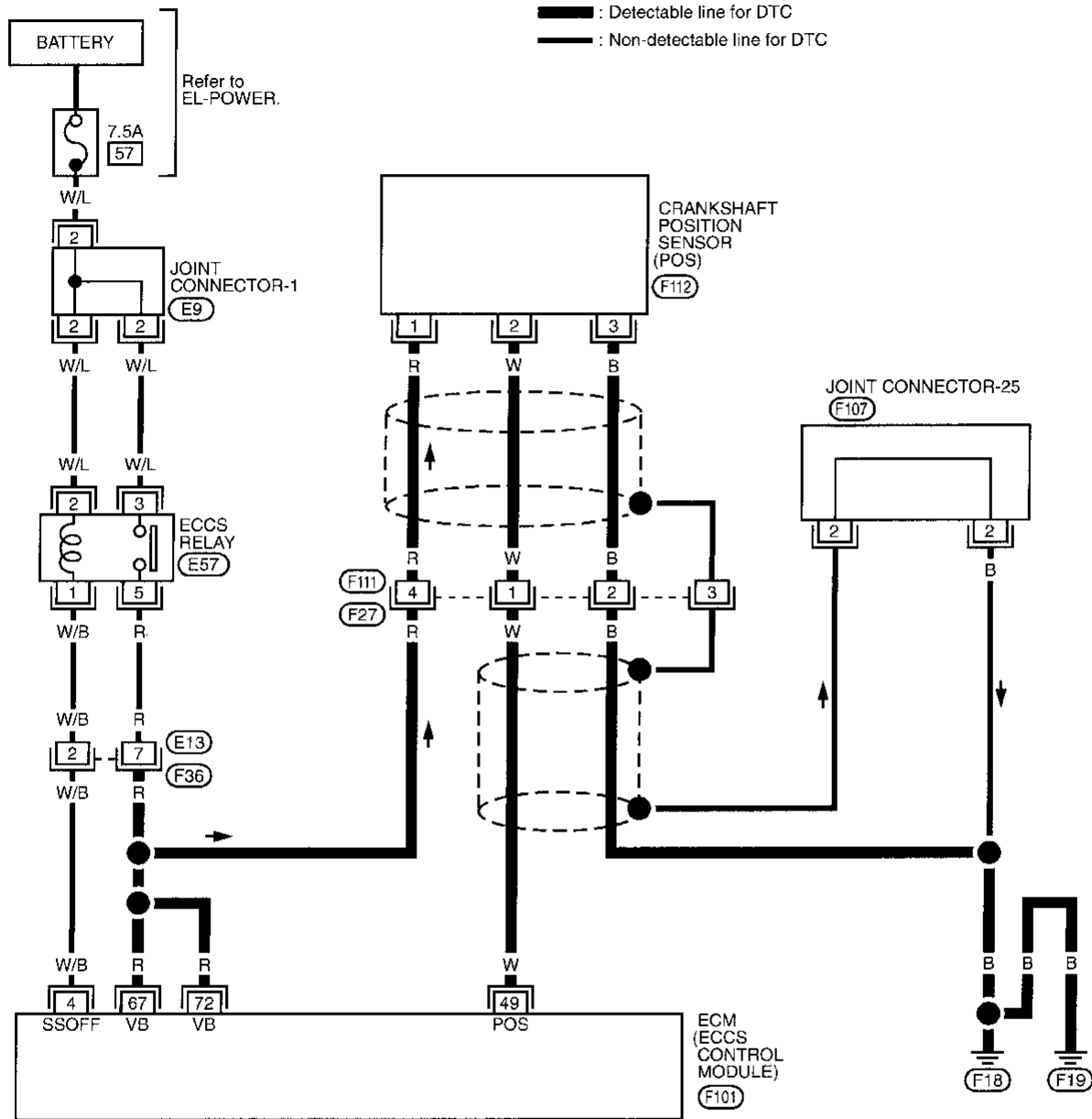
Before performing the following procedure, confirm that battery voltage is more than 10.5V.

- | | |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | <ol style="list-style-type: none"> 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT. 2) Crank engine for at least 2 seconds. |
| OR | |
| | <ol style="list-style-type: none"> 1) Crank engine for at least 2 seconds. 2) Select "MODE 3" with GST. |
| OR | |
| | <ol style="list-style-type: none"> 1) Crank engine for at least 2 seconds. 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON". 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM. |

TROUBLE DIAGNOSIS FOR DTC P0335

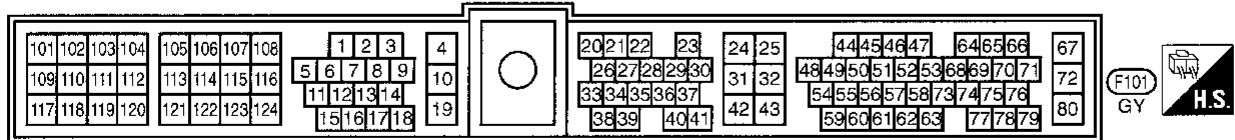
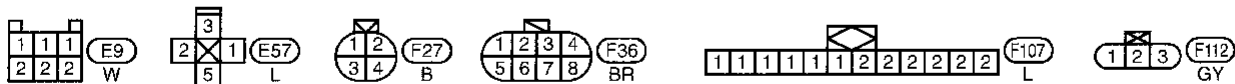
Crankshaft Position Sensor (CKPS) (POS) (DTC: 0802) (Cont'd)

EC-POS-01



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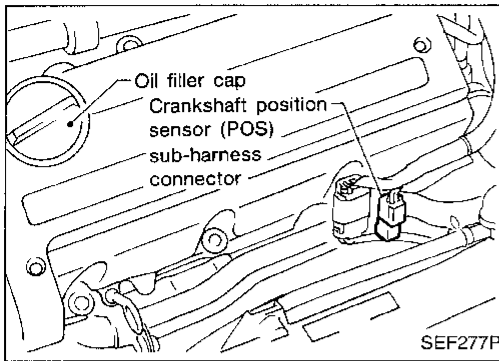
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TROUBLE DIAGNOSIS FOR DTC P0335

Crankshaft Position Sensor (CKPS) (POS) (DTC: 0802) (Cont'd)

DIAGNOSTIC PROCEDURE



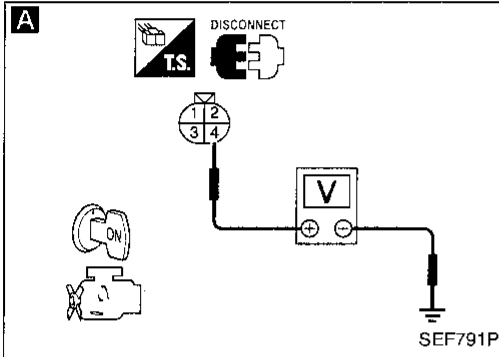
INSPECTION START

A

CHECK POWER SUPPLY-I.

1. Turn ignition switch "OFF".
2. Disconnect crankshaft position sensor (POS) sub-harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ④ and ground with CONSULT or tester.

Voltage: Battery voltage



NG → Check the following.

- Harness connectors (F36, E13)
- Harness continuity between crankshaft position sensor (POS) sub-harness connector and ECCS relay
- Harness continuity between crankshaft position sensor (POS) sub-harness connector and ECM

If NG, repair harness or connectors.

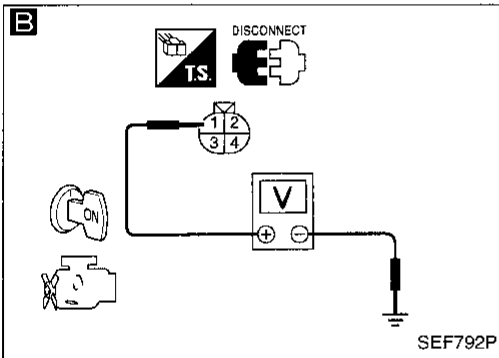
OK →

B

CHECK POWER SUPPLY-II.

Check voltage between terminal ① and ground with CONSULT or tester.

Voltage: Approximately 5V



NG → Repair harness or connectors.

OK →

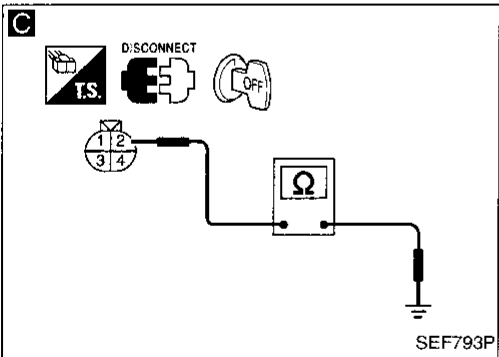
C

CHECK GROUND CIRCUIT-I.

1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.
3. Check harness continuity between terminal ② and engine ground.

Continuity should exist.

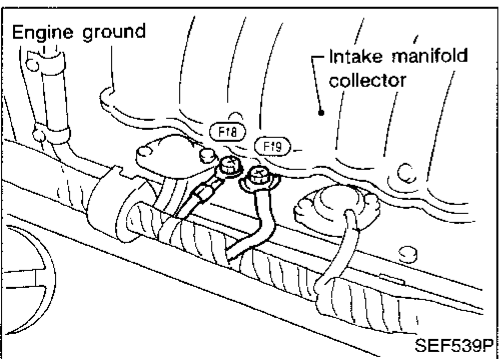
If OK, check harness for short.



NG → Repair harness or connectors.

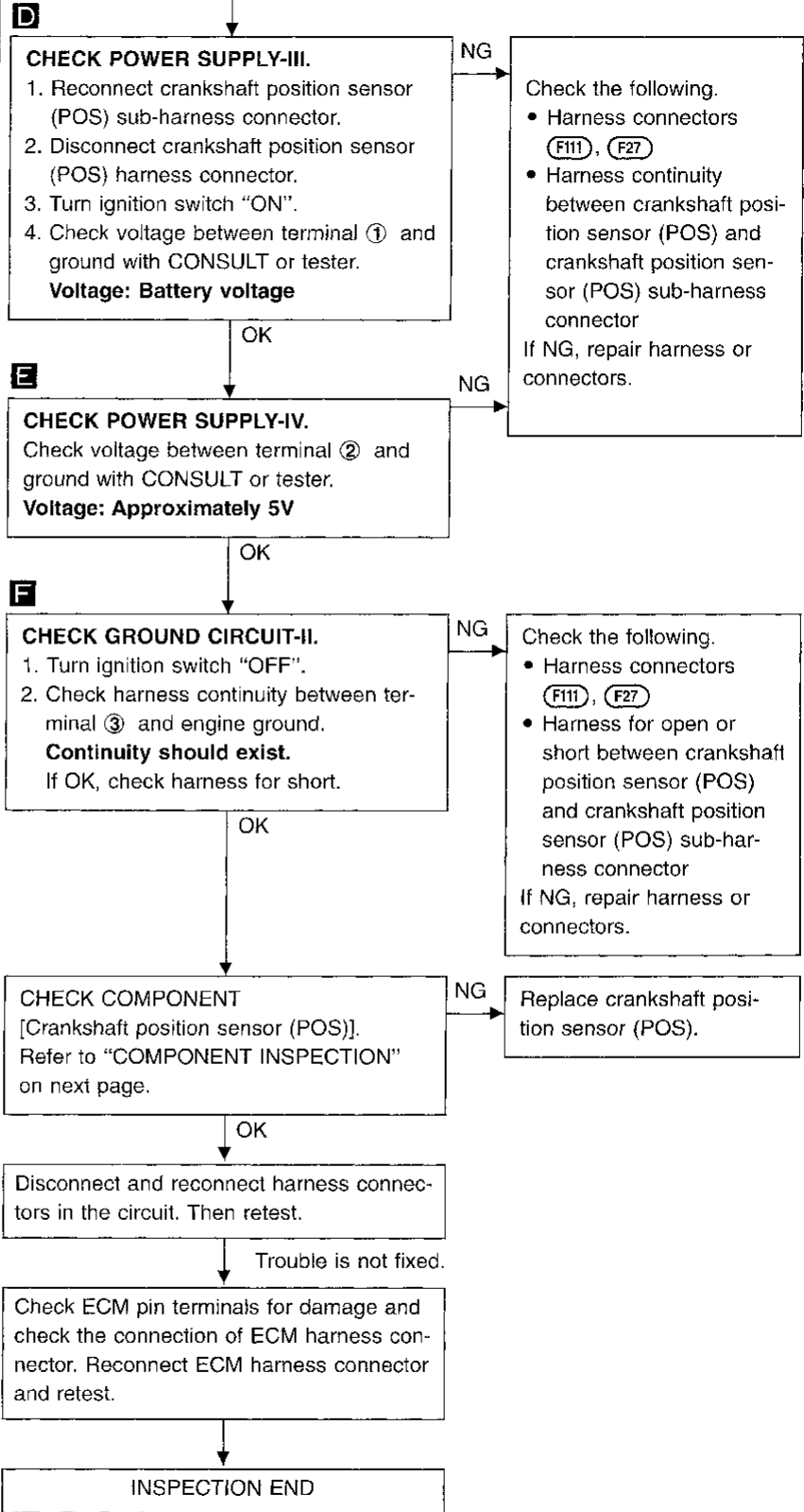
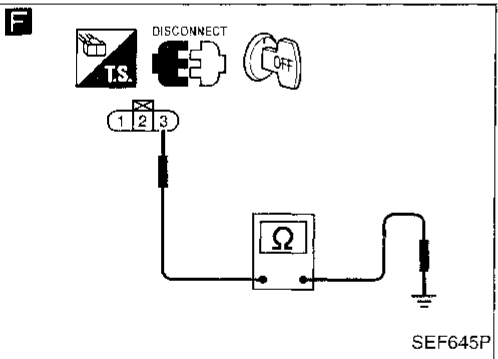
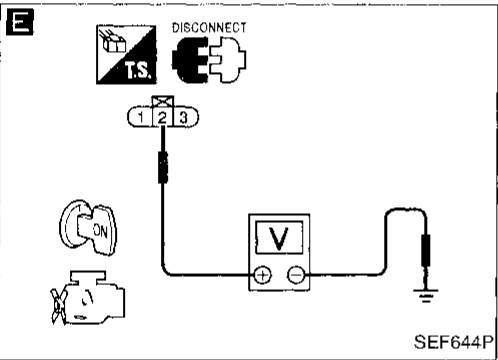
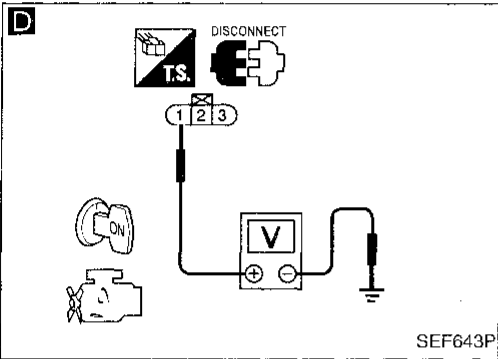
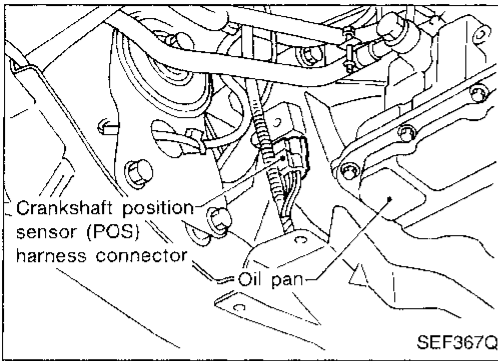
OK →

Ⓐ



TROUBLE DIAGNOSIS FOR DTC P0335

Crankshaft Position Sensor (CKPS) (POS) (DTC: 0802) (Cont'd)



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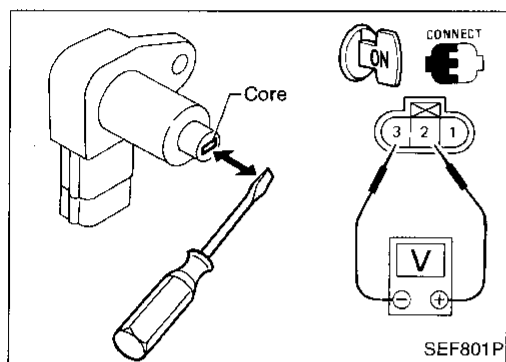
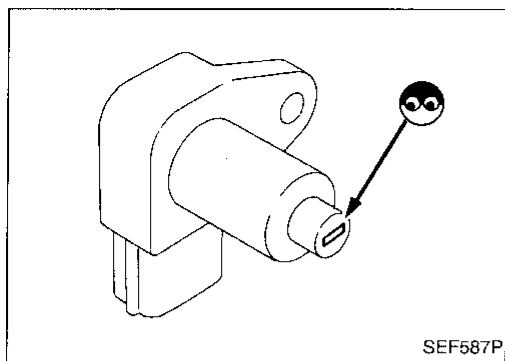
TROUBLE DIAGNOSIS FOR DTC P0335

Crankshaft Position Sensor (CKPS) (POS) (DTC: 0802) (Cont'd)

COMPONENT INSPECTION

Crankshaft position sensor (POS)

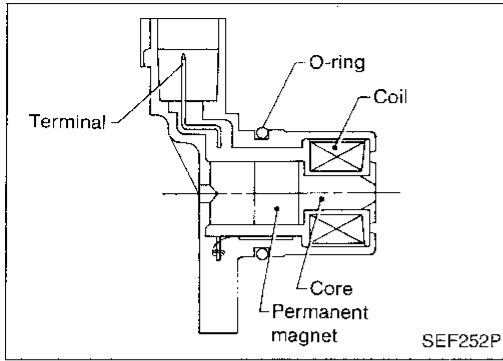
1. Disconnect crankshaft position sensor (POS) harness connector.
2. Loosen the fixing bolt of the sensor.
3. Remove the sensor.
4. Visually check the sensor for chipping.
5. Reconnect crankshaft position sensor (POS) harness connector.
6. Turn ignition switch "ON".
7. Check voltage between terminals ② and ③ when bringing a screwdriver into contact with, and quickly pulling away from the sensor core.



Terminal	Condition	Voltage
② . ③	Contacted	Approximately 5V
	Pulled away	Approximately 0V

There should be a steady 5V as the screwdriver is drawn away slowly.

If NG, replace crankshaft position sensor (POS).



Camshaft Position Sensor (CMPS) (PHASE) (DTC: 0101)

The camshaft position sensor (PHASE) is located on the engine front cover facing the camshaft sprocket. It detects the cylinder No. signal.

The sensor consists of a permanent magnet, core and coil.

When engine is running, the gap between the sensor and the camshaft sprocket will periodically change. Permeability near the sensor also changes.

Due to the permeability change, the magnetic flux near the core is changed. Therefore, the voltage signal generated in the coil is changed.

The ECM receives the voltage signal and detects the cylinder No. signal.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0340 0101	<ul style="list-style-type: none"> • The cylinder No. signal is not sent to ECM for the first few seconds during engine cranking. • The cylinder No. signal is not sent 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 EL section.) • Starting system circuit (Refer to EL section.)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Note: If both DTC P0340 and P1335, P0335 or P1336 are displayed, perform TROUBLE DIAGNOSIS FOR DTC P1335, P0335 or P1336 first. (See EC-283, 192 or EC-287.)

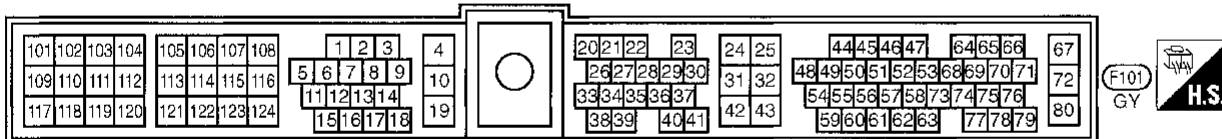
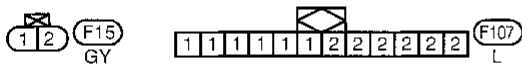
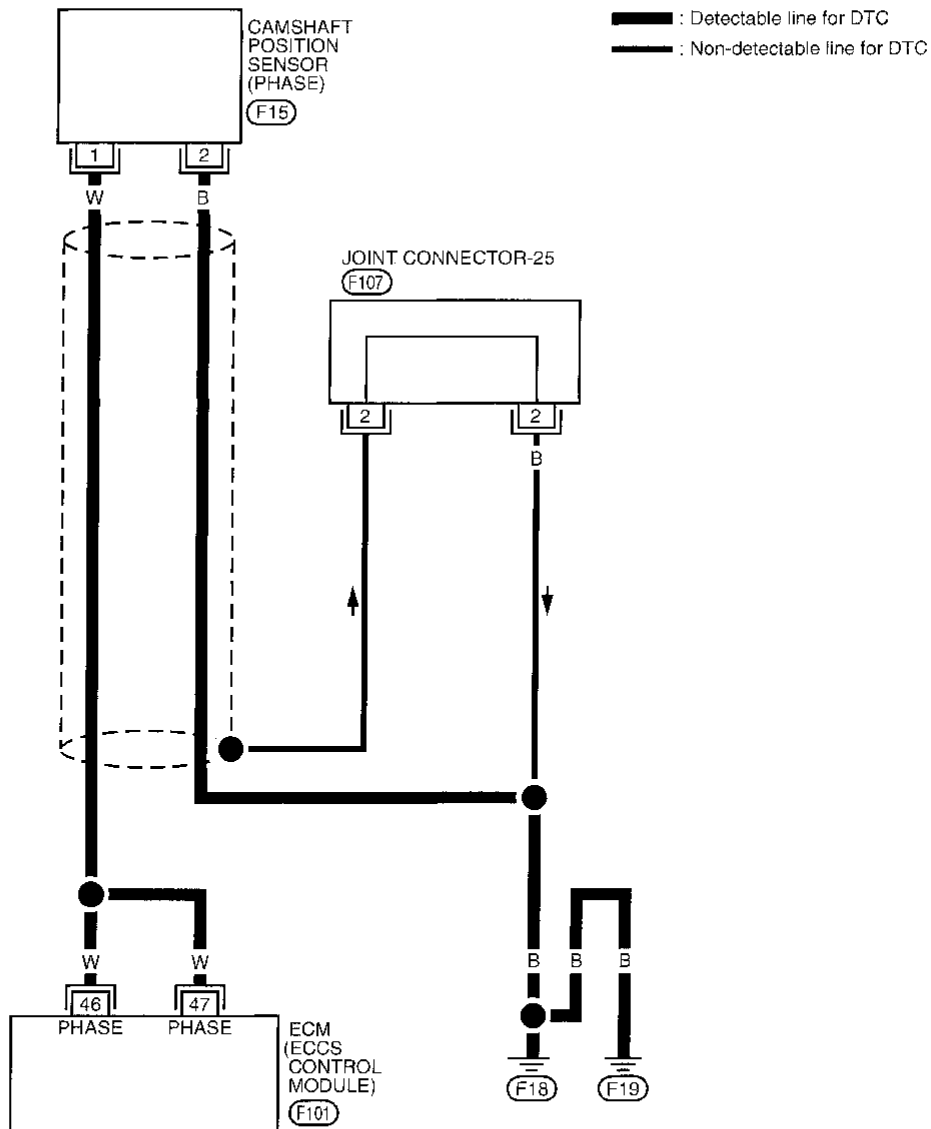
Before performing the following procedure, confirm that battery voltage is more than 10.5V.

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| | <ol style="list-style-type: none"> 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT. 2) Crank engine for at least 2 seconds. |
| OR | |
| | <ol style="list-style-type: none"> 1) Crank engine for at least 2 seconds. 2) Select "MODE 3" with GST. |
| OR | |
| | <ol style="list-style-type: none"> 1) Crank engine for at least 2 seconds. 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON". 3) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM. |

TROUBLE DIAGNOSIS FOR DTC P0340

Camshaft Position Sensor (CMPS) (PHASE) (DTC: 0101) (Cont'd)

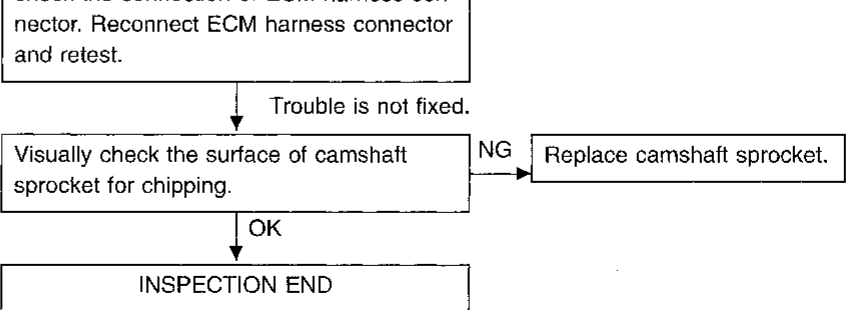
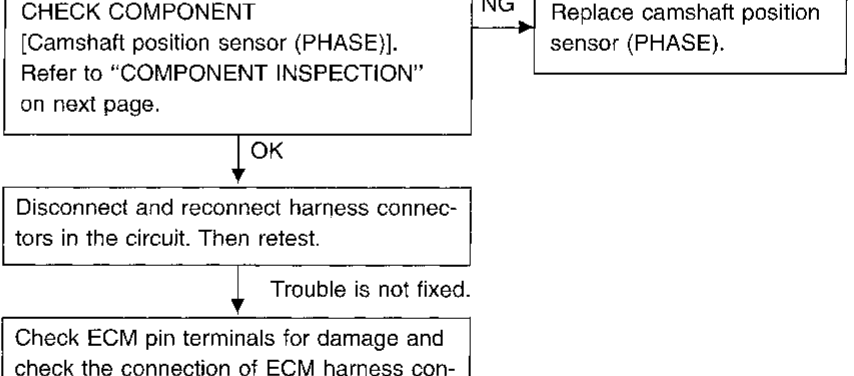
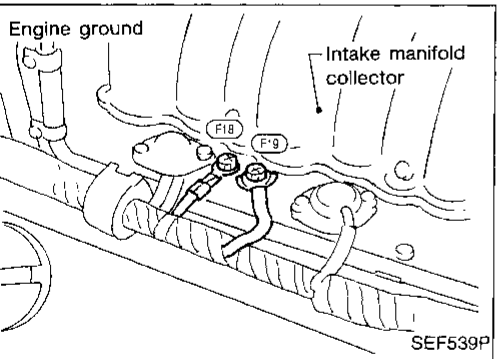
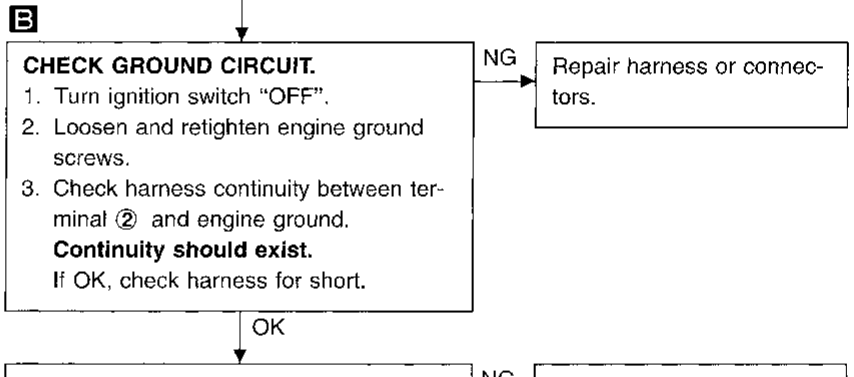
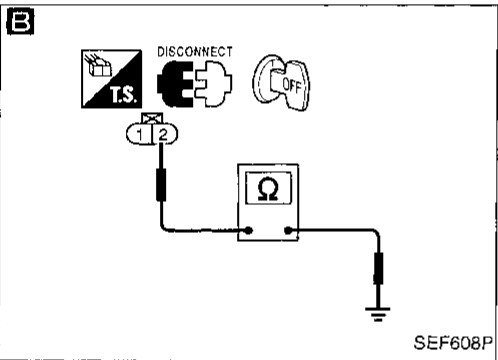
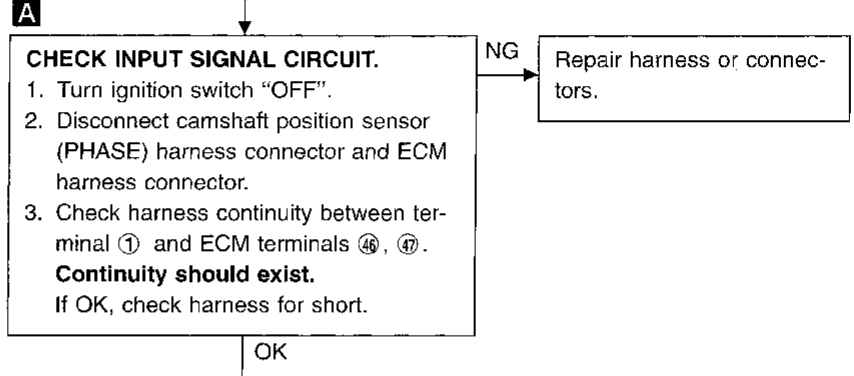
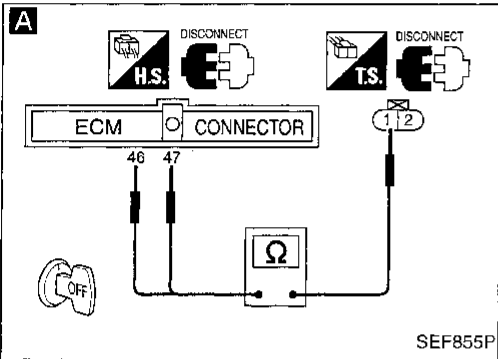
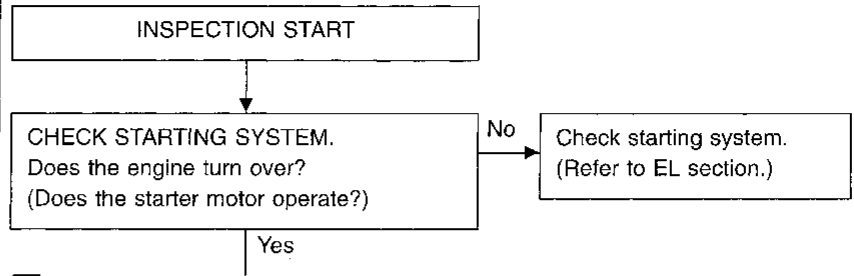
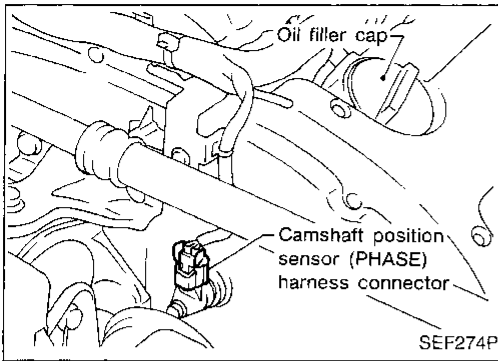
EC-PHASE-01



TROUBLE DIAGNOSIS FOR DTC P0340

Camshaft Position Sensor (CMPS) (PHASE) (DTC: 0101) (Cont'd)

DIAGNOSTIC PROCEDURE



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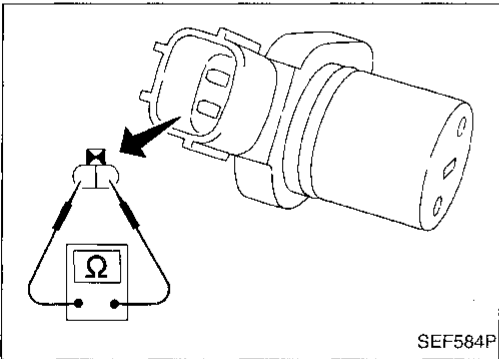
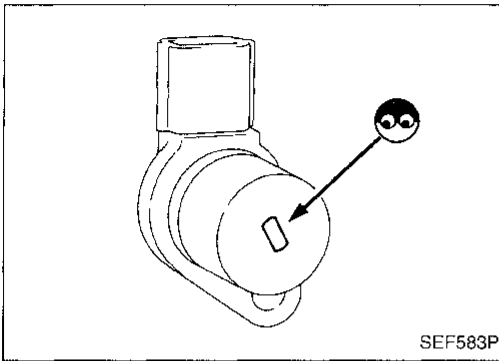
TROUBLE DIAGNOSIS FOR DTC P0340

Camshaft Position Sensor (CMPS) (PHASE) (DTC: 0101) (Cont'd)

COMPONENT INSPECTION

Camshaft position sensor (PHASE)

1. Disconnect camshaft position sensor (PHASE) 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.

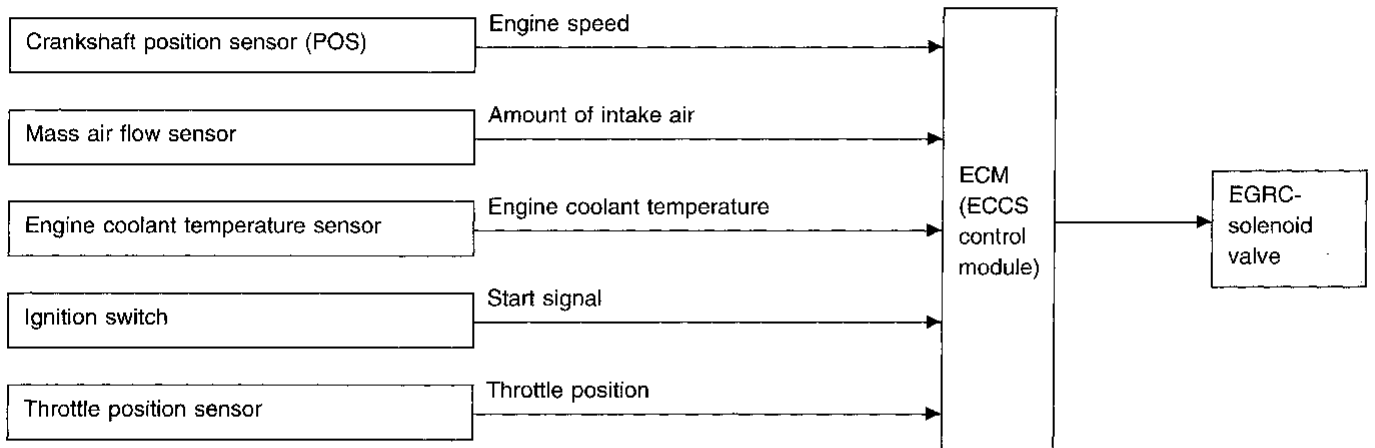
Resistance:

Approximately 1,440 - 1,760 Ω at 20°C (68°F)
(HITACHI make)

Approximately 2,090 - 2,550 Ω at 20°C (68°F)
(MITSUBISHI make)

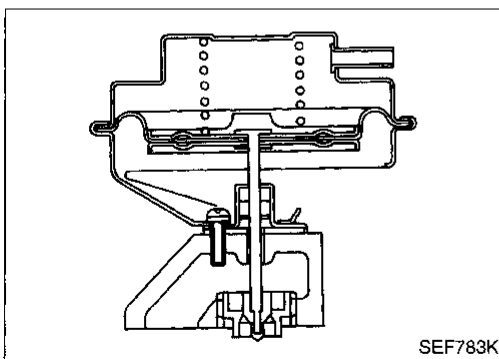
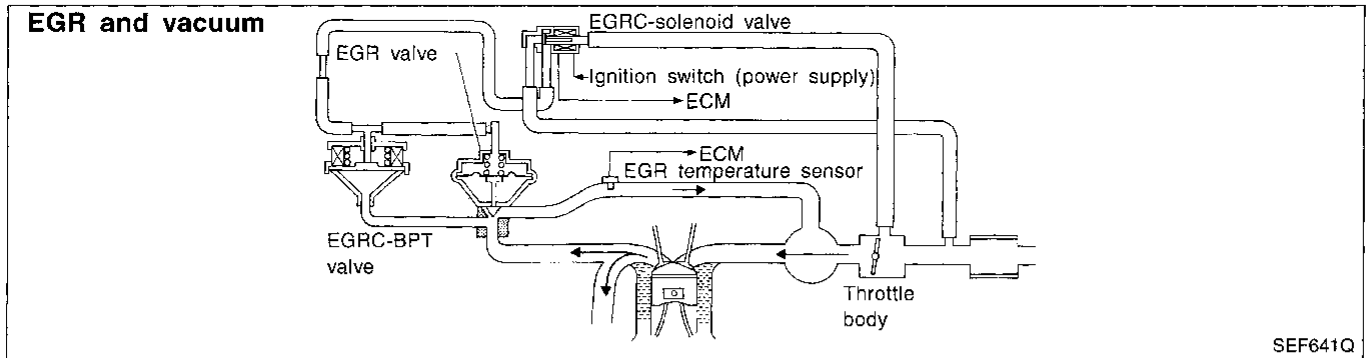
EGR Function (DTC: 0302)

SYSTEM DESCRIPTION



This system cuts and controls vacuum applied to the EGR valve to suit engine operating conditions. This cut-and-control operation is accomplished through the ECM and the EGRC-solenoid valve. When the ECM detects any of the following conditions, current flows through the solenoid valve. This causes the port vacuum to be discharged into the atmosphere and the EGR valve remains closed.

- Low engine coolant temperature
- Engine starting
- Engine stopped
- Engine idling
- Excessively high engine coolant temperature
- Mass air flow sensor malfunction



COMPONENT DESCRIPTION

Exhaust gas recirculation (EGR) valve

The EGR valve controls the amount of exhaust gas routed to the intake manifold. Vacuum is applied to the EGR valve in response to throttle valve opening. The vacuum controls the movement of a taper valve connected to the vacuum diaphragm in the EGR valve.

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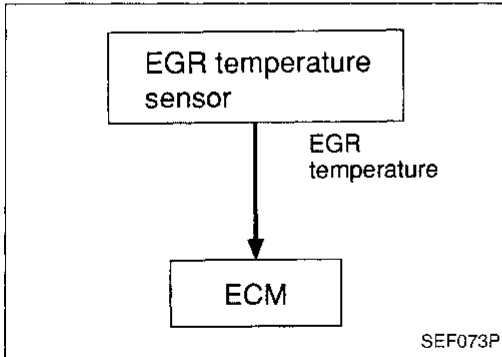
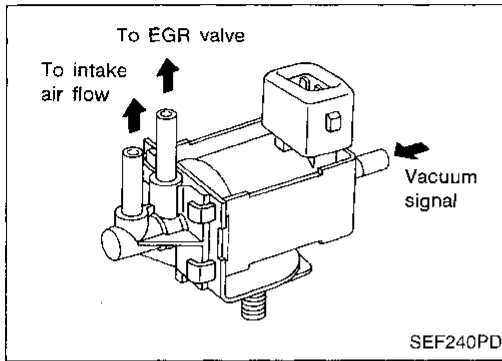
TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

EGRC-solenoid valve

The EGRC-solenoid valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the coil in the solenoid valve is energized. A plunger will then move to cut the vacuum signal (from the throttle body to the EGR valve).

When the ECM sends an OFF signal, the vacuum signal passes through the solenoid valve. The signal then reaches the EGR valve.



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.

If EGR temperature sensor detects EGR flow under the condition that does not call for EGR, a high-flow malfunction is diagnosed.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0400 0302	A) The exhaust gas recirculation (EGR) flow is excessively low during the specified driving condition.	<ul style="list-style-type: none"> • EGR valve stuck closed • EGRC-BPT valve leaks • Passage blocked • EGRC-solenoid valve • Tube leaking for EGR valve
	B) The exhaust gas recirculation (EGR) flow is excessively high during the specified driving condition.	<ul style="list-style-type: none"> • EGRC-solenoid valve • EGR valve leaking or stuck open

OVERALL FUNCTION CHECK

Use this procedure to check the overall EGR function. During this check, a DTC might not be confirmed.

Before starting with the following procedure, check the engine coolant temperature of the freeze frame data with CONSULT or Generic Scan Tool.

If the engine coolant temperature is higher than or equal to 55°C (131°F), perform only "Procedure for malfunction A".

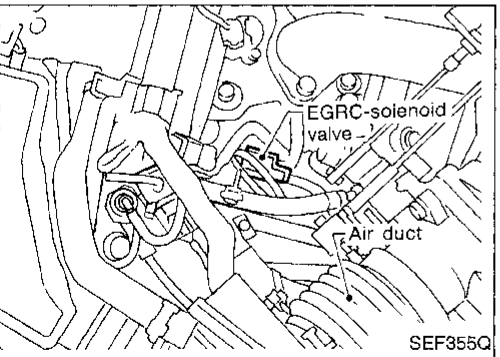
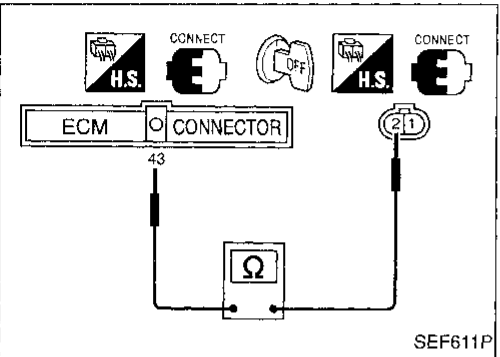
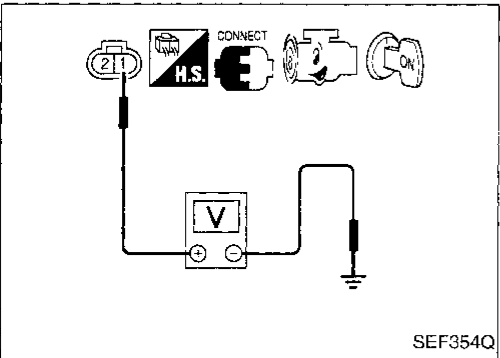
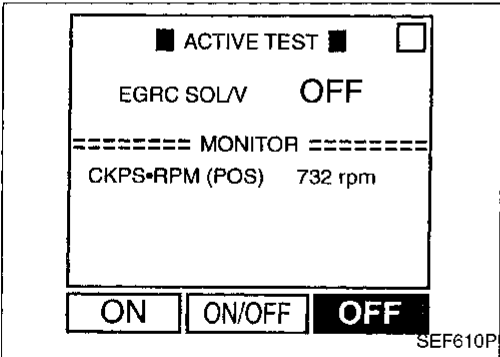
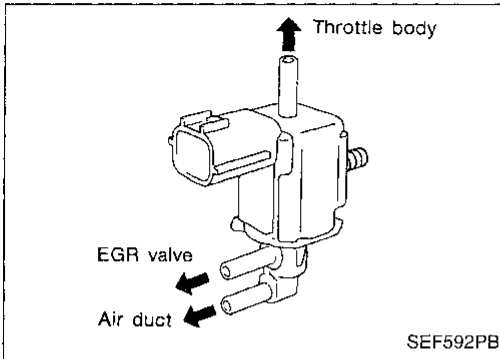
If the engine coolant temperature is lower than 55°C (131°F), perform both "Procedure for malfunction A" and "Procedure for malfunction B".

If the freeze frame data for another malfunction is stored in the ECM, perform both "Procedure for malfunction A" and "Procedure for malfunction B". In this case, check DTCs in the ECM and perform inspections one by one based on "INSPECTION PRIORITY", EC-86.

TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

Procedure for malfunction A



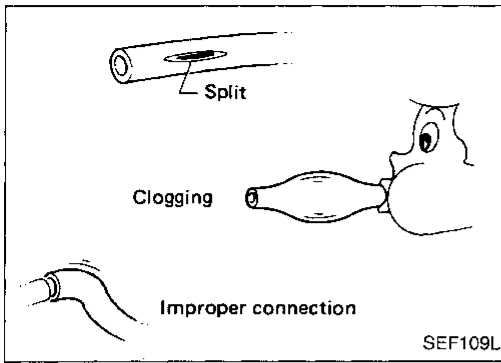
- 1) Start engine and warm it up sufficiently.
- 2) Select "EGRC SOLENOID VALVE" in "ACTIVE TEST" mode with CONSULT and turn the solenoid valve "OFF".
- 3) Check the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm under no load.
EGR valve should lift up and down without sticking.
- 4) Check voltage between EGR temperature sensor harness connector terminal ① and ground at idle speed.
Less than 4.5V should exist.
- 5) Turn ignition switch "OFF".
- 6) Check harness continuity between EGR temperature sensor harness connector terminal ② and ECM terminal ④.
Continuity should exist.
- 7) Perform "COMPONENT CHECK", "EGR temperature sensor". (See page EC-209.)

OR

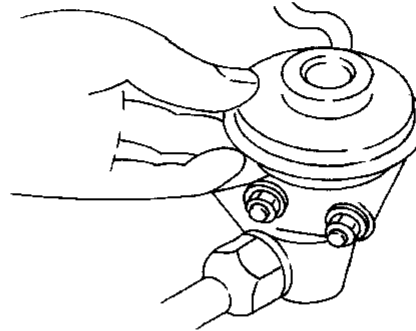
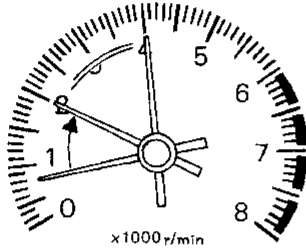
- 1) Disconnect EGRC-solenoid valve harness connector. (The DTC for EGRC-solenoid valve will be displayed, however, ignore it.)
- 2) Start engine and warm it up sufficiently.
- 3) Check the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm under no load.
EGR valve should lift up and down without sticking.
- 4) Reconnect EGRC-solenoid valve harness connector.
- 5) Check voltage between EGR temperature sensor harness connector terminal ① and ground at idle speed.
Less than 4.5V should exist.
- 6) Turn ignition switch "OFF".
- 7) Check harness continuity between EGR temperature sensor harness connector terminal ② and ECM terminal ④.
Continuity should exist.
- 8) Perform "COMPONENT CHECK", "EGR temperature sensor". (See page EC-209.)

TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)



Overall function check



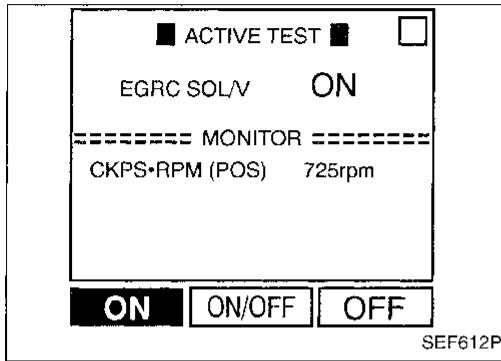
Check the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm.

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TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

Procedure for malfunction B



- 1) Start engine.
- 2) Select "EGRC SOLENOID VALVE" in "ACTIVE TEST" mode with CONSULT and turn the solenoid valve "ON".
- 3) Check for the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm under no load.
EGR valve should be closed and should not lift up.

OR

- 1) Turn ignition switch "ON".
- 2) Confirm the engine coolant temperature is lower than 52°C (126°F) in "Mode 1" with GST. Perform the following steps before its temperature becomes higher than 52°C (126°F).

- 3) Start engine.
- 4) Check for the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm under no load.
EGR valve should be closed and should not lift up.

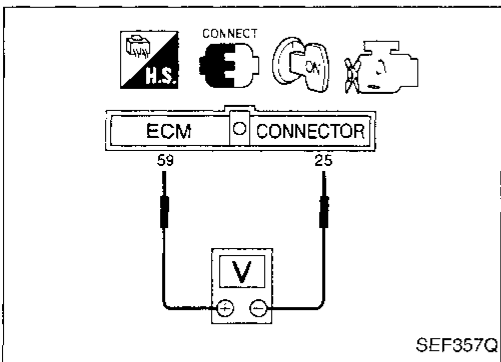
OR

- 1) Turn ignition switch "ON".
- 2) Confirm the voltage between ECM terminals 59 and 25 is higher than 2.24V. Perform the following steps before the voltage becomes lower than 2.24V.

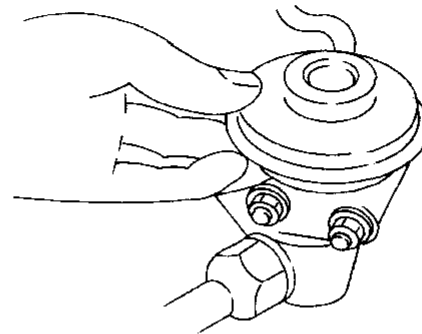
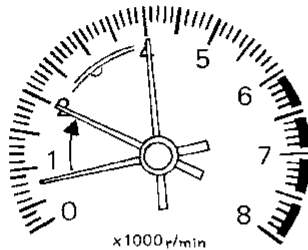
- 3) Start engine.
- 4) Check for the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm under no load.
EGR valve should be closed and should not lift up.

FUEL SYS #1	OPEN
FUEL SYS #2	OPEN
CALC LOAD	0%
COOLANT TEMP	31°C
SHORT FT #1	0%
LONG FT #1	0%
SHORT FT #2	0%
LONG FT #2	0%
ENGINE SPD	0RPM
VEHICLE SPD	0MPH
IGN ADVANCE	1.0°
INTAKE AIR	25°C

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Overall function check



Check the EGR valve lifting when revving engine from 2,000 rpm up to 4,000 rpm.

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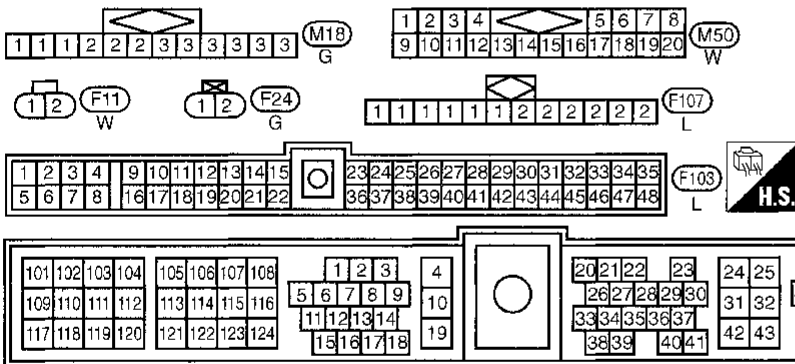
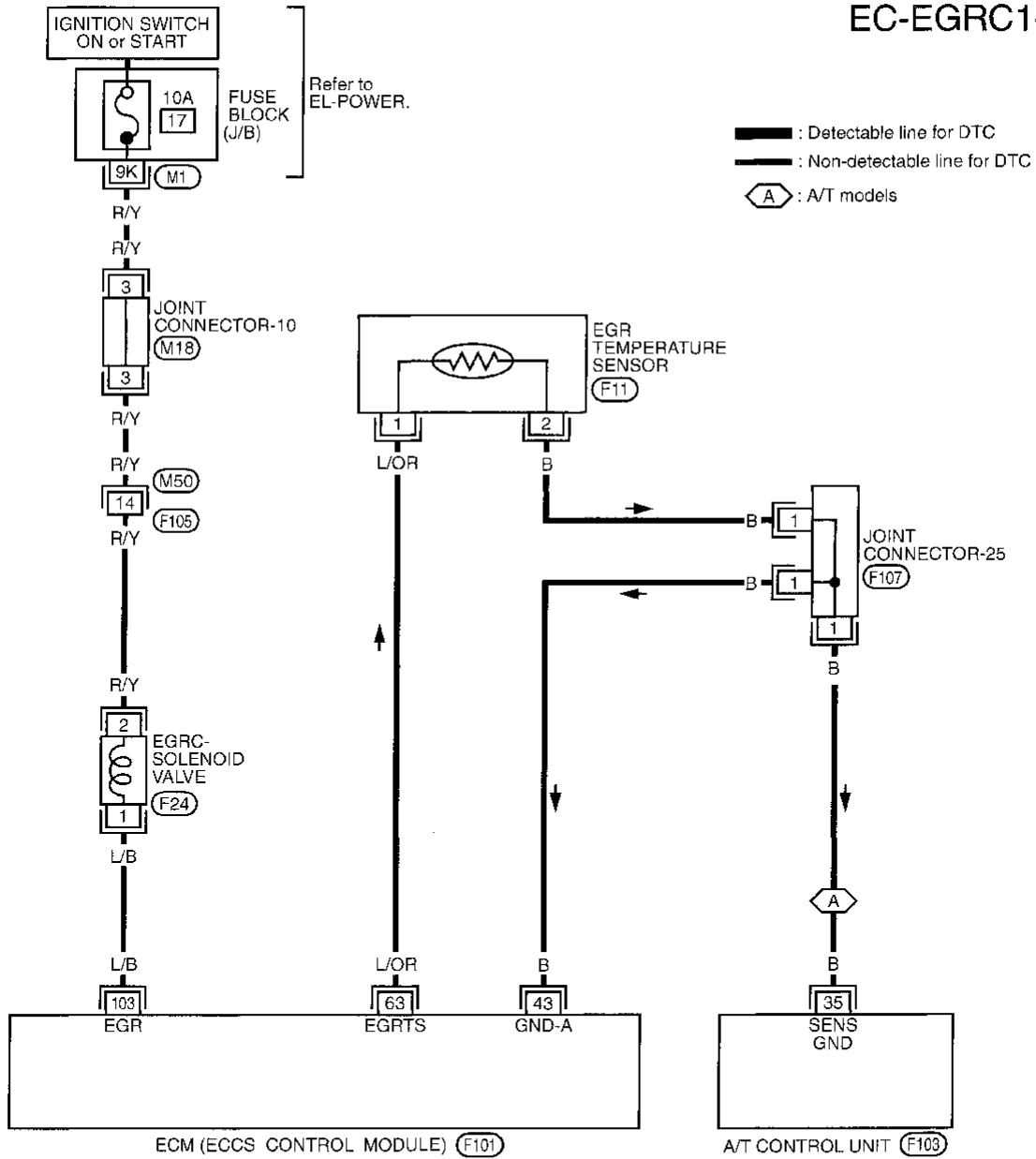
EL

IX

TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

EC-EGRC1-01

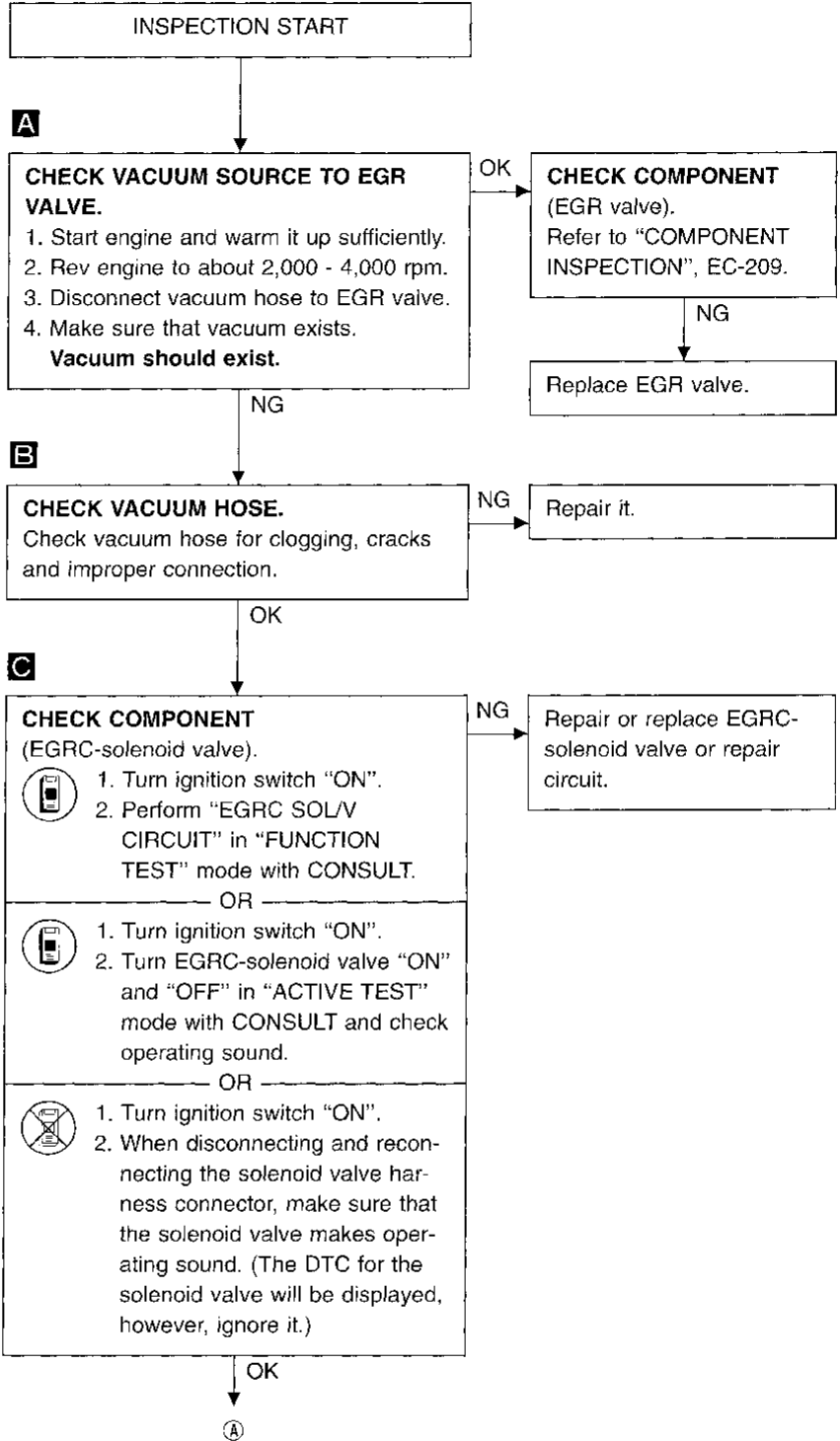
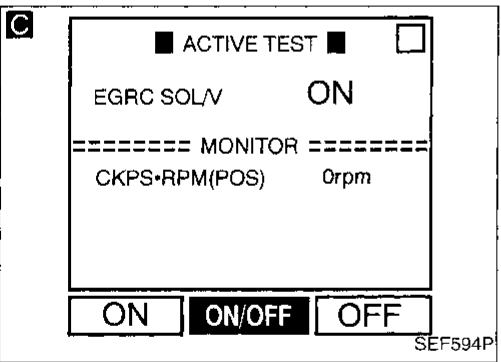
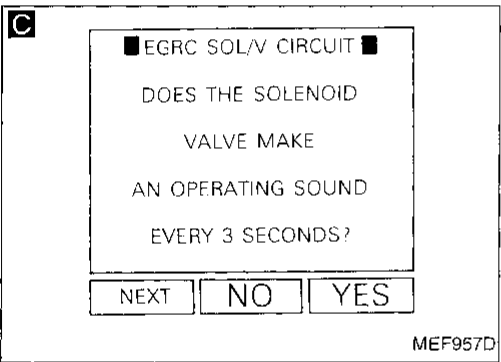
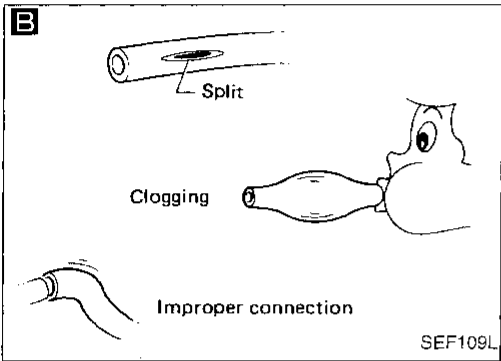
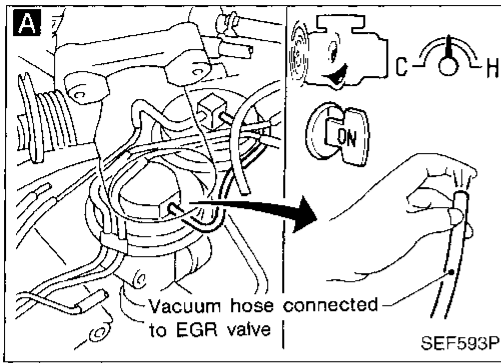


Refer to last page (Foldout page).
M1

TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

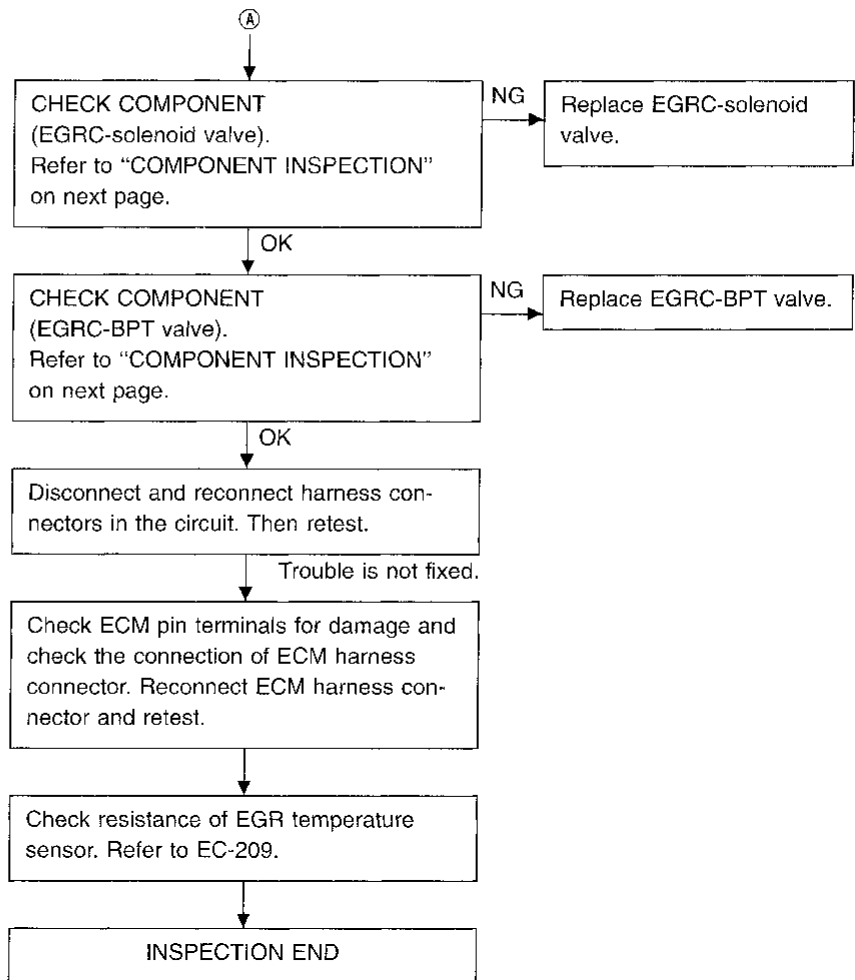
DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)



TROUBLE DIAGNOSIS FOR DTC P0400

EGR Function (DTC: 0302) (Cont'd)

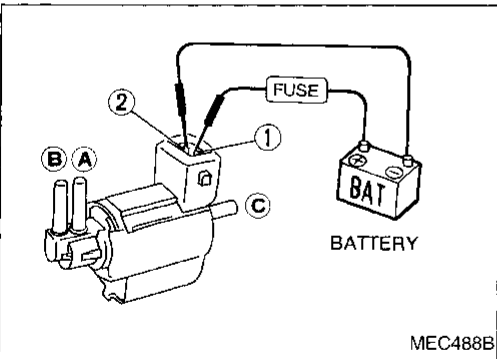
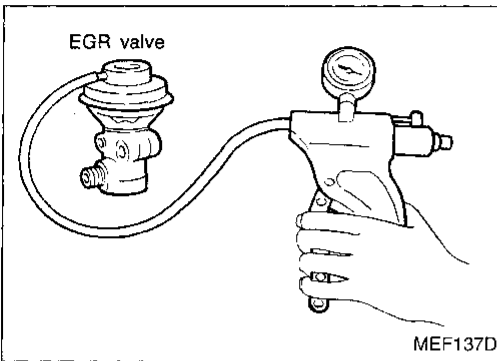
COMPONENT INSPECTION

EGR valve

Apply vacuum to EGR valve vacuum port with a hand vacuum pump.

EGR valve spring should lift.

If NG, replace EGR valve.

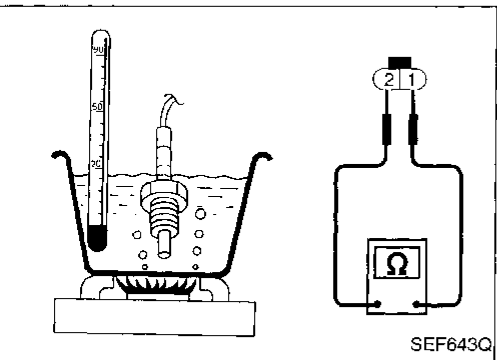


EGRC-solenoid valve

Check solenoid valve, following the table as shown below:

Conditions	Air passage continuity between ① and ②	Air passage continuity between ① and ③
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

If NG, replace the solenoid valve.



EGR temperature sensor

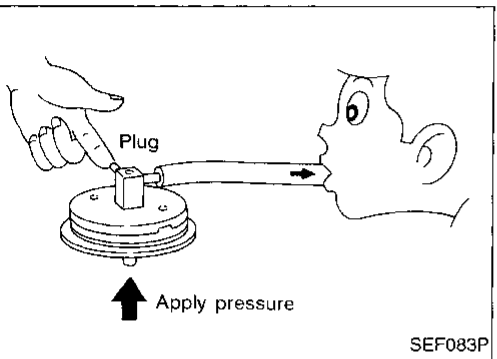
Check resistance change and resistance value.

EGR temperature °C (°F)	Voltage (V)	Resistance (MΩ)
0 (32)	4.81	7.9 - 9.7
50 (122)	2.82	0.57 - 0.70
100 (212)	0.8	0.08 - 0.10
150 (302)	0.16	0.01 - 0.02

If NG, replace EGR temperature sensor.

EGRC-BPT valve

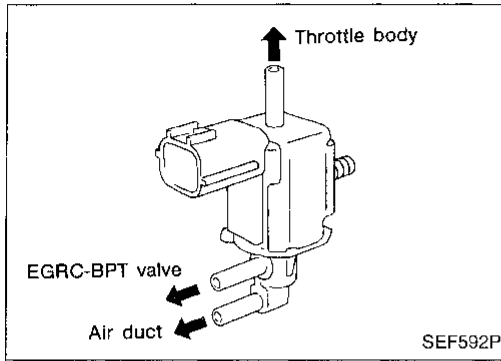
1. Plug one of two ports of EGRC-BPT valve.
2. Vacuum from the other port and check for leakage while applying a pressure above 0.981 kPa (100 mmH₂O, 3.94 inH₂O) from under EGRC-BPT valve.
3. If a leakage is noted, replace the valve.



TROUBLE DIAGNOSIS FOR DTC P0402

EGRC-BPT Valve Function (DTC: 0306) (Cont'd)

OVERALL FUNCTION CHECK



Use this procedure to check the overall function of the EGRC-BPT valve. During the check, a DTC might not be confirmed.

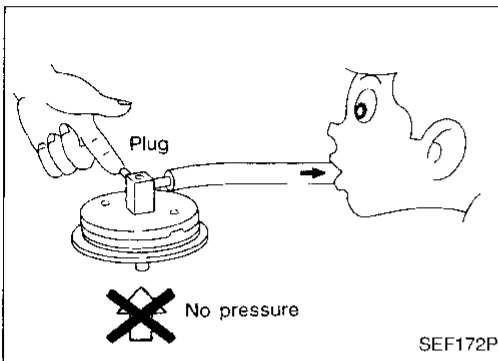
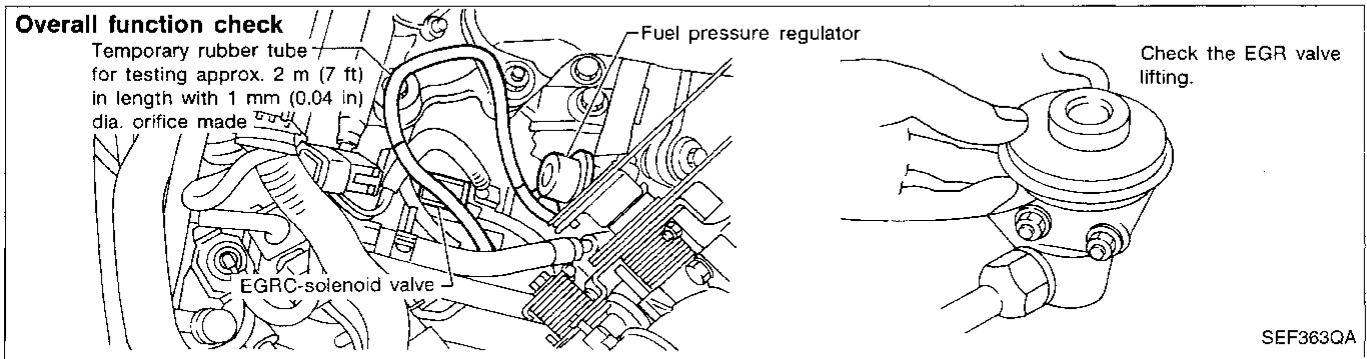
- 1) Disconnect the rubber tube to the fuel pressure regulator from the intake manifold at the fuel pressure regulator.
- 2) Disconnect the rubber tube to the EGRC-solenoid valve from the EGRC-BPT valve at the EGRC-solenoid valve.
- 3) Connect these two rubber tubes using a rubber tube that is approx. 2 meter in length and has 1 mm (0.04 in) dia. orifice made in it. (The intake manifold vacuum will be directly applied to the EGRC-BPT valve.)
- 4) Start engine.
- 5) Check for the EGR valve lifting with engine at less than 1,500 rpm under no load.

EGR valve should remain closed or slightly lift up.

- 6) Keep engine speed at about 2,000 rpm, then check the EGR valve lifting when revving engine up to 4,000 rpm under no load.

EGR valve should lift up to the full position, and go down without sticking when the engine is returned to idle.

- 7) Check rubber tube between the EGRC-solenoid valve and throttle body for misconnection, cracks or obstruction.



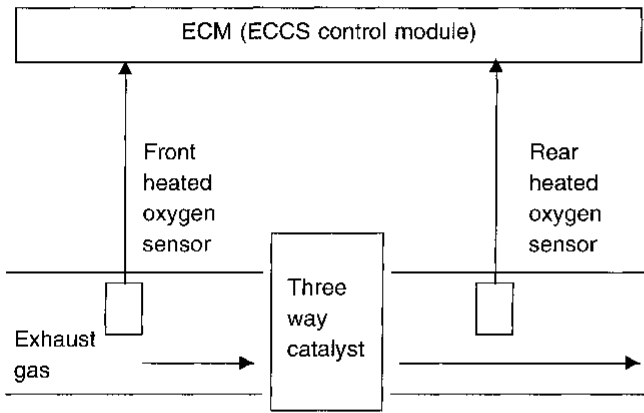
COMPONENT INSPECTION

EGRC-BPT valve

1. Plug one of two ports of EGRC-BPT valve.
 2. Vacuum from the other port and check leakage without applying any pressure from under EGRC-BPT valve.
- Leakage should exist.**

Three Way Catalyst Function (DTC: 0702, 0703)

ON-BOARD DIAGNOSIS LOGIC



The ECM monitors the switching frequency ratio of front and rear heated oxygen sensors.

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 second stage diagnosis is applied.

The second stage diagnosis switches the mixture ratio feedback control using front heated oxygen sensor to rear heated oxygen sensor.

Then ECM measures the switching lag time between front and rear heated oxygen sensors.

The longer lag time indicates the greater oxygen storage capacity. If the lag time is within the specified level, the three way catalyst malfunction is diagnosed.

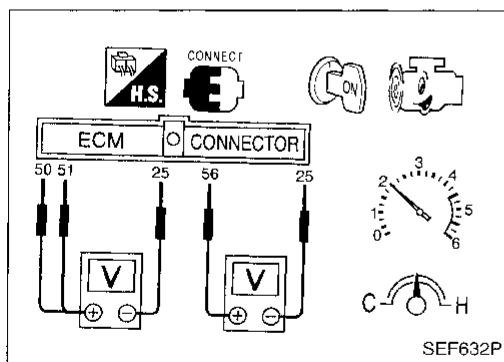
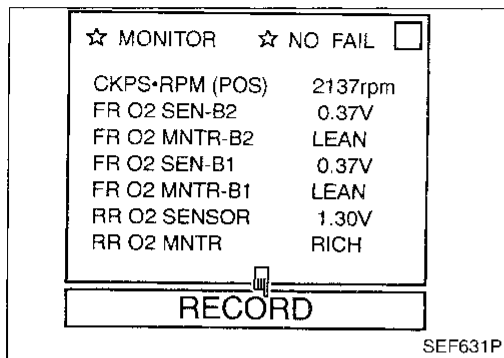
Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
For right bank P0420 0702	<ul style="list-style-type: none"> • Three way catalyst does not operate properly. • Three way catalyst does not have enough oxygen storage capacity. 	<ul style="list-style-type: none"> • Three way catalyst • Exhaust tube • Intake air leaks • Injectors • Injector leaks
For left bank P0430 0703		

OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the three way catalyst.
During this check, a DTC might not be confirmed.

TROUBLE DIAGNOSIS FOR DTC P0420, P0430

Three Way Catalyst Function (DTC: 0702, 0703) (Cont'd)



- 1) Start engine and warm it up sufficiently.
- 2) Set "MANU TRIG" and "HI SPEED", then select "FR O2 SEN-B1", "FR O2 SEN-B2", "RR O2 SENSOR", "FR O2 MNTR-B2", "FR O2 MNTR-B1", "RR O2 MNTR" in "DATA MONITOR" mode with CONSULT.
- 3) Touch "RECORD" on CONSULT screen with engine speed held at 2,000 rpm constant under no load.
- 4) Make sure that the switching frequency between "RICH" and "LEAN" of "RR O2 SENSOR" is very less than that of "FR O2 SEN-B1" or "FR O2 SEN-B2".

Switching frequency ratio =

Rear heated oxygen sensor switching frequency

Front heated oxygen sensor switching frequency

This ratio should be less than 1/2.

If the ratio is greater than 0.5, the three way catalyst is not operating properly.

Note: If the "FR O2 MNTR-B1" or "FR O2 MNTR-B2" does not indicate "RICH" and "LEAN" periodically more than 5 times within 10 seconds at step 3, perform TROUBLE DIAGNOSIS FOR DTC P0130 or P0150 first. (EC-139 or EC-154.)

OR



- 1) Start engine and warm it up sufficiently.
- 2) Set voltmeters probes between ECM terminals 50 [front heated oxygen sensor (right bank) signal], 51 [front heated oxygen sensor (left bank) signal] and 25 (engine ground), and ECM terminals 56 (rear heated oxygen sensor signal) and 25 (engine ground).
- 3) Keep engine speed at 2,000 rpm constant under no load.
- 4) Make sure that the voltage switching frequency (high & low) between ECM terminals 56 and 25 is very less than that of ECM terminals 50 and 25, or 51 and 25.

Switching frequency ratio =

Rear heated oxygen sensor voltage switching frequency

Front heated oxygen sensor voltage switching frequency

This ratio should be less than 1/2.

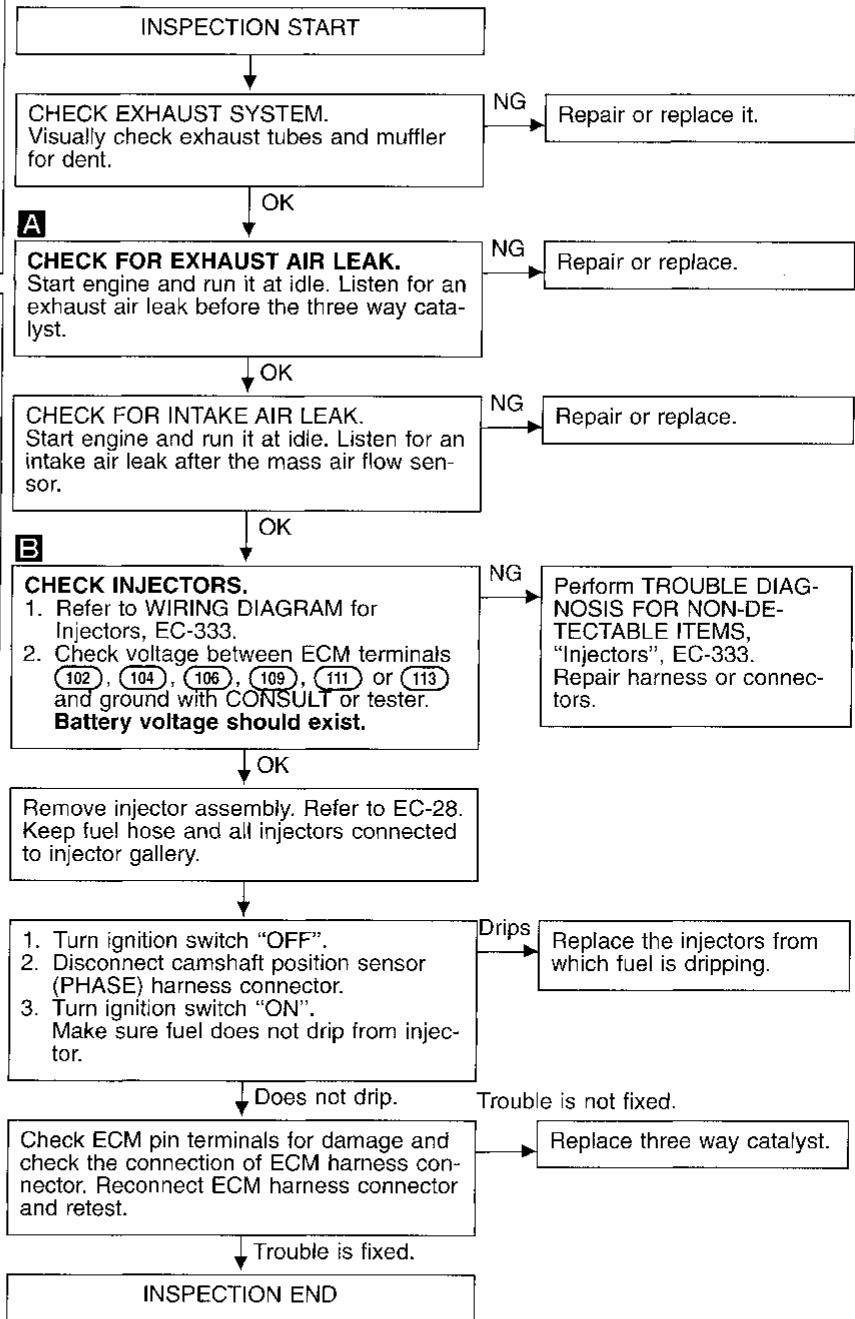
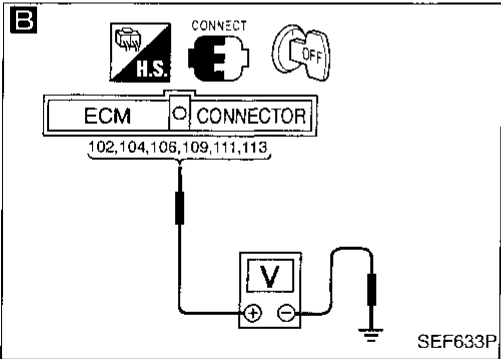
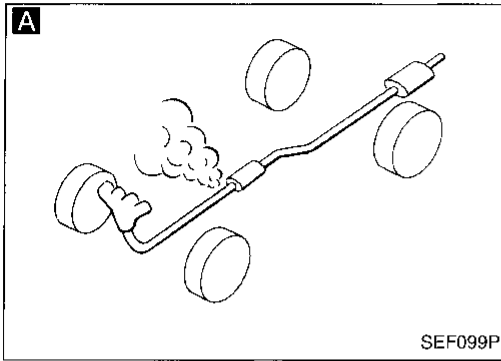
If the ratio is greater than 0.5, it means three way catalyst does not operate properly.

Note: If the voltage at terminal 50 or 51 does not switch periodically more than 5 times within 10 seconds at step 3, perform TROUBLE DIAGNOSIS FOR DTC P0130 or P0150 first. (EC-139 or EC-154.)

TROUBLE DIAGNOSIS FOR DTC P0420, P0430

Three Way Catalyst Function (DTC: 0702, 0703) (Cont'd)

DIAGNOSTIC PROCEDURE



**Evaporative Emission (EVAP) Control System
(Small Leak) (DTC: 0705)**

ON-BOARD DIAGNOSIS LOGIC

This diagnosis uses two methods to detect leaks in the EVAP purge line.

The first method, the pressure test, makes use of vapor pressure in the fuel tank. The second method, the vacuum test, makes use of engine intake manifold vacuum.

Pressure test

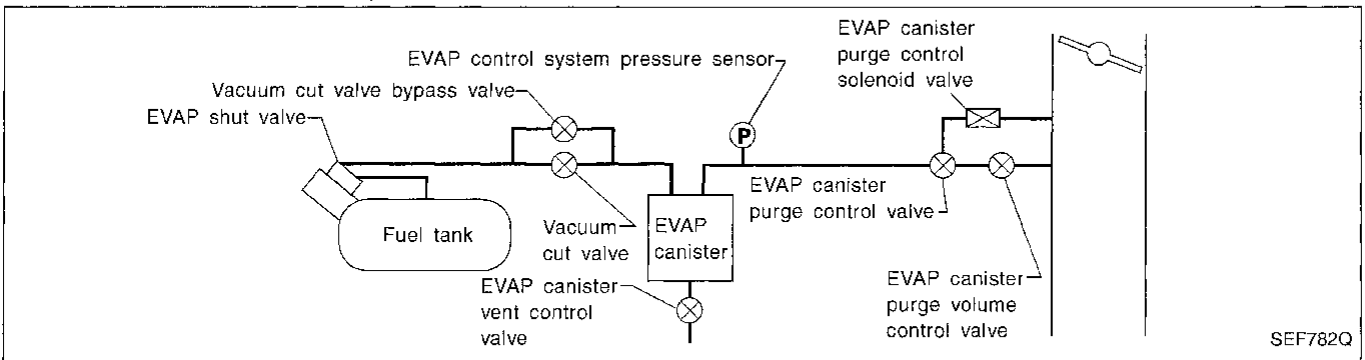
The EVAP canister vent control valve is closed to shut the EVAP purge line. The vacuum cut valve bypass valve will then be opened to clear the line between the fuel tank and the EVAP canister purge control valve. The EVAP control system pressure sensor can now monitor the pressure inside the fuel tank.

If pressure increases, the ECM will check for leaks in the line between the vacuum cut valve and EVAP canister purge control valve. If no pressure does not increase, the ECM will perform the "Vacuum test".

Vacuum test

If pressure does not increase in the "Pressure test", the ECM will check for leaks in the line between the fuel tank and EVAP canister purge control 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 control valve. The EVAP canister vent control valve will then be closed to shut the EVAP purge line off. The EVAP canister purge volume control valve and EVAP canister purge control valve are opened to depressurize the EVAP purge line using intake manifold vacuum. After this occurs, the EVAP canister purge control valve and EVAP canister purge volume control valve will be closed.



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TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0440 0705	<ul style="list-style-type: none">• EVAP control system has a leak.• EVAP control 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 control 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 purge control valve• EVAP canister purge volume control valve• EVAP canister purge control solenoid valve• Absolute pressure sensor• Tank fuel temperature sensor• MAP/BARO switch solenoid valve• Blocked or bent rubber tube to MAP/BARO switch solenoid valve

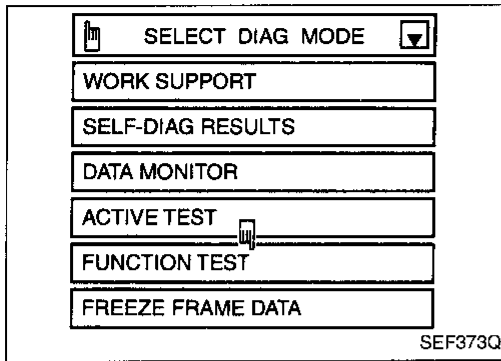
CAUTION:

- Use only a genuine 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 rubber tube as a replacement.

TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



CAUTION:

Always select "SINGLE TEST" with CONSULT when performing the "FUNCTION TEST".

1. Select "EVAP (SMALL LEAK)" in "FUNCTION TEST" mode with CONSULT.
2. Make sure that "OK" is displayed with "EVAP (SMALL LEAK)". (If "NG" is displayed, refer to "DIAGNOSTIC PROCEDURE".)
3. Check fuel filler cap and fuel tank when the fuel tank is more than 3/4 full.
Refer to "DIAGNOSTIC PROCEDURE", EC-219.

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TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the EVAP control system (Small leak). During this check, a DTC might not be confirmed.

NOTE:

Prepare one-way valve (Part No. 14958 V6700) for this test.

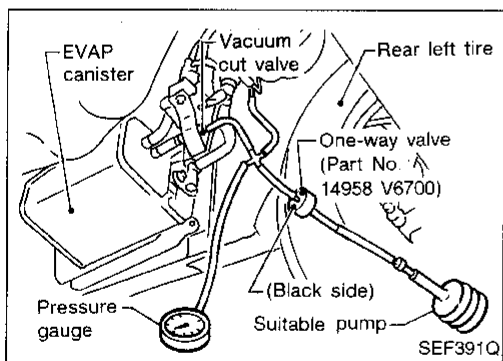
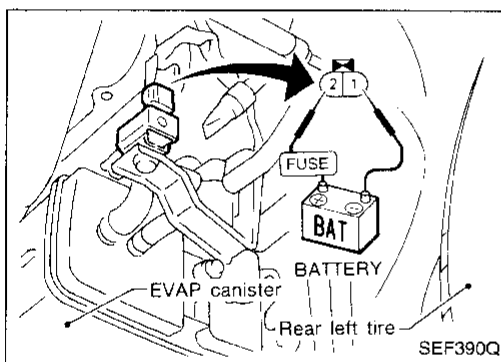
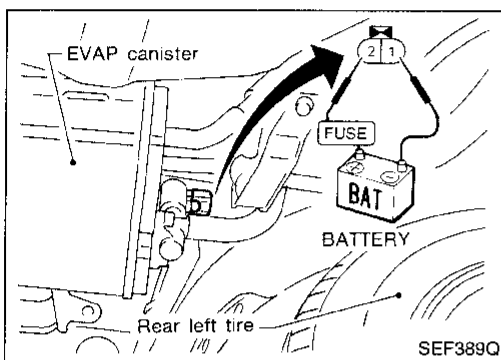
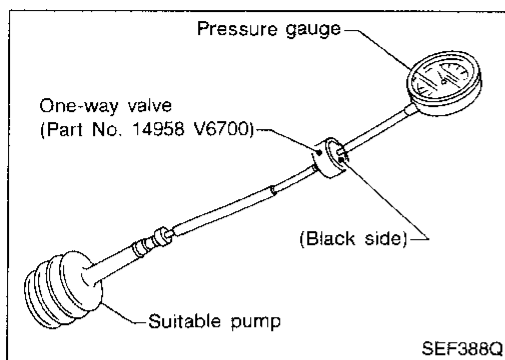


1. Turn ignition switch "OFF".
2. Completely fill fuel tank.
3. Set up one-way valve (Part No. 14958 V6700), pressure gauge and suitable pump as shown at left. Pressurize the system to 13.3 kPa (100 mmHg, 3.94 inHg, 1.93 psi). Measure the amount of depressurization in kPa (mmHg, inHg) after one minute with the system left unattended.
4. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12V until the end of test.)
5. Apply 12 volts DC to vacuum cut valve bypass valve. The valve will open. (Continue to apply 12V until the end of test.)
6. Disconnect rubber tube between vacuum cut valve and EVAP shut valve. Set up one-way valve (Part No. 14958 V6700), pressure gauge and suitable pump as shown at left.
7. Increase system pressure until gauge registers 13.3 kPa (100 mmHg, 3.94 inHg, 1.93 psi). [If pump is rated at a discharge volume of 0.13ℓ (1/8 US qt, 1/8 Imp qt) for one operating stroke, it is capable of increasing pressure to 13.3 kPa (100 mmHg, 3.94 inHg, 1.93 psi) with approximately 60 operating strokes. If pressure does not increase at all during the test, diagnosis will be ineffective ("NG").]

CAUTION:

Do not allow pump pressure to exceed 13.3 kPa (100 mmHg, 3.94 inHg, 1.93 psi). A higher pressure may damage fuel tank and EVAP canister.

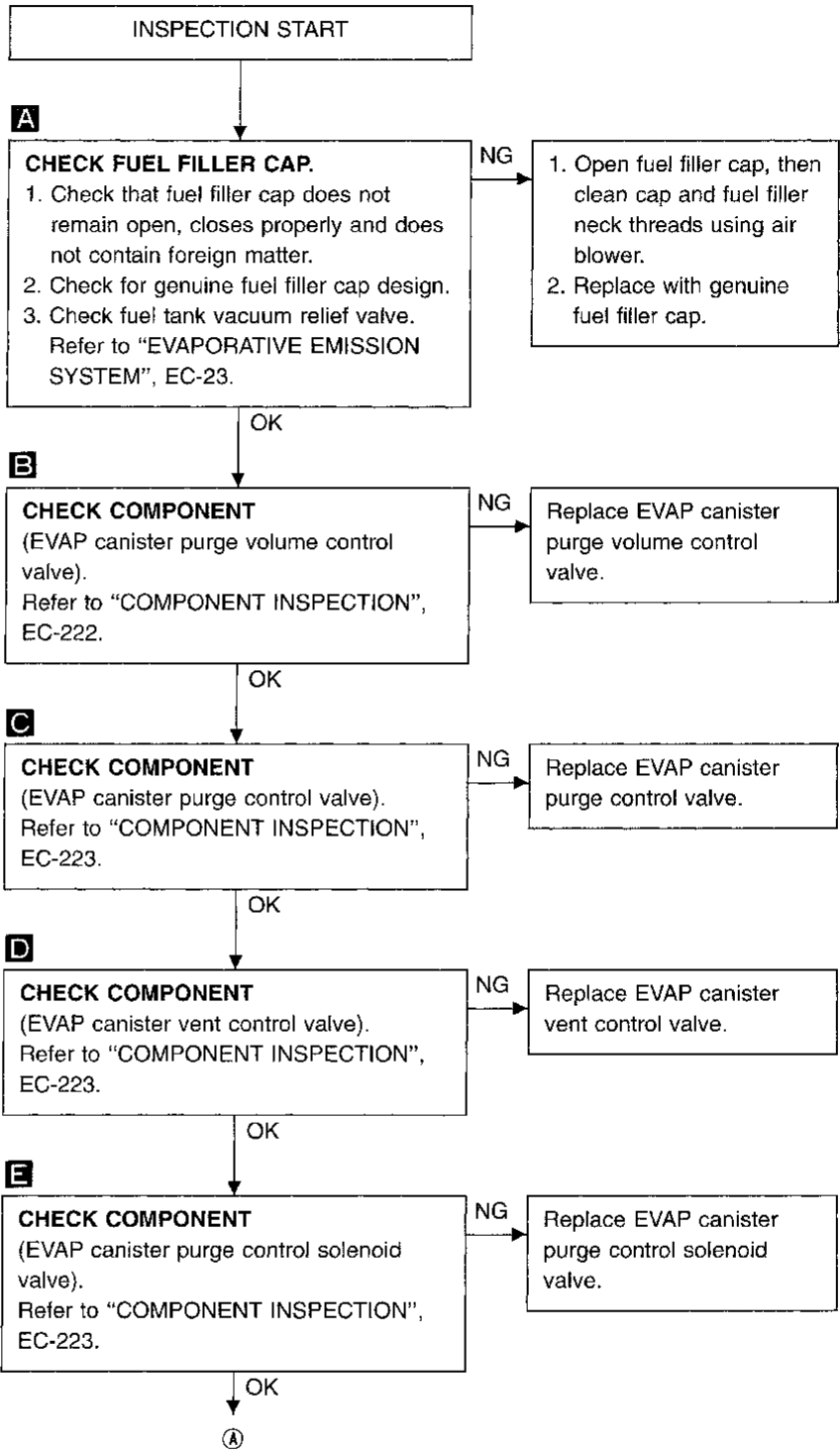
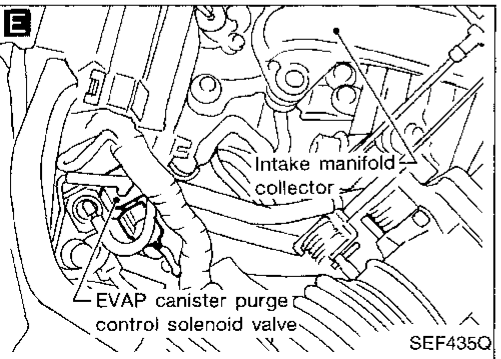
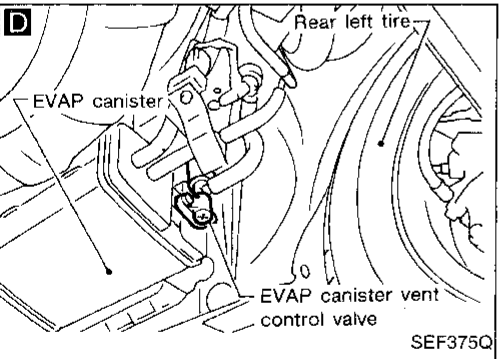
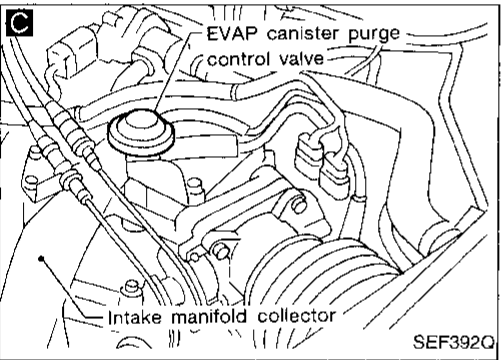
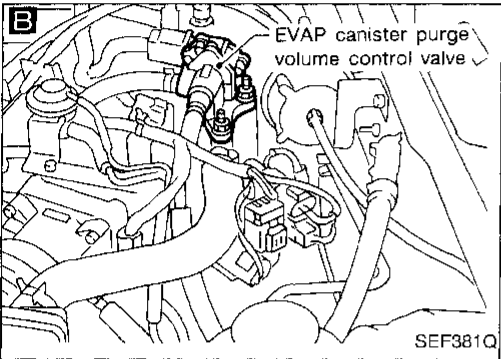
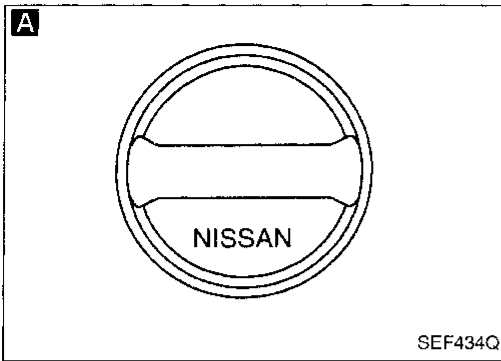
8. Make sure that after one minute the amount of pressure recovery is within the following.
The measured amount in step 3 + 4.0 kPa (30 mmHg, 1.18 inHg, 0.6 psi).
9. Check fuel filler cap and fuel tank. Refer to "DIAGNOSTIC PROCEDURE", EC-219.



TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

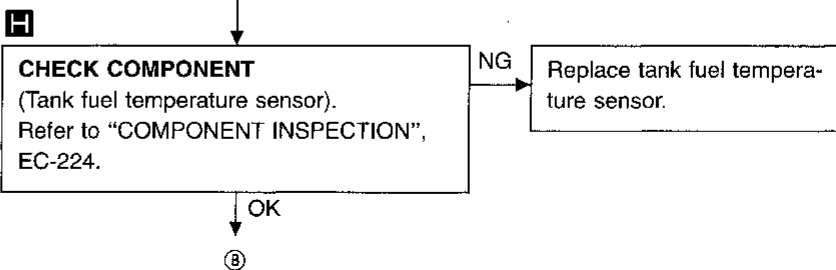
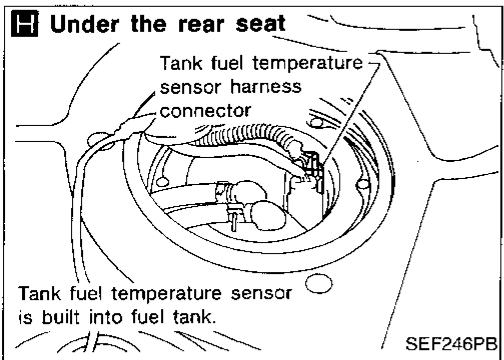
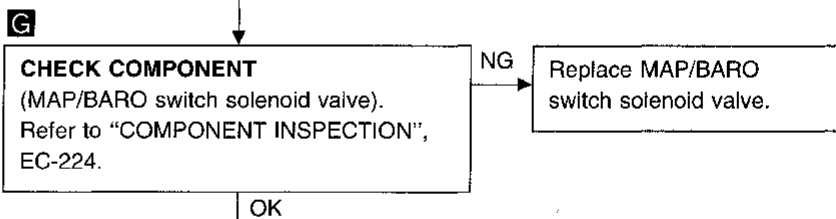
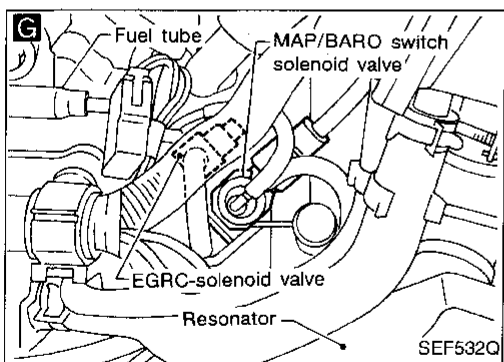
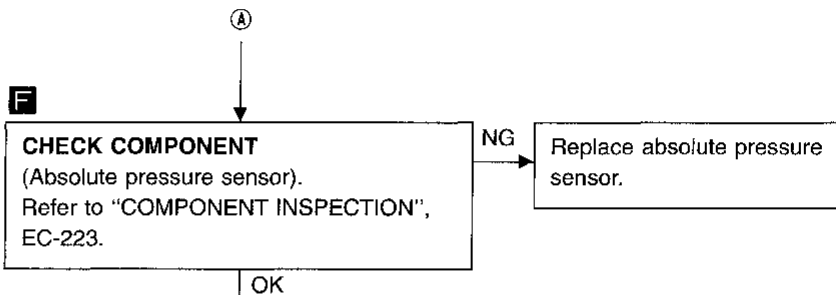
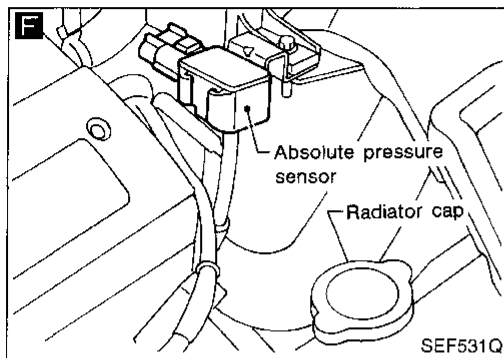
DIAGNOSTIC PROCEDURE



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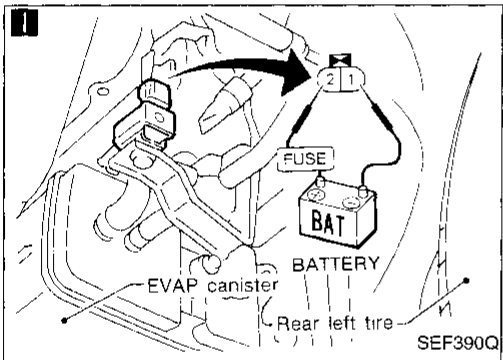
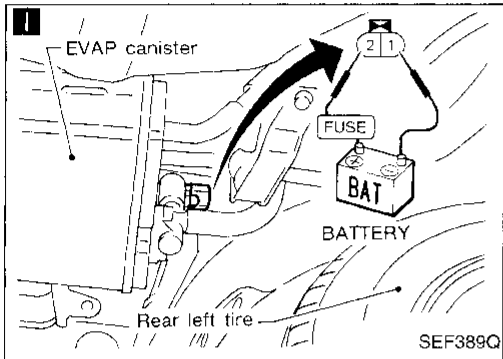
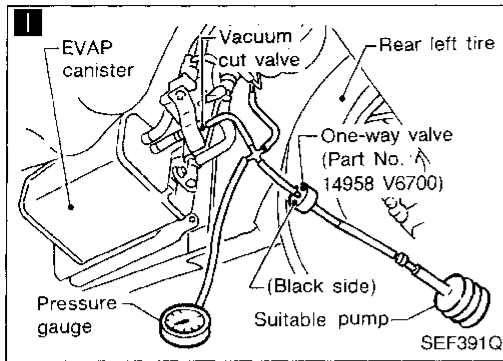
TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)



TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)



1

CHECK EVAP PURGE LINE.
 Check EVAP purge line (pipe, rubber tube, fuel tank and EVAP canister) for cracks. Refer to "EVAPORATIVE EMISSION SYSTEM, EC-24."
 To locate cracked areas, apply soapy water to locations in question. Apply pump pressure as shown in the figure at left. Air bubbles will appear from cracked areas.
CAUTION:
Do not allow pump pressure to exceed 13.3 kPa (100 mmHg, 3.94 inHg, 1.93 psi). A higher pressure may damage fuel tank and EVAP canister.

- Do not use super color check liquid, etc.
- Do not depressurize inside EVAP purge line.

1. Turn ignition switch "OFF".
2. Apply 12 volts DC to EVAP canister vent control valve. The valve will close. (Continue to apply 12V 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. Disconnect rubber tube between vacuum cut valve and EVAP shut valve. Set up one-way valve (Part No. 14958 V6700), pressure gauge and suitable pump as shown at left.

NG → Repair or replace it.

OK

Clean EVAP purge line (pipe and rubber tube) using air blower.

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

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TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

COMPONENT INSPECTION

EVAP canister purge volume control valve

1. Disconnect EVAP canister purge volume control valve harness connector.
2. Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

Resistance:

Approximately 30Ω [At 25°C (77°F)]

3. Reconnect EVAP canister purge volume control valve harness connector.
4. Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
5. Turn ignition switch "ON".
6. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT. Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the valve opening.
If NG, replace the EVAP canister purge volume control valve.

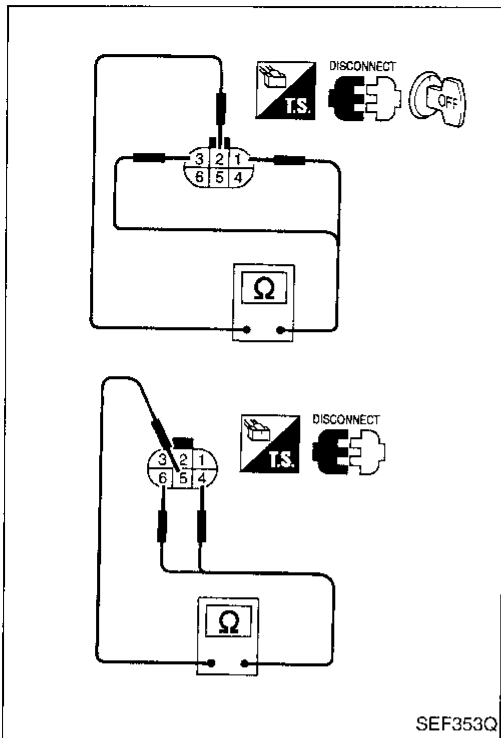
OR

1. Disconnect EVAP canister purge volume control valve harness connector.
2. Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

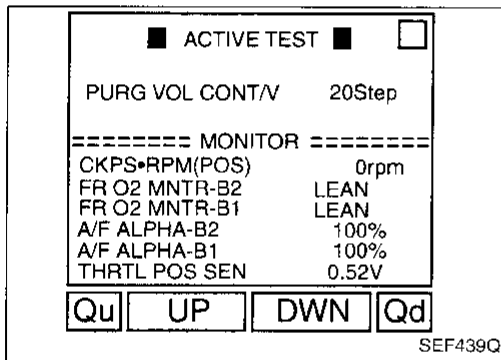
Resistance:

Approximately 30Ω [At 25°C (77°F)]

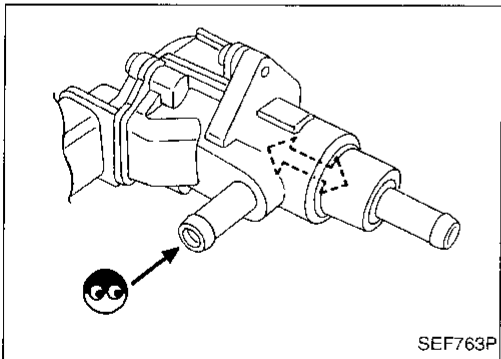
3. Reconnect EVAP canister purge volume control valve harness connector.
4. Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
5. Turn ignition switch "ON" and "OFF". Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the ignition switch position.
If NG, replace the EVAP canister purge volume control valve.



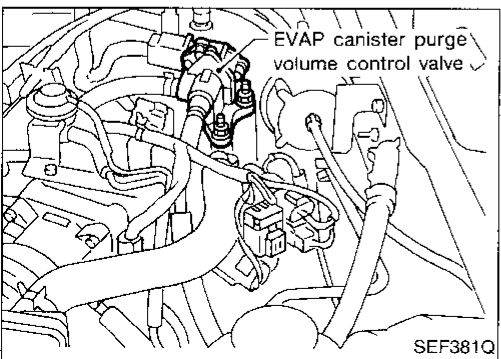
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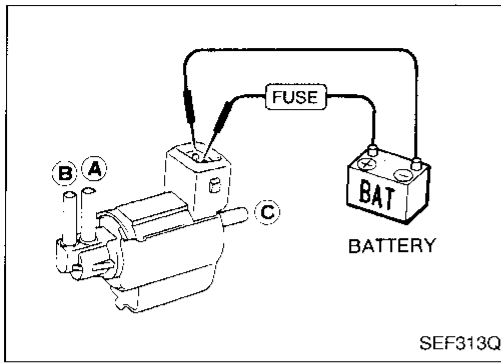
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TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

EVAP canister purge control solenoid valve

Check air passage continuity.



Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12V direct current supply between terminals	Yes	No
No supply	No	Yes

If NG, replace solenoid valve.

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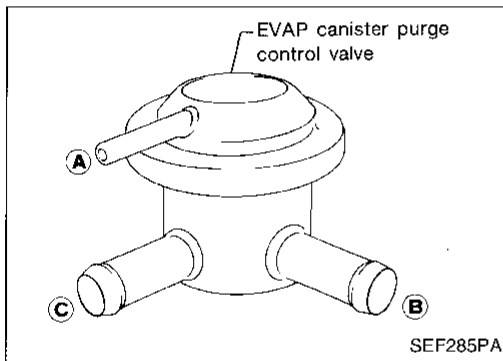
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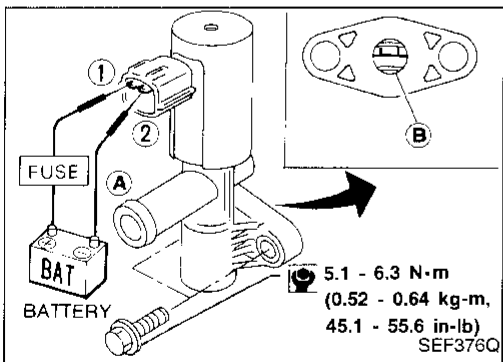
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EVAP canister purge control valve

Check EVAP canister purge control valve as follows:

1. Blow air in port (A), (B) and (C), and check that there is no leakage.
2. Apply vacuum to port (A). [Approximately -13.3 to -20.0 kPa (-100 to -150 mmHg, -3.94 to -5.91 inHg)]
Blow air in port (C) and check that it flows freely out of port (B).

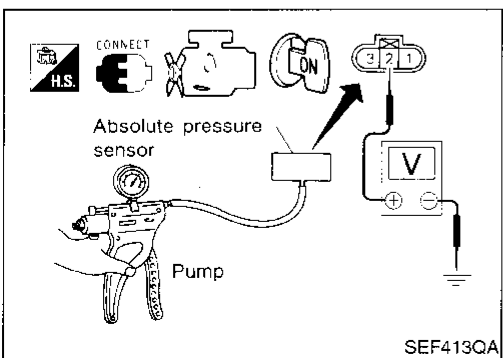


EVAP canister vent control valve

Check air passage continuity.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals ① and ②	No
No supply	Yes

If NG, clean valve using air blower or replace as necessary.



Absolute pressure sensor

1. Remove absolute pressure sensor from bracket with its harness connector connected.
2. Remove hose from absolute pressure sensor.
3. Turn ignition switch "ON" and check output voltage between terminal ② and engine ground.
The voltage should be 3.2 to 4.8 V.
4. Use pump to apply vacuum of -26.7 kPa (-200 mmHg, -7.87 inHg, -3.87 psi) to absolute pressure sensor as shown in figure and check the output voltage.
The voltage should be 1.0 to 1.4 V lower than the value measured in step 3.

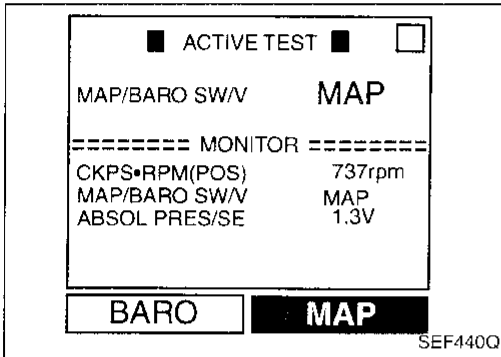
TROUBLE DIAGNOSIS FOR DTC P0440

Evaporative Emission (EVAP) Control System (Small Leak) (DTC: 0705) (Cont'd)

CAUTION:

Always calibrate the vacuum pump gauge when using it.

- If NG, replace absolute pressure sensor.



MAP/BARO switch solenoid valve

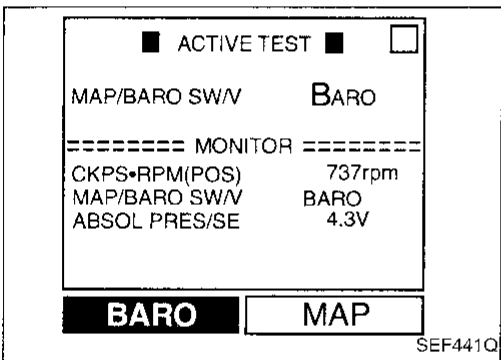


- Start engine and warm it up sufficiently.
- Perform "MAP/BARO SW/V" in "ACTIVE TEST" mode with CONSULT.
- Check the following.
 - When "MAP" is selected, "ABSOL PRES/SE" indicates approximately 1.3V.
 - When "BARO" is selected, "ABSOL PRES/SE" indicates approximately 4.3V.
- If NG, replace solenoid valve.

OR

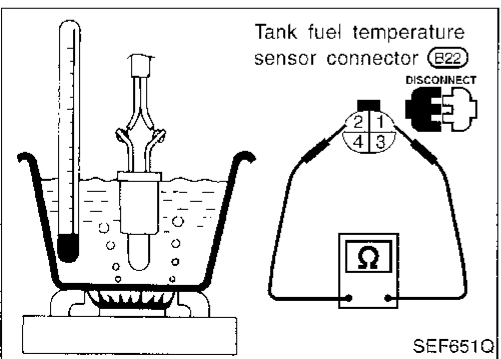
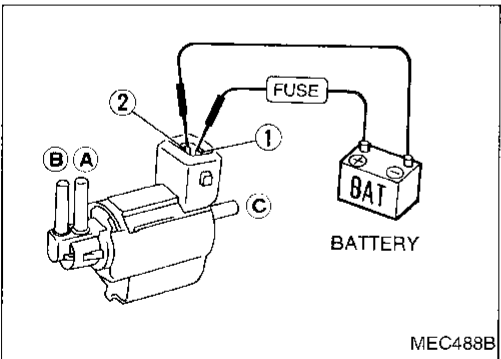


- Remove MAP/BARO switch solenoid valve.
- Check air passage continuity.



Condition	Air passage continuity between ① and ②	Air passage continuity between ① and ③
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

- If NG, replace solenoid valve.



Tank fuel temperature sensor

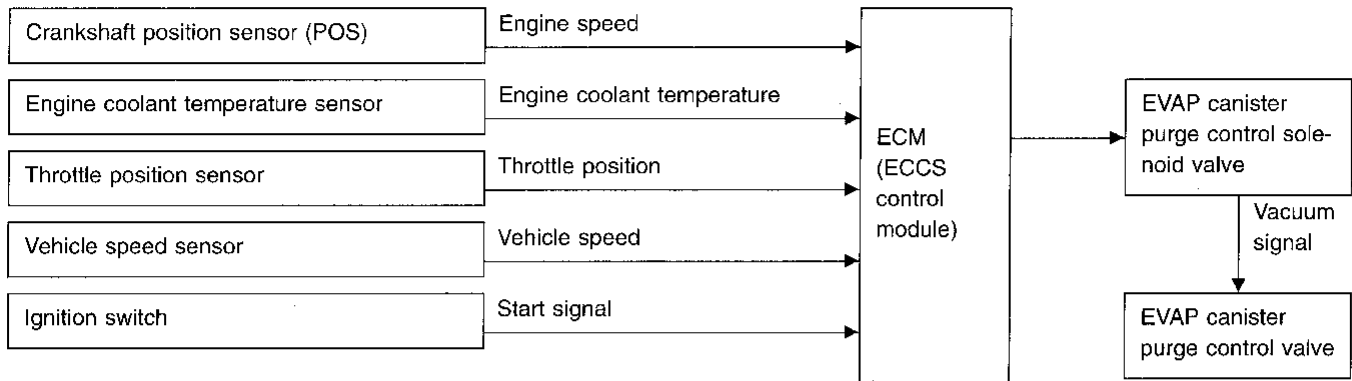
Check resistance as shown in the figure.

Temperature °C (°F)	Resistance kΩ
20 (68)	2.3 - 2.7
50 (122)	0.79 - 0.90

If NG, replace tank fuel temperature sensor.

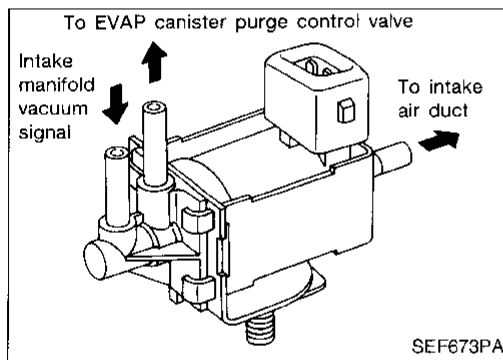
Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807)

SYSTEM DESCRIPTION



This system controls the vacuum signal applied to the EVAP canister purge control valve. When the ECM detects any of the following conditions, current does not flow through the EVAP canister purge control solenoid valve. The solenoid valve cuts the vacuum signal so that the EVAP canister purge control valve remains closed.

- Ignition switch "ON"
- Closed throttle position
- Low or high engine coolant temperature
- During deceleration
- Engine stopped
- Low vehicle speed (M/T models)

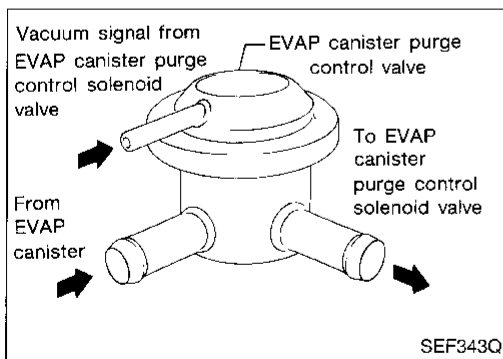


COMPONENT DESCRIPTION

EVAP canister purge control solenoid valve

The EVAP canister purge control solenoid valve responds to signals from the ECM. When the ECM sends an OFF signal, the vacuum signal (from the intake manifold to the EVAP canister purge control valve) is cut.

When the ECM sends an ON (ground) signal, the vacuum signal passes through the EVAP canister purge control solenoid valve. The signal then opens the EVAP canister purge control valve.



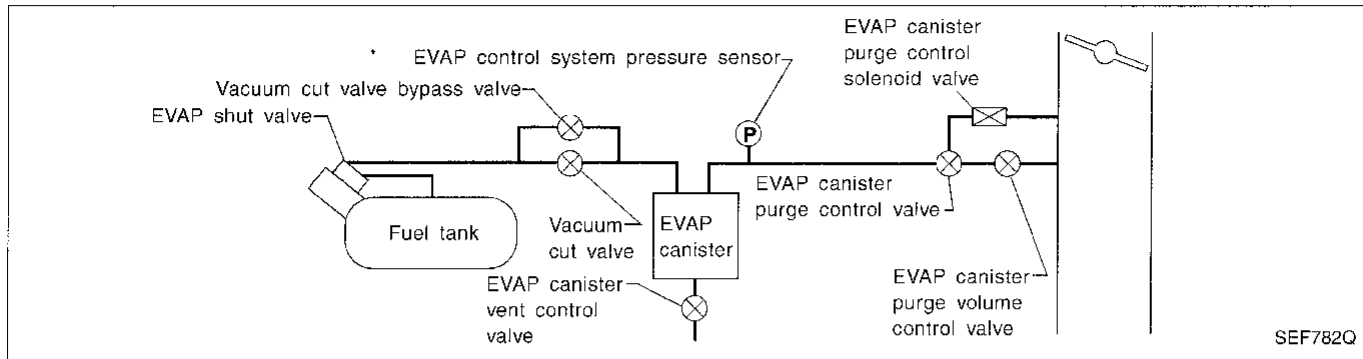
EVAP canister purge control valve

When the vacuum signal is cut by EVAP canister purge control solenoid valve, EVAP canister purge control valve closes.

TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

EVAPORATIVE EMISSION SYSTEM DIAGRAM



Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0443 0807	A) The improper voltage signal is sent to ECM through EVAP canister purge control solenoid valve.	<ul style="list-style-type: none"> • Harness or connectors (The EVAP canister purge control solenoid valve circuit is open or shorted.) • EVAP canister purge control solenoid valve
	B) EVAP canister purge control valve does not operate properly (stuck open).	<ul style="list-style-type: none"> • EVAP canister purge control valve • EVAP canister purge control solenoid valve • Vacuum hoses for clogging or disconnection • EVAP control system pressure sensor

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Perform "Procedure for malfunction A" first. If the DTC cannot be confirmed, perform "Procedure for malfunction B" on next page.

Procedure for malfunction A



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Wait at least 5 seconds.

OR



- 1) Turn ignition switch "ON" and wait at least 5 seconds.
- 2) Select "MODE 3" with GST.

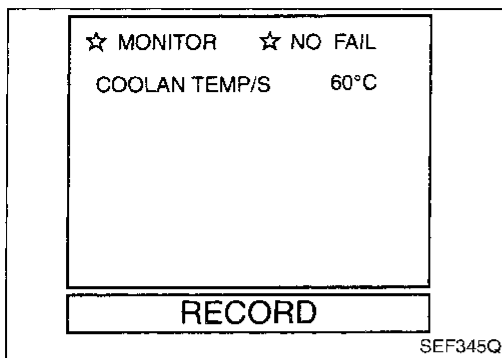
OR



- 1) Turn ignition switch "ON" and wait at least 5 seconds.
- 2) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)



Procedure for malfunction B

- 1) Jack up drive wheels. GI
- 2) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT. MA
- 3) Start engine and warm it up until the engine coolant temperature rises to 60 to 80°C (140 to 176°F), then stop engine. (If the engine coolant temperature exceeds the above range, stop engine and wait until the temperature cools down to within this range.) EM
- 4) Start engine and let it idle for at least 70 seconds. LC
- 5) Maintain the following conditions for at least 30 seconds.

Gear position:

"2" or "D" range (A/T)

"3rd" or "4th" gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

Engine speed:

1,500 - 2,500 rpm

Coolant temperature:

Less than 100°C (212°F)

OR

FUEL SYS #1	OLDRIVE
FUEL SYS #2	OLDRIVE
CALC LOAD	24.3%
COOLANT TEMP	60°C
SHORT FT #1	-0.7%
LONG FT #1	0%
SHORT FT #2	0.8%
LONG FT #2	0%
ENGINE SPD	737RPM
VEHICLE SPD	0MPH
IGN ADVANCE	9.0°
INTAKE AIR	25°C

SEF346Q

- 1) Jack up drive wheels. MT
- 2) Turn ignition switch "ON" and select "MODE 1" mode with GST. AT
- 3) Start engine and warm it up until the engine coolant temperature rises to 60 to 80°C (140 to 176°F), then stop engine. (If the engine coolant temperature exceeds the above range, stop engine and wait until the temperature cools down to within this range.) FA
- 4) Start engine and let it idle for at least 70 seconds. RA
- 5) Maintain the following conditions for at least 30 seconds.

Gear position:

"2" or "D" range (A/T)

"3rd" or "4th" gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

Engine speed:

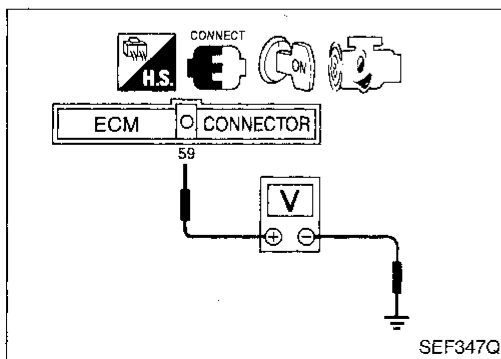
1,500 - 2,500 rpm

Coolant temperature:

Less than 100°C (212°F)

- 6) Select "MODE 3" mode with GST. BR

OR



- 1) Jack up drive wheels. HA
- 2) Turn ignition switch "ON". EL
- 3) Start engine and warm it up until the voltage between ECM terminal 59 and ground drops to 1.2 to 1.9V. (If the voltage drops below the above range, stop engine and wait until the voltage rises to within this range.) IDX
- 4) Start engine and let it idle for at least 70 seconds. BT

TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

- 5) Maintain the following conditions for at least 30 seconds.

Gear position:

“2” or “D” range (A/T)

“3rd” or “4th” gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

Engine speed:

1,500 - 2,500 rpm

Voltage between ECM terminal 59 and ground:

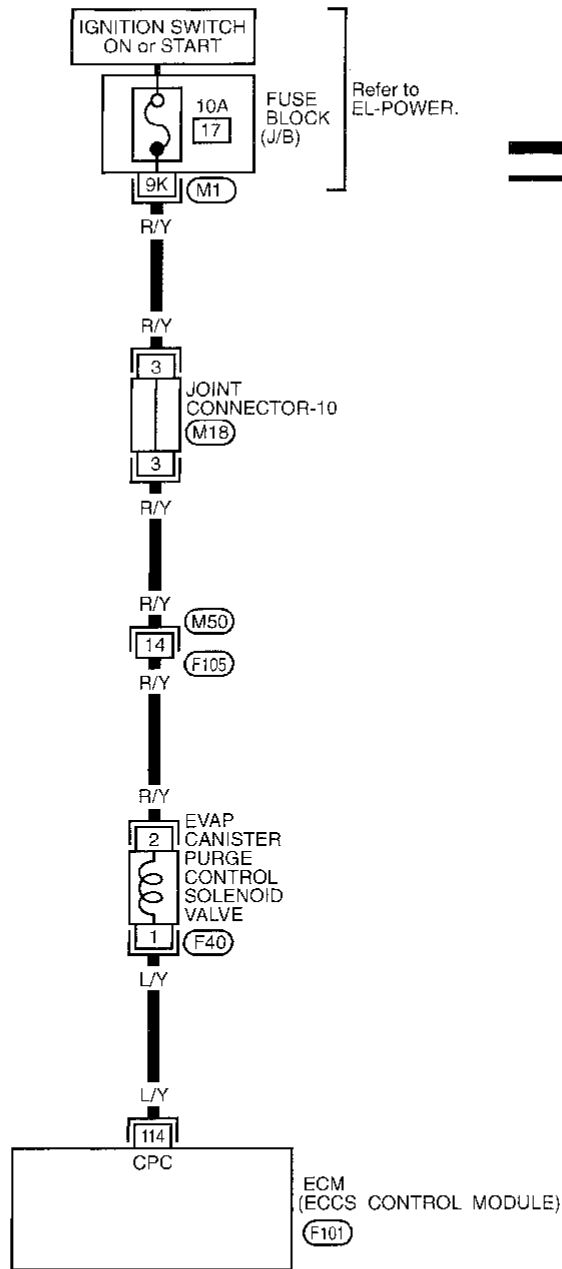
More than 0.8V

- 6) Turn ignition switch “OFF”, wait at least 5 seconds and then turn “ON”.
- 7) Perform “Diagnostic Test Mode II (Self-diagnostic results)” with ECM.

TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

EC-CANI/V-01



— : Detectable line for DTC
— : Non-detectable line for DTC

GI

MA

EM

LC

EC

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GL

MT

AT

FA

RA

BR

ST

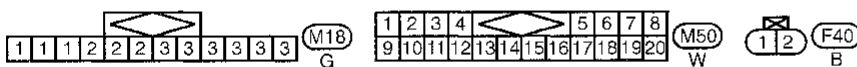
RS

BT

HA

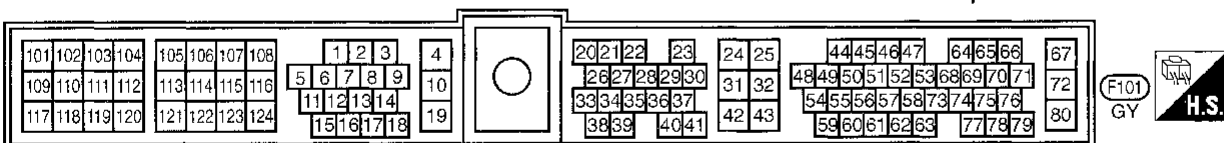
EL

IDX



Refer to last page (Foldout page).

(M1)

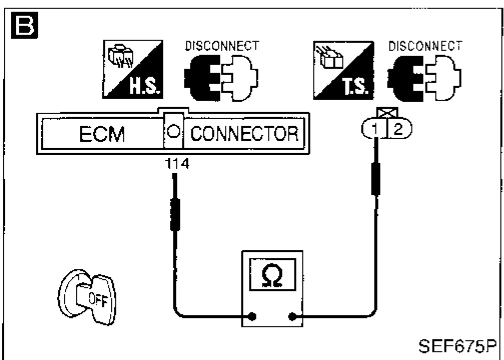
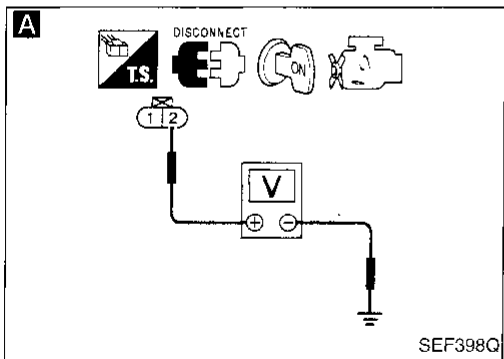
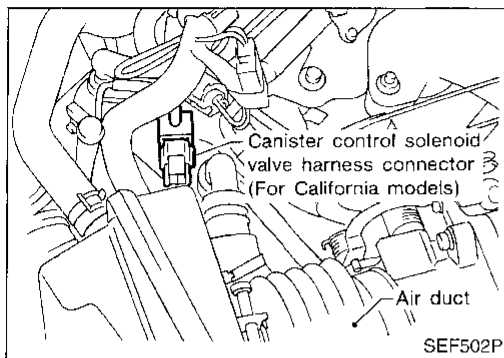


TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

DIAGNOSTIC PROCEDURE

Procedure for malfunction A



INSPECTION START

A
CHECK POWER SUPPLY.
 1. Disconnect EVAP canister purge control solenoid valve harness connector.
 2. Turn ignition switch "ON".
 3. Check voltage between terminal ② and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
 • Harness connectors
 • (F105), (M50)
 • 10A fuse
 • Joint connector-10
 • Harness for open or short between EVAP canister purge control solenoid valve and fuse
 If NG, repair harness or connectors.

B
CHECK OUTPUT SIGNAL CIRCUIT.
 1. Disconnect ECM harness connector.
 2. Check harness continuity between ECM terminal (114) and terminal ①.
Continuity should exist.
 If OK, check harness for short.

NG → Repair harness or connectors.

CHECK COMPONENT
 (EVAP canister purge control solenoid valve).
 Refer to "COMPONENT INSPECTION", EC-232.

NG → Replace EVAP canister purge control solenoid valve.

Disconnect and reconnect harness connectors in the circuit. Then retest.

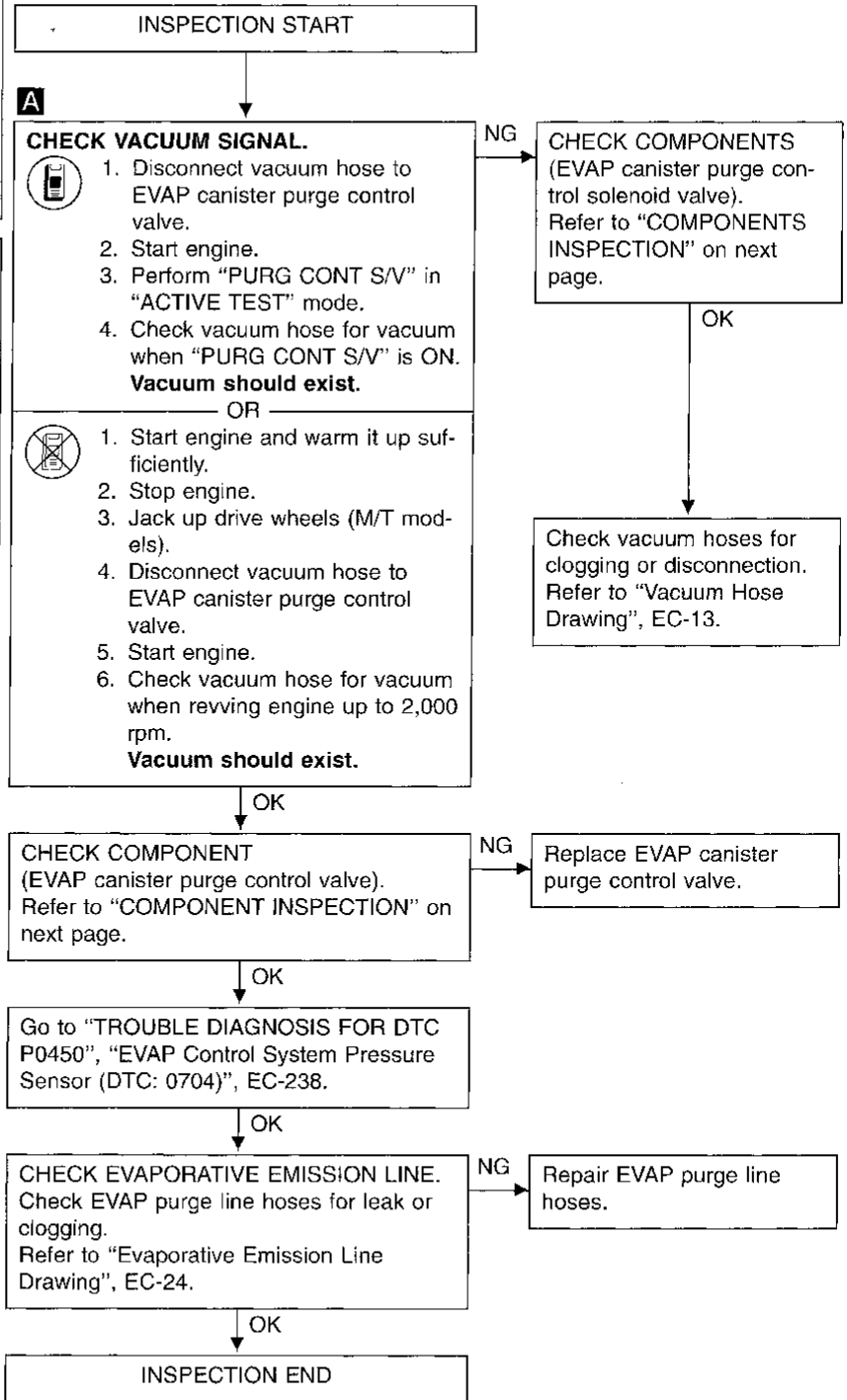
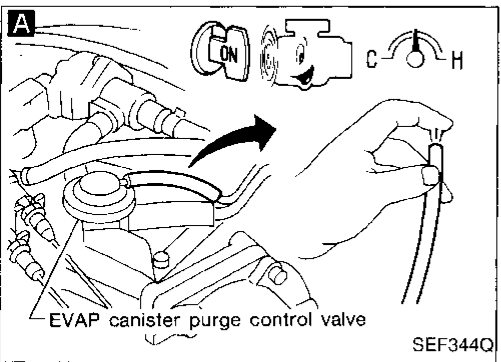
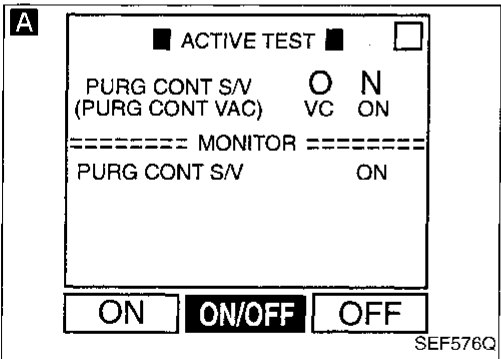
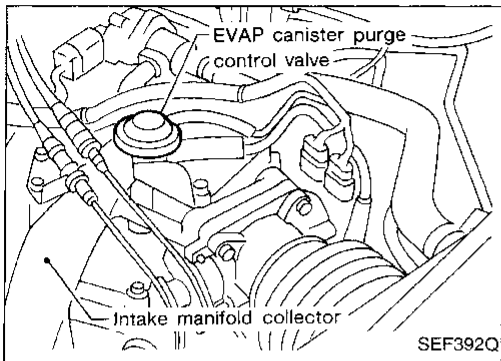
Trouble is not fixed.
 Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

Procedure for malfunction B



CI
MA
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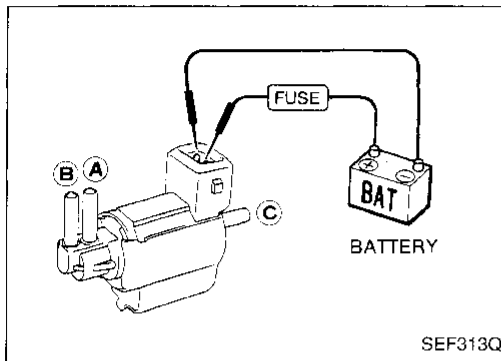
TROUBLE DIAGNOSIS FOR DTC P0443

Evaporative Emission (EVAP) Canister Purge Control Valve/Solenoid Valve (DTC: 0807) (Cont'd)

COMPONENT INSPECTION

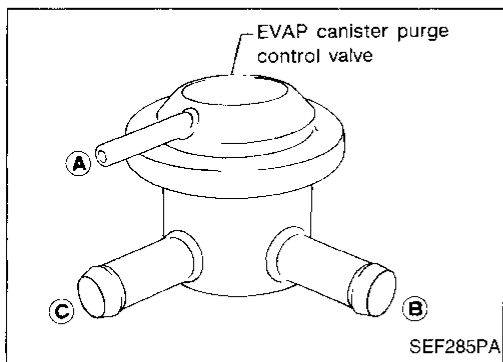
EVAP canister purge control solenoid valve

Check air passage continuity.



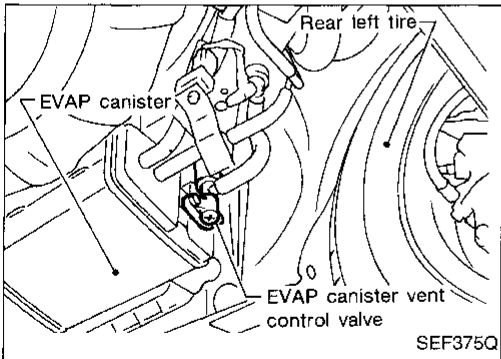
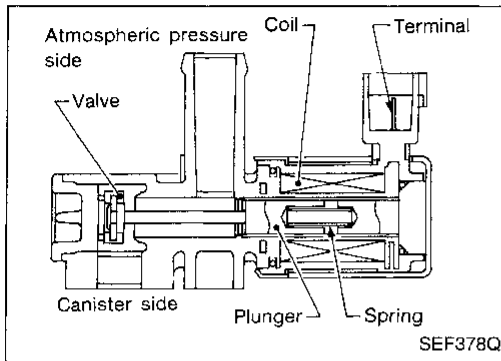
Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12V direct current supply between terminals	Yes	No
No supply	No	Yes

If NG, replace solenoid valve.



EVAP canister purge control valve

1. Blow air in ports (A), (B) and (C) and check that there is no leakage.
2. Apply vacuum to port (A). [Approximately -13.3 to -20.0 kPa (-100 to -150 mmHg, -3.94 to -5.91 inHg)]
Then blow air in port (C) and check that air flows freely out of port (B).



Evaporative Emission (EVAP) Canister Vent Control Valve (DTC: 0903)

The EVAP canister vent control valve is located on the EVAP canister and is used to seal the canister vent.

This solenoid (the EVAP canister vent control 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 loss 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 loss system is depressurized and allows "EVAP Control System (Small Leak)" diagnosis.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0446 0903	A) An improper voltage signal is sent to ECM through EVAP canister vent control valve.	<ul style="list-style-type: none"> • Harness or connectors [EVAP canister vent control valve circuit is open or shorted.]
	B) EVAP canister vent control valve does not operate properly.	<ul style="list-style-type: none"> • EVAP canister vent control valve • EVAP control system pressure sensor • Blocked rubber tube to EVAP canister vent control valve

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Before performing the following procedure, confirm that battery voltage is more than 12V.

Perform "Procedure for malfunction A". If the DTC cannot be confirmed, then perform "Procedure for malfunction B" on next page.

Procedure for malfunction A

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and wait at least 5 seconds.

OR

- 1) Start engine and wait at least 5 seconds.
- 2) Select "MODE 3" with GST.

OR

- 1) Start engine and wait at least 5 seconds.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0446

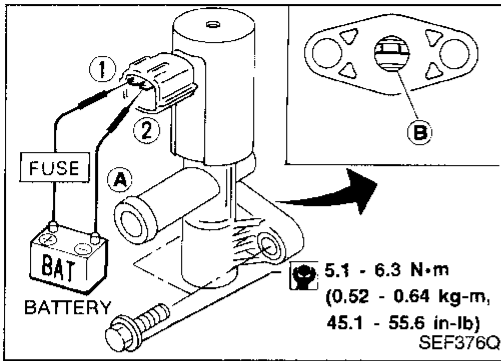
Evaporative Emission (EVAP) Canister Vent Control Valve (DTC: 0903) (Cont'd)

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.

Procedure for malfunction B

1. Remove EVAP canister vent control valve from EVAP canister and disconnect hoses from the valve.
2. Check air passage continuity.

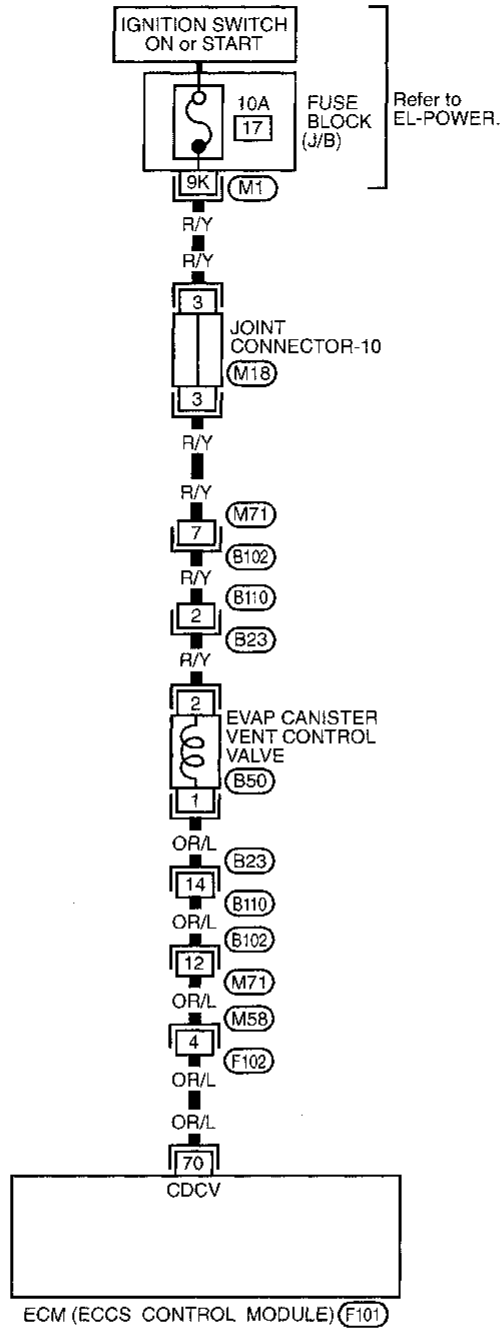


Condition	Air passage continuity between ① and ②
12V direct current supply between terminals ① and ②	No
No supply	Yes

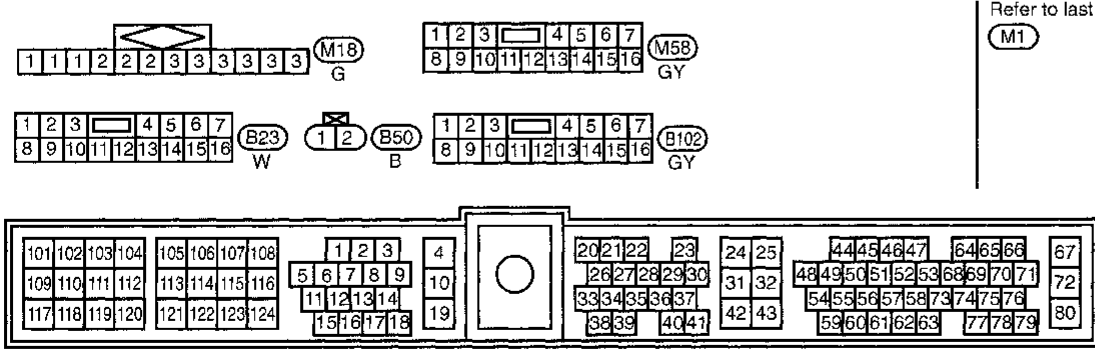
TROUBLE DIAGNOSIS FOR DTC P0446

Evaporative Emission (EVAP) Canister Vent Control Valve (DTC: 0903) (Cont'd)

EC-VENT/V-01



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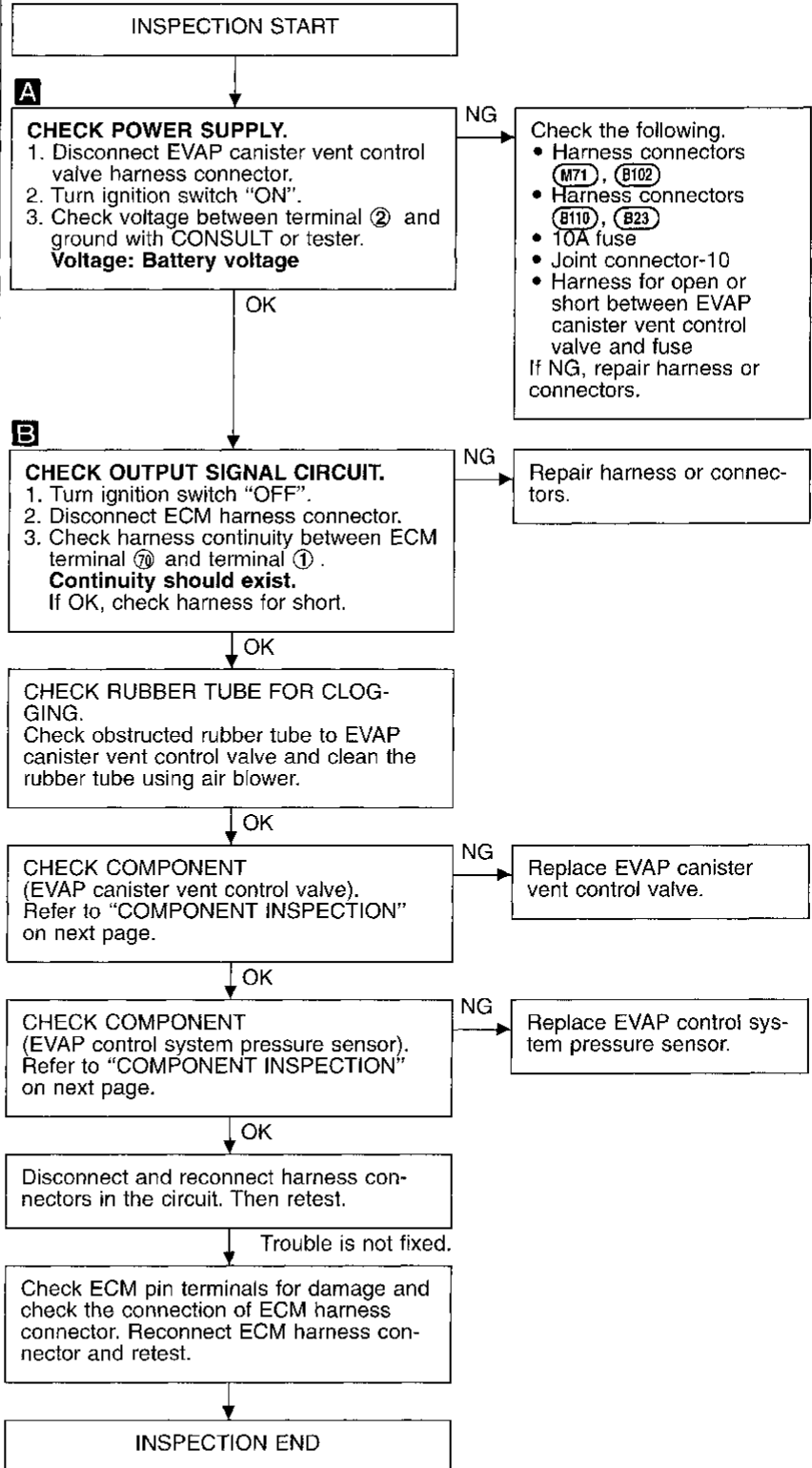
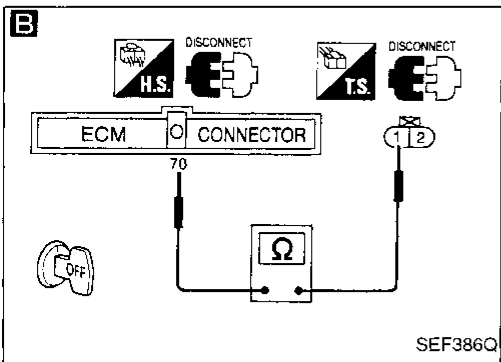
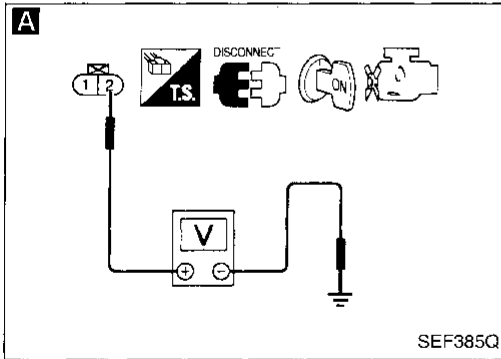
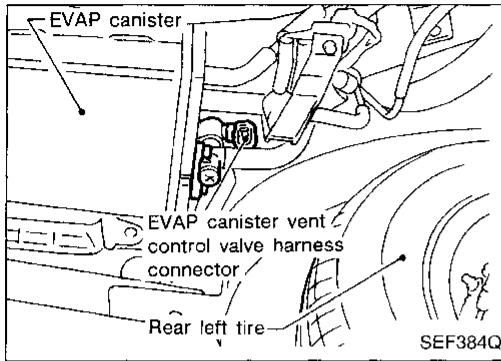
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TROUBLE DIAGNOSIS FOR DTC P0446

Evaporative Emission (EVAP) Canister Vent Control Valve (DTC: 0903) (Cont'd)

DIAGNOSTIC PROCEDURE



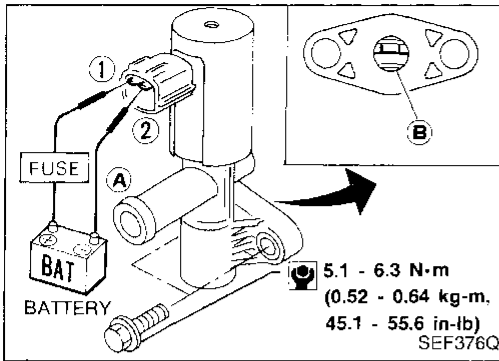
TROUBLE DIAGNOSIS FOR DTC P0446

Evaporative Emission (EVAP) Canister Vent Control Valve (DTC: 0903) (Cont'd)

COMPONENT INSPECTION

EVAP canister vent control valve

Check air passage continuity.



Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals ① and ②	No
No supply	Yes

If NG, clean valve using air blower or replace as necessary.

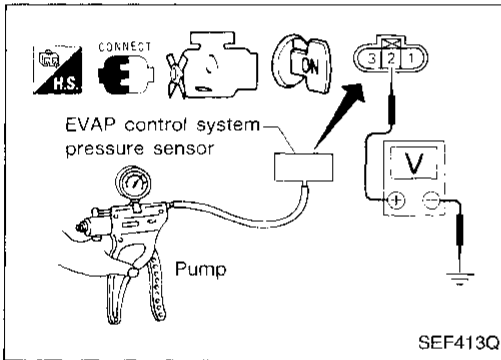
CL
MA
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EC

FE
CL

EVAP control system pressure sensor

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
4. Check output voltage between terminal ② and engine ground.



Pressure (Relative to atmospheric pressure)	Voltage (V)
0 kPa (0 mmHg, 0 inHg, 0 psi)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg, -1.35 psi)	0.4 - 0.6

MT
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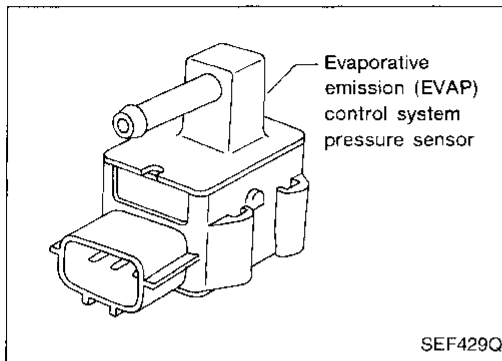
CAUTION:

Always calibrate the vacuum pump gauge when using it.

5. If NG, replace EVAP control system pressure sensor.

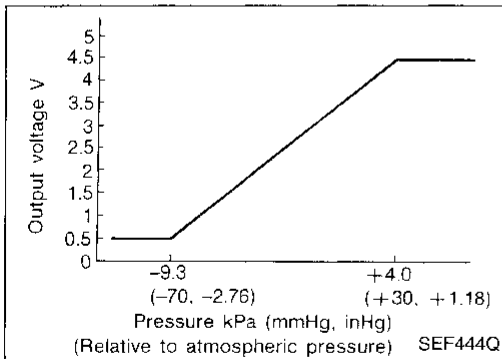
BR
ST
RS
BT
HA
EL
DX

TROUBLE DIAGNOSIS FOR DTC P0450



Evaporative Emission (EVAP) Control System Pressure Sensor (DTC: 0704)

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.



Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0450 0704	<ul style="list-style-type: none"> • An improper voltage signal from EVAP control system pressure sensor is sent to ECM. 	<ul style="list-style-type: none"> • Harness or connectors (The EVAP control system pressure sensor circuit is open or shorted.) • EVAP control system pressure sensor • EVAP canister vent control valve (The valve is stuck open.)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT.
- 5) Wait at least 12 seconds.

OR



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and wait at least 12 seconds.
- 4) Select "MODE 3" with GST.

OR

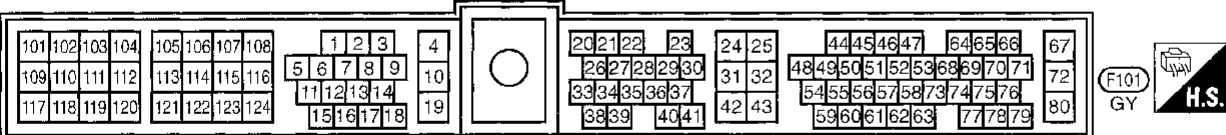
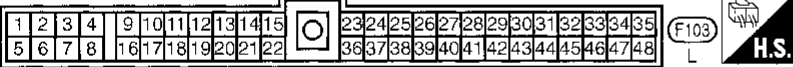
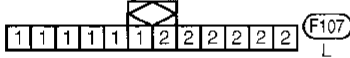
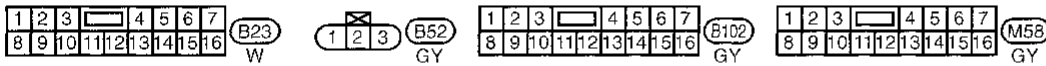
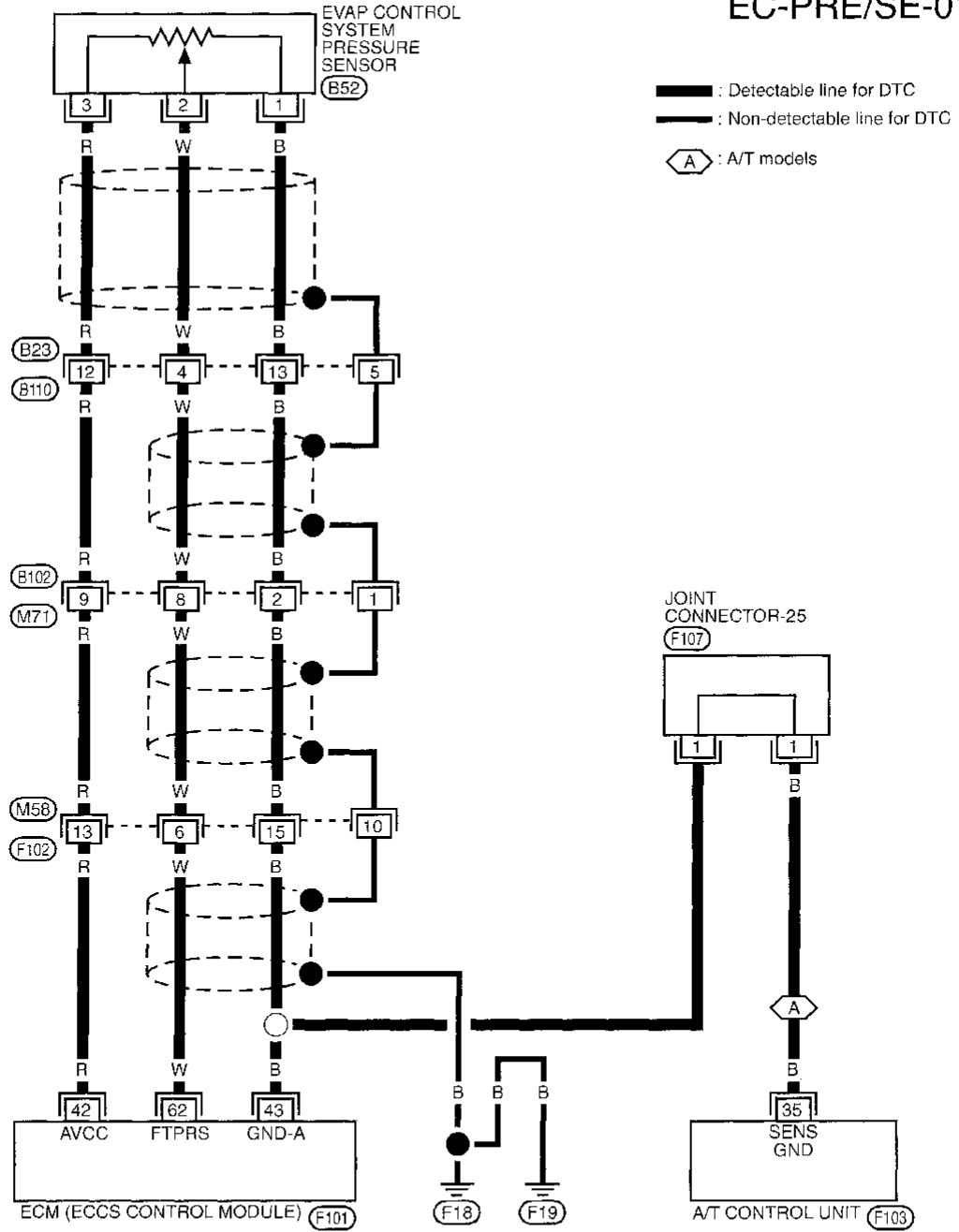


- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and wait at least 12 seconds.
- 4) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 5) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P0450

Evaporative Emission (EVAP) Control System Pressure Sensor (DTC: 0704) (Cont'd)

EC-PRE/SE-01

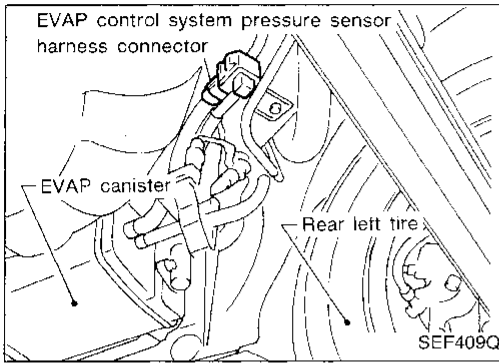


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TROUBLE DIAGNOSIS FOR DTC P0450

Evaporative Emission (EVAP) Control System Pressure Sensor (DTC: 0704) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

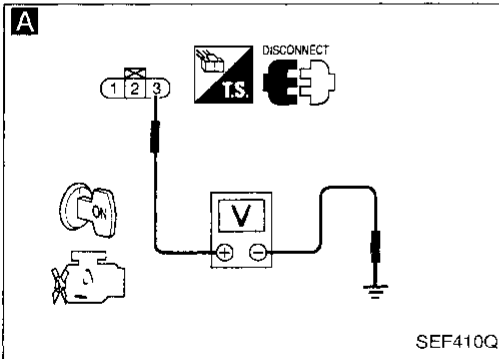
A

CHECK POWER SUPPLY.

1. Turn ignition switch "OFF".
2. Disconnect EVAP control system pressure sensor harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ③ and engine ground with CONSULT or tester.

Voltage: Approximately 5V

NG → Repair harness or connectors.



B

CHECK GROUND CIRCUIT.

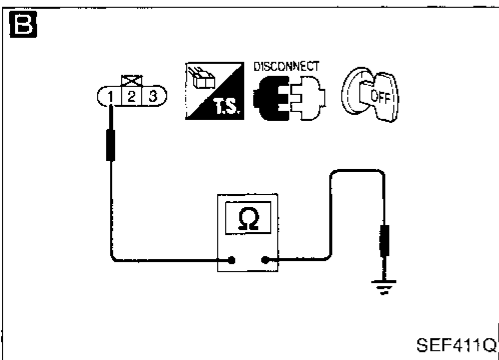
1. Turn ignition switch "OFF".
2. Loosen and retighten ground screw.
3. Check harness continuity between terminal ① and engine ground.

Continuity should exist.
If OK, check harness for short.

NG → Check the following.

- Harness connectors (B23), (B110)
- Harness connectors (B102), (M71)
- Harness connectors (M58), (F102)
- Joint connector-25 (A/T models)
- Harness for open or short between ECM and EVAP control system pressure sensor
- Harness for open or short between A/T control unit and EVAP control system pressure sensor

If NG, repair harness or connectors.



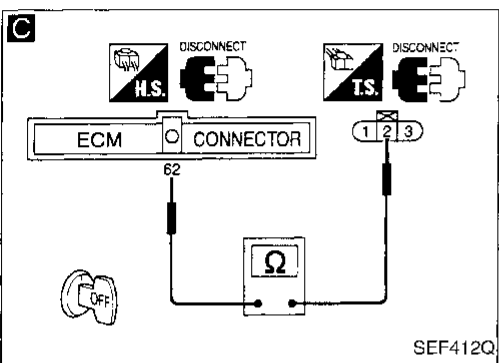
C

CHECK INPUT SIGNAL CIRCUIT.

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ⑥ and terminal ②.

Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

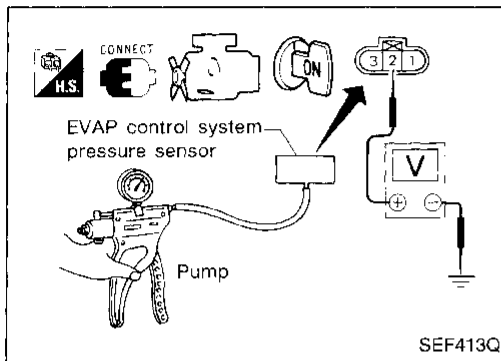
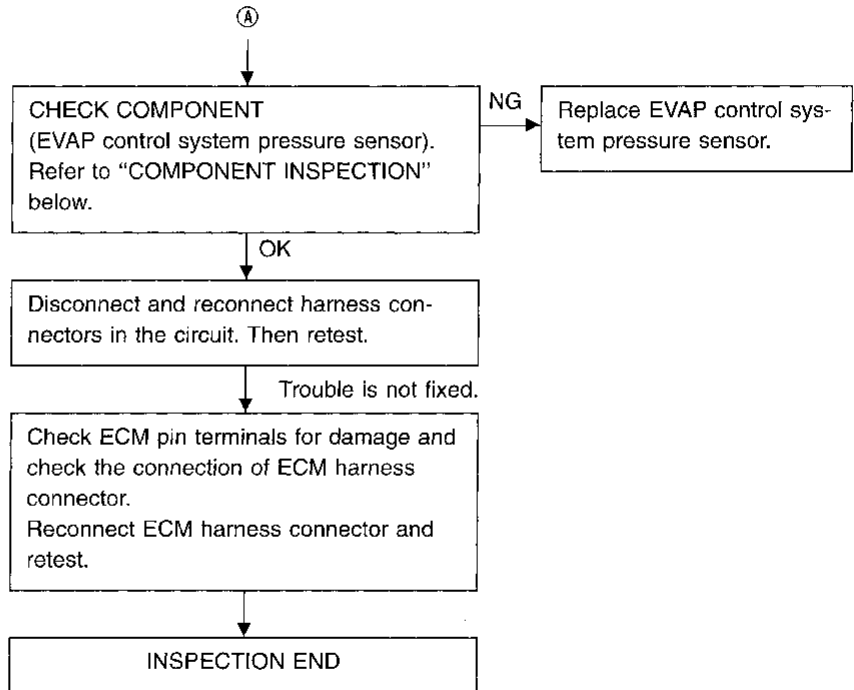


CHECK COMPONENT
(EVAP canister vent control valve).
Refer to "COMPONENT INSPECTION", EC-237.

OK → (A)

TROUBLE DIAGNOSIS FOR DTC P0450

Evaporative Emission (EVAP) Control System Pressure Sensor (DTC: 0704) (Cont'd)



COMPONENT INSPECTION

EVAP control system pressure sensor

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
4. Check output voltage between terminal ② and engine ground.

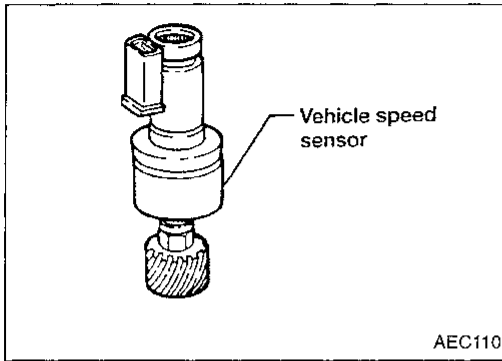
Pressure (Relative to atmospheric pressure)	Voltage (V)
0 kPa (0 mmHg, 0 inHg, 0 psi)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg, -1.35 psi)	0.4 - 0.6

CAUTION:

Always calibrate the vacuum pump gauge when using it.

5. If NG, replace EVAP control system pressure sensor.

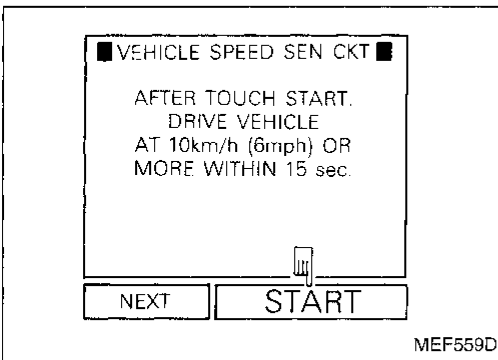
TROUBLE DIAGNOSIS FOR DTC P0500



Vehicle Speed Sensor (VSS) (DTC: 0104)

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.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0500 0104	<ul style="list-style-type: none"> The almost 0 km/h (0 MPH) signal from the vehicle speed sensor is sent to ECM even when the vehicle is driving. 	<ul style="list-style-type: none"> Harness or connector (The vehicle speed sensor circuit is open or shorted.) Vehicle speed sensor



OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the vehicle speed sensor circuit. During this check, a DTC might not be confirmed.

- 1) Jack up drive wheels.
- 2) Start engine.
- 3) Perform "VEHICLE SPEED SEN CKT" in "FUNCTION TEST" mode with CONSULT.

OR

- 2) Start engine.
- 3) Read vehicle speed sensor signal in "DATA MONITOR" mode with CONSULT.

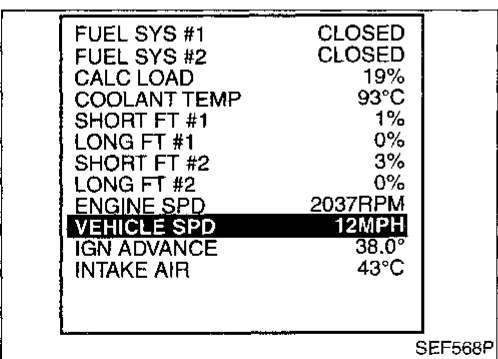
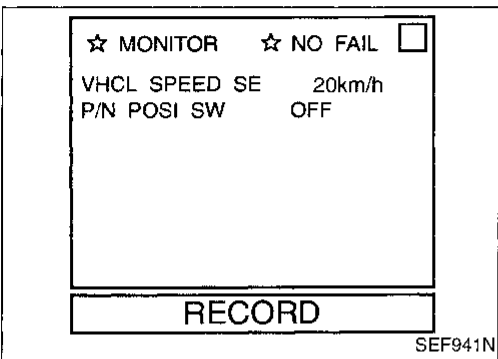
The vehicle speed on CONSULT should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.

OR

- 2) Start engine.
- 3) Read vehicle speed sensor signal in "MODE 1" with GST.

The vehicle speed on GST should be able to exceed 10 km/h (6 MPH) when rotating wheels with suitable gear position.


OR



TROUBLE DIAGNOSIS FOR DTC P0500

Vehicle Speed Sensor (VSS) (DTC: 0104) (Cont'd)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

-  1) Start engine and warm it up sufficiently.
- 2) Perform test drive for at least 10 seconds continuously in the following recommended condition. GI
- Engine speed : 1,400 - 2,400 rpm (A/T models) MA
1,700 - 2,400 rpm (M/T models)
 - Intake manifold vacuum: -53.3 to -40.0 kPa EM
(-400 to -300 mmHg, -15.75 to -11.81 inHg) (A/T models)
 - 53.3 to -26.7 kPa LC
(-400 to -200 mmHg, -15.75 to -7.87 inHg) (M/T models)
 - Gear position : Suitable position (except "N" or "P" position) **EC**
- 3) Stop the vehicle, turn ignition switch "OFF", wait at least 5 seconds and then turn "ON". FE
- 4) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

Even if a Diagnostic Trouble Code is not detected, perform the above test drive at least one more time. CL

MT

AT

FA

RA

BR

ST

RS

BT

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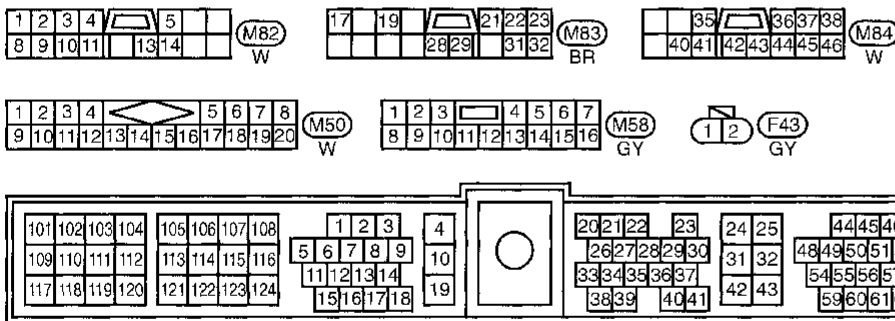
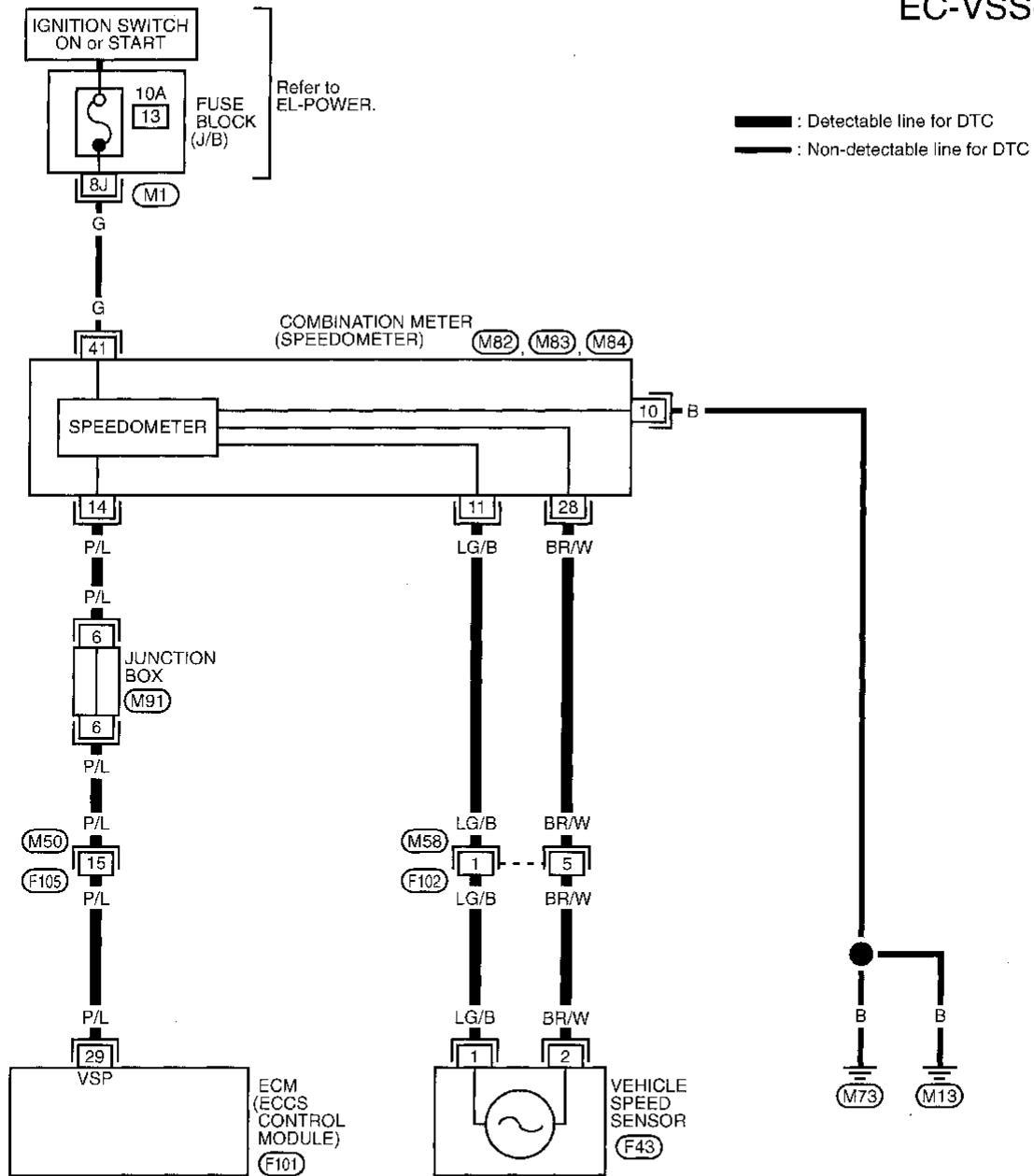
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TROUBLE DIAGNOSIS FOR DTC P0500

Vehicle Speed Sensor (VSS) (DTC: 0104) (Cont'd)

EC-VSS-01



Refer to last page (Foldout page).

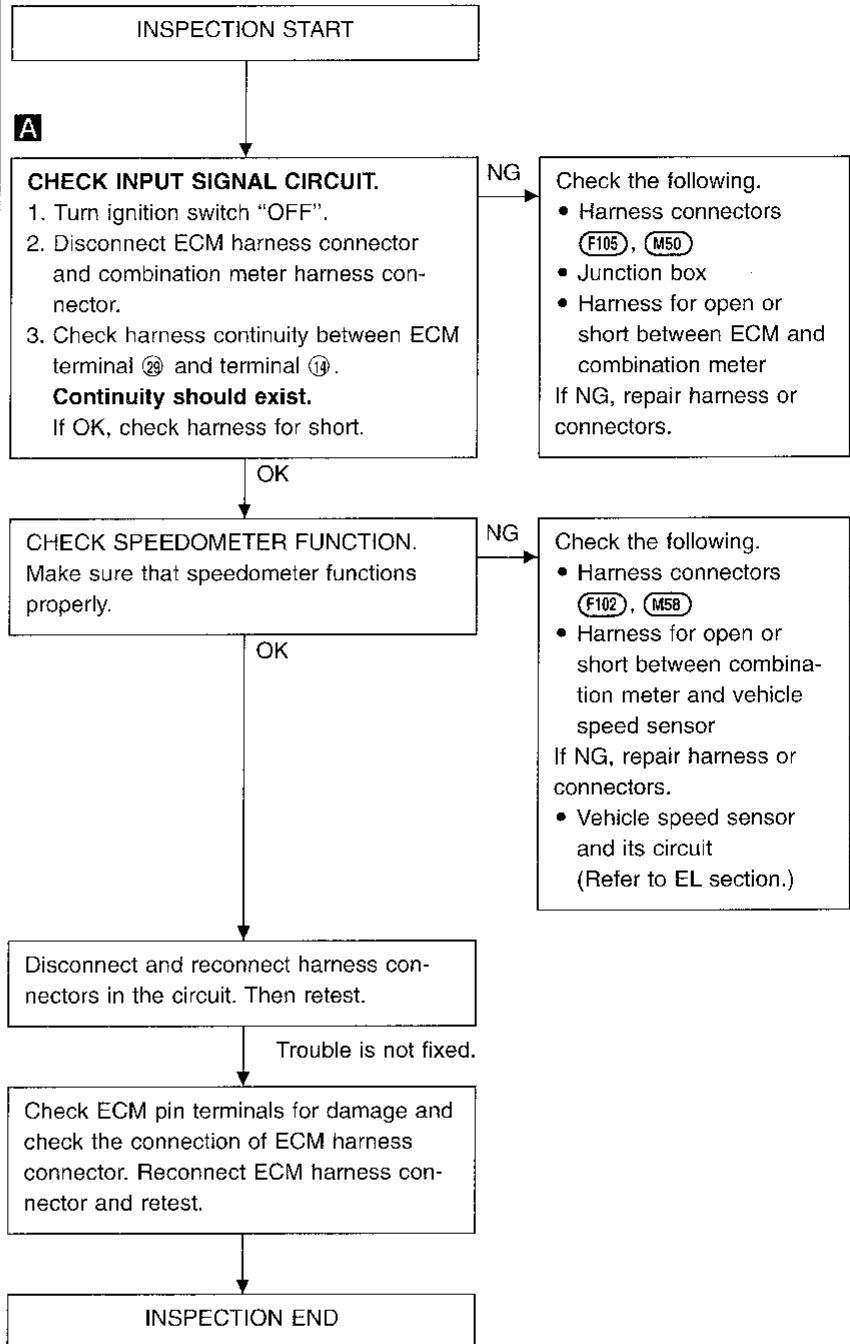
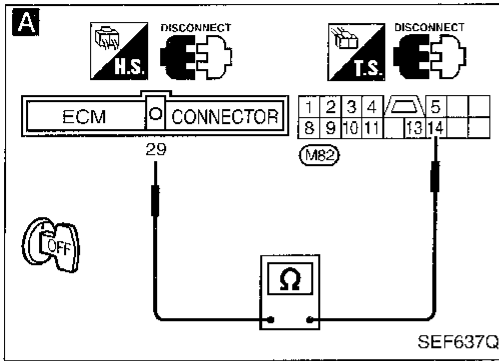
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TROUBLE DIAGNOSIS FOR DTC P0500

Vehicle Speed Sensor (VSS) (DTC: 0104) (Cont'd)

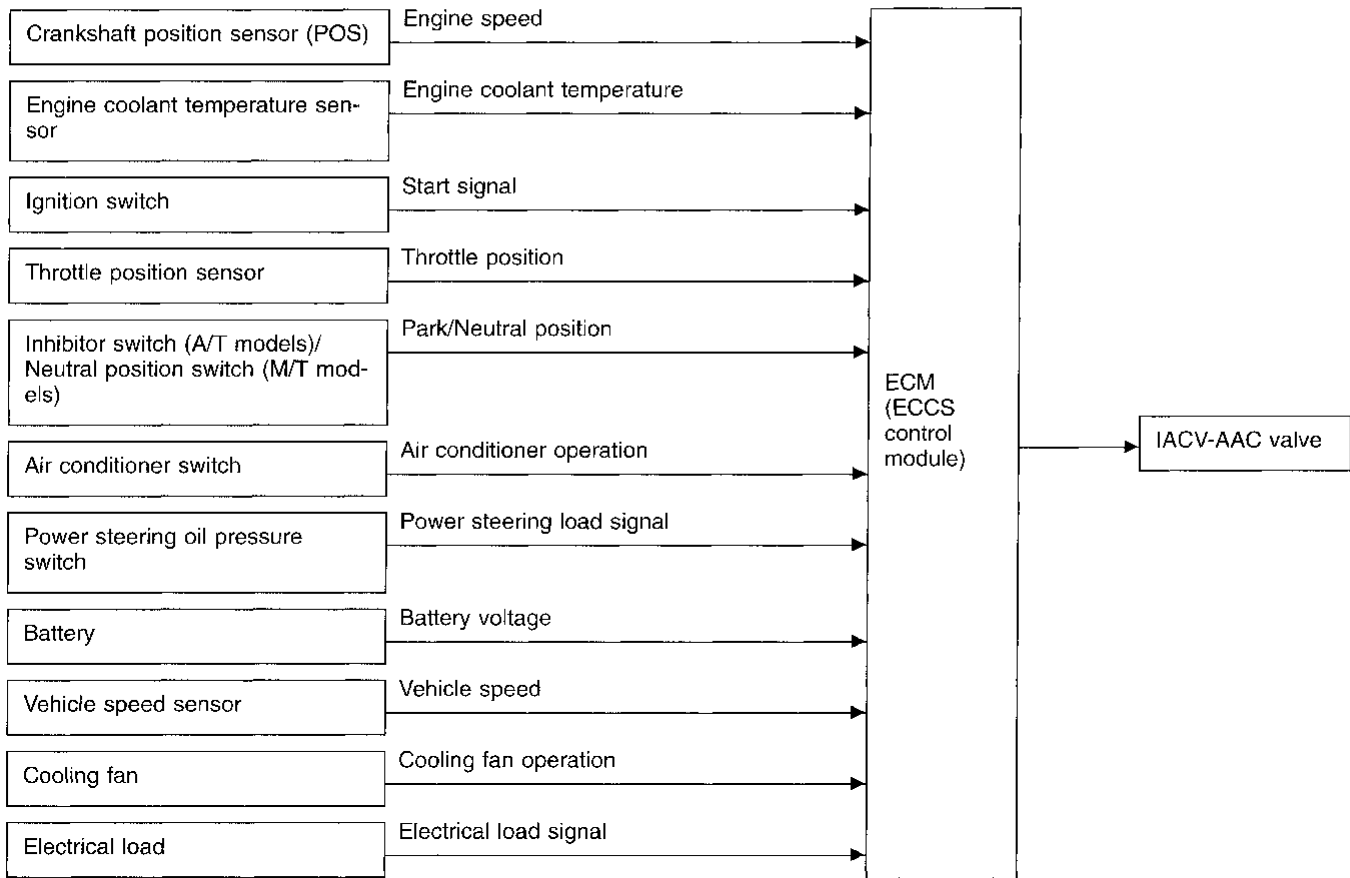
DIAGNOSTIC PROCEDURE



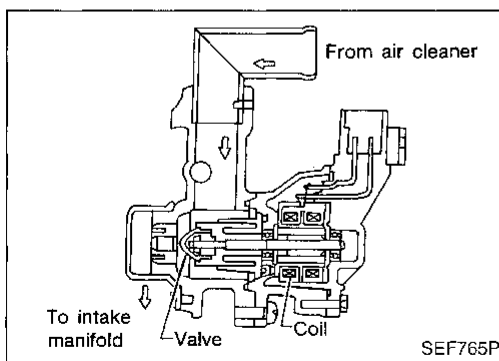
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Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205)

SYSTEM DESCRIPTION



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 crankshaft position sensor (POS) 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

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.

TROUBLE DIAGNOSIS FOR DTC P0505

Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205) (Cont'd)

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0505 0205	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.) • IACV-AAC valve

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Perform "Procedure for malfunction A" first. If DTC cannot be confirmed, perform "Procedure for malfunction B".

Procedure for malfunction A

- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine and let it idle.
- 4) Keep engine speed at 2,500 rpm for 3 seconds, then let it idle for 3 seconds.
Do not rev engine up to speeds more than 3,000 rpm.
- 5) Perform step 4 once more.

OR

- 1) Start engine and let it idle.
- 2) Keep engine speed at 2,500 rpm for 3 seconds, then let it idle for 3 seconds.
Do not rev engine up to speeds more than 3,000 rpm.
- 3) Perform step 2 once more.
- 4) Select "MODE 3" with GST.

OR

- 1) Start engine and let it idle.
- 2) Keep engine speed at 2,500 rpm for 3 seconds, then let it idle for 3 seconds.
Do not rev engine up to speeds more than 3,000 rpm.
- 3) Perform step 2 once more.
- 4) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 5) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

Procedure for malfunction B

- 1) Open engine hood.
- 2) Start engine and warm it up sufficiently.
- 3) Turn ignition switch "OFF" and wait at least 5 seconds.
- 4) Turn ignition switch "ON" again and select "DATA MONITOR" mode with CONSULT.
- 5) Start engine and run it for at least 1 minute at idle speed. (Headlamp switch, rear defogger switch: OFF)

OR

TROUBLE DIAGNOSIS FOR DTC P0505

Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205) (Cont'd)



- 1) Open engine hood.
- 2) Start engine and warm it up sufficiently.
- 3) Turn ignition switch "OFF" and wait at least 5 seconds.
- 4) Start engine again and run it for at least 1 minute at idle speed. (Headlamp switch, rear defogger switch: OFF)
- 5) Select "MODE 3" with GST.

OR

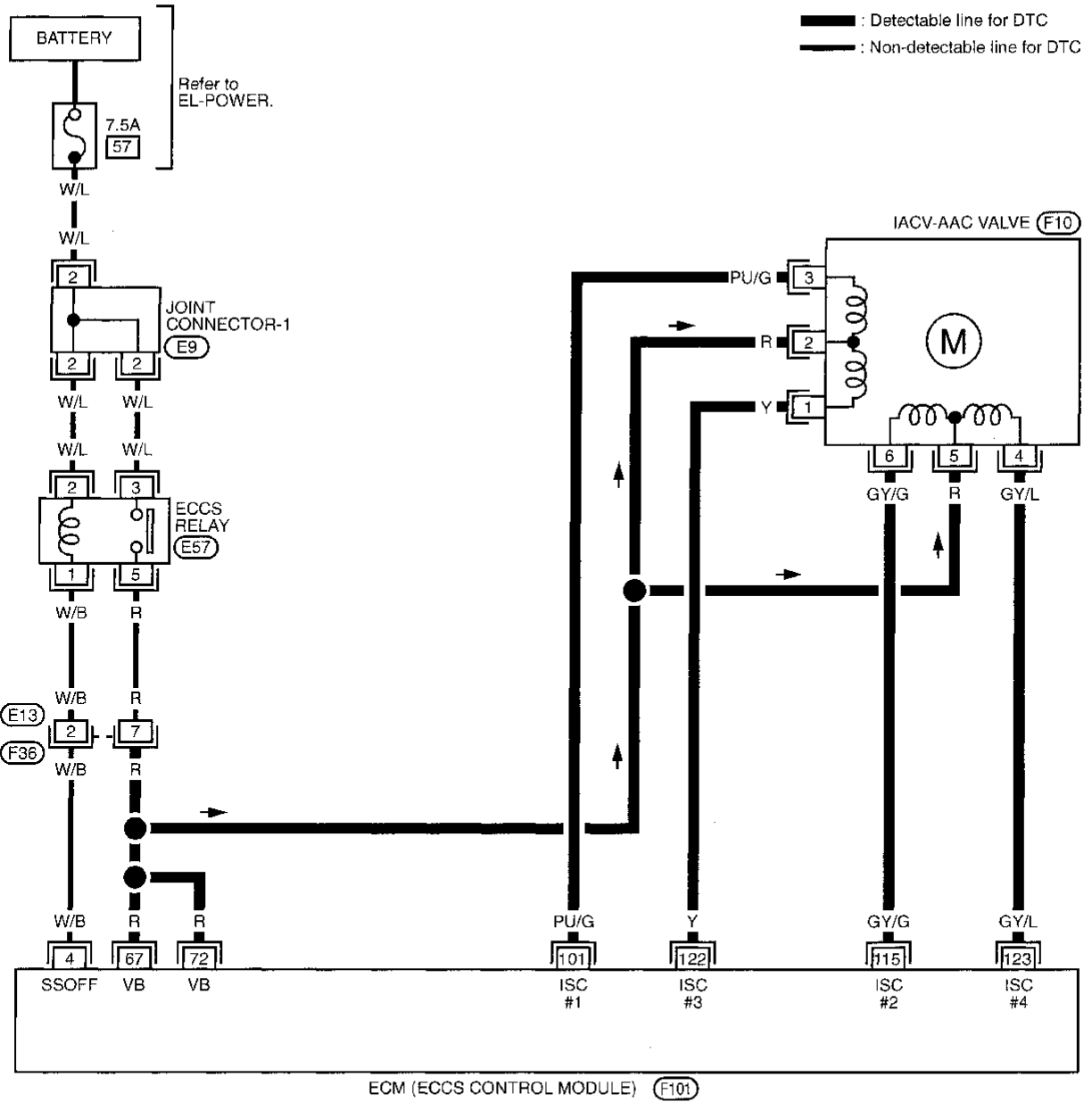


- 1) Open engine hood.
- 2) Start engine and warm it up sufficiently.
- 3) Turn ignition switch "OFF" and wait at least 5 seconds.
- 4) Start engine again and run it for at least 1 minute at idle speed. (Headlamp switch, rear defogger switch: OFF)
- 5) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 6) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

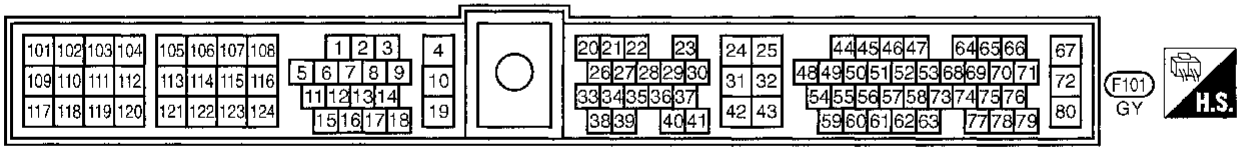
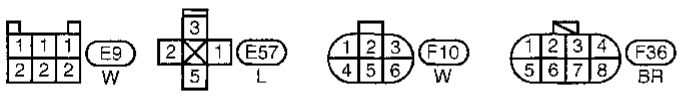
TROUBLE DIAGNOSIS FOR DTC P0505

Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205) (Cont'd)

EC-AAC/V-01



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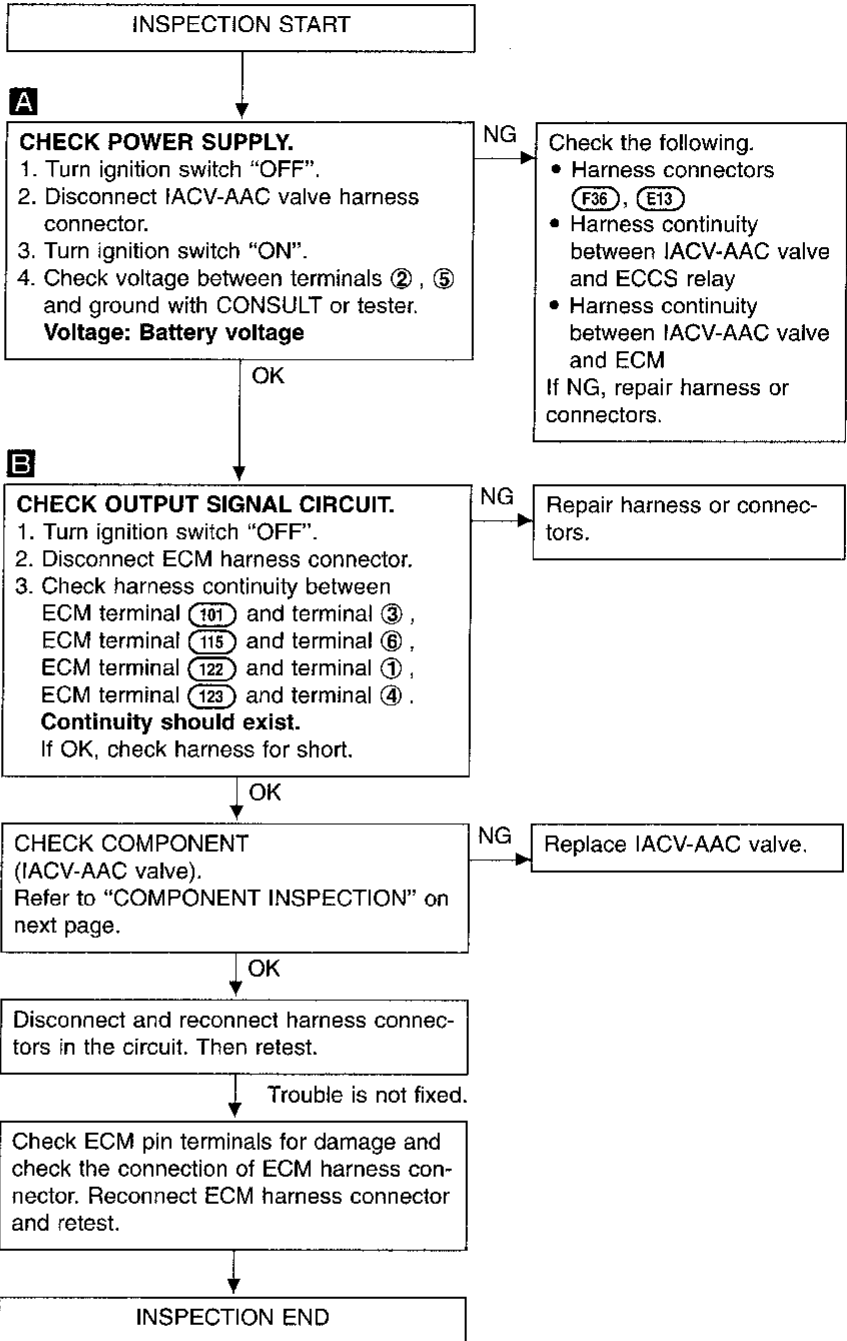
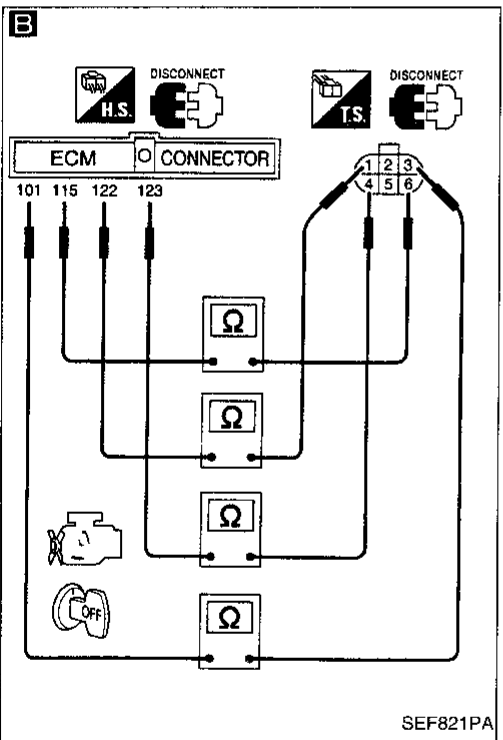
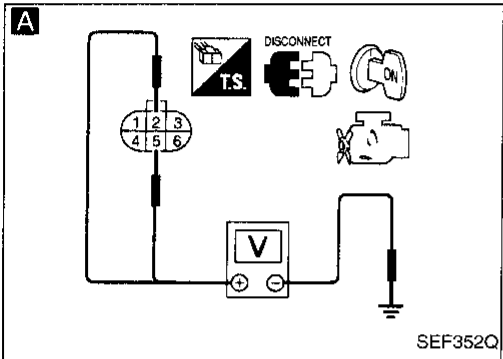
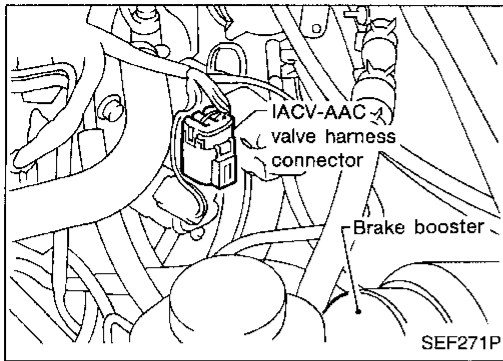


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TROUBLE DIAGNOSIS FOR DTC P0505

Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205) (Cont'd)

DIAGNOSTIC PROCEDURE



TROUBLE DIAGNOSIS FOR DTC P0505

Idle Air Control Valve (IACV) — Auxiliary Air Control (AAC) Valve (DTC: 0205) (Cont'd)

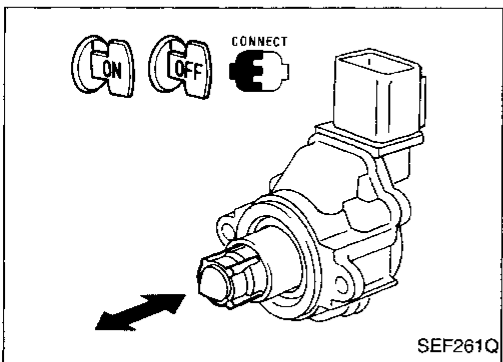
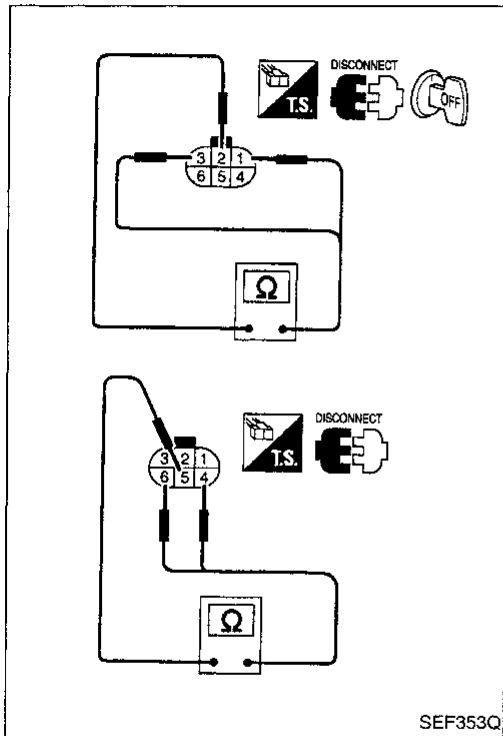
COMPONENT INSPECTION

IACV-AAC valve

1. Disconnect IACV-AAC valve harness connector.
2. Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

Resistance:

Approximately 30Ω [at 20°C (68°F)]



3. Reconnect IACV-AAC valve harness connector.
4. Remove idle air adjusting unit assembly (IACV-AAC valve is built-in) from engine.
(The IACV-AAC valve harness connector should remain connected.)
5. Turn ignition switch "ON" and "OFF", and ensure the IACV-AAC valve shaft smoothly moves forward and backward, according to the ignition switch position.
If NG, replace the IACV-AAC valve.

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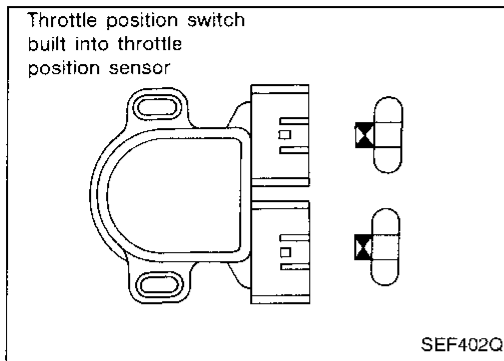
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TROUBLE DIAGNOSIS FOR DTC P0510

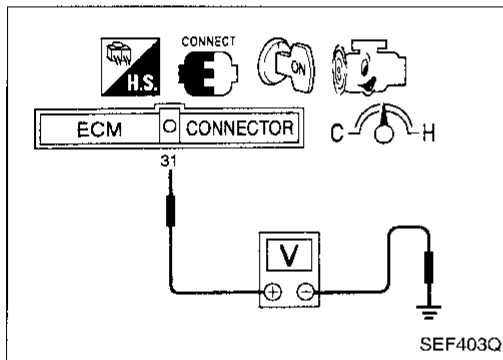


Closed Throttle Position Switch (DTC: 0203)

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.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0510 0203	<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.



OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the closed throttle position switch circuit. During this check, a DTC might not be confirmed.



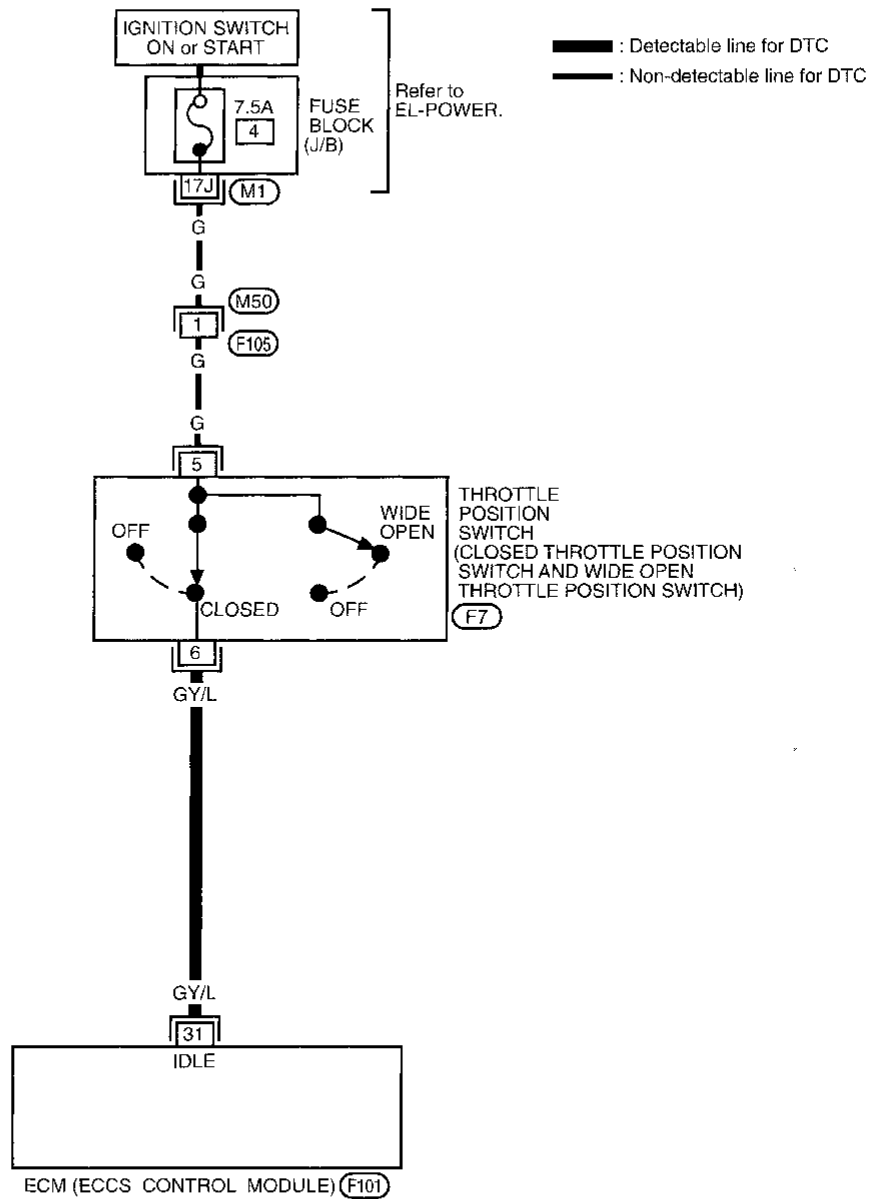
- 1) Start engine and warm it up sufficiently.
- 2) Check the voltage between ECM terminal ③① and ground under the following conditions.

At idle: Battery voltage
At 2,000 rpm: Approximately 0V

TROUBLE DIAGNOSIS FOR DTC P0510

Closed Throttle Position Switch (DTC: 0203) (Cont'd)

EC-TP/SW-01



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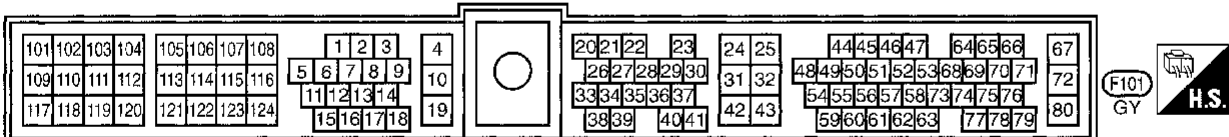
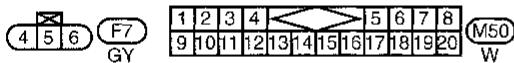
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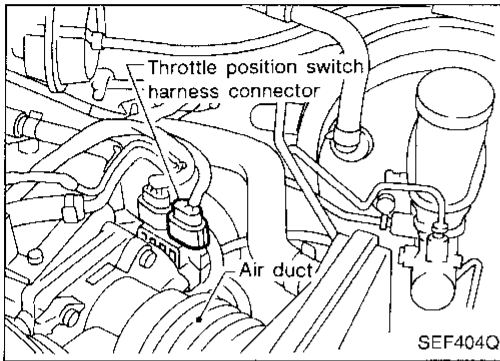
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TROUBLE DIAGNOSIS FOR DTC P0510

Closed Throttle Position Switch (DTC: 0203) (Cont'd)

DIAGNOSTIC PROCEDURE

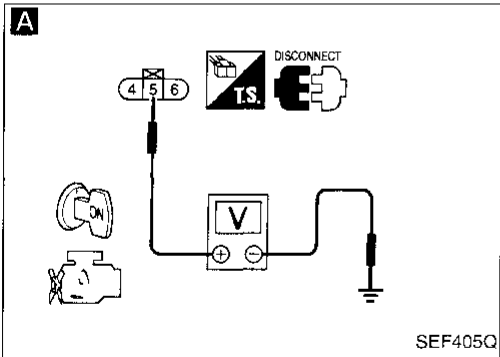


INSPECTION START

CHECK FIC.
Perform "Fast Idle Cam (FIC) Inspection and Adjustment", EC-29.

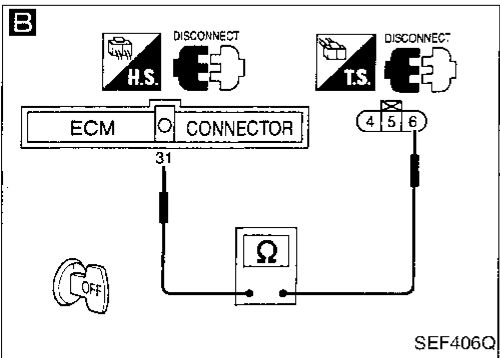
A
CHECK POWER SUPPLY.
1. Turn ignition switch "OFF".
2. Disconnect throttle position switch harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ⑤ and engine ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
• Harness connectors
• F105, M50
• 7.5A fuse
• Harness for open or short between throttle position switch and fuse
If NG, repair harness or connectors.



OK → **B**
CHECK INPUT SIGNAL CIRCUIT.
1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between ECM terminal ③ and terminal ⑥.
Continuity should exist.

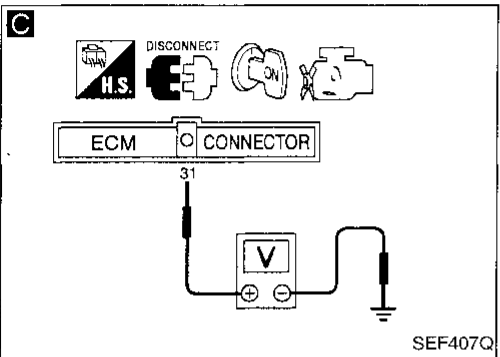
NG → Repair harness or connectors.



OK → **C**
CHECK INPUT SIGNAL CIRCUIT.
1. Turn ignition switch "ON".
2. Check voltage between ECM terminal ③ and engine ground.
Voltage: Approx. 0V

NG → Repair harness or connectors.

OK → ADJUST THROTTLE POSITION SWITCH.
Perform BASIC INSPECTION, EC-70.



NG → Replace throttle position switch.

OK → Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector.
Reconnect ECM harness connector and retest.

INSPECTION END

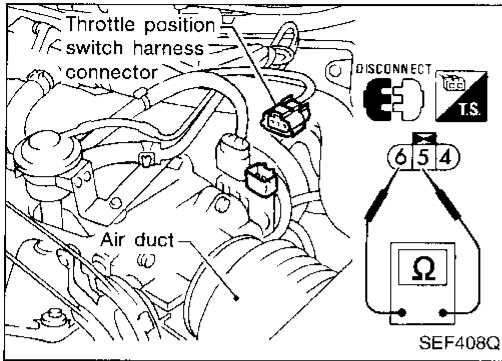
TROUBLE DIAGNOSIS FOR DTC P0510

Closed Throttle Position Switch (DTC: 0203) (Cont'd)

COMPONENT INSPECTION

Closed throttle position switch

1. Start engine and warm it up sufficiently.
2. Turn ignition switch "OFF".
3. Disconnect throttle position switch harness connector.
4. Check continuity between terminals ⑤ and ⑥ while opening throttle valve manually.



Throttle valve conditions	Continuity
Completely closed	Yes
Partially open or completely open	No

If NG, replace throttle position switch.

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TROUBLE DIAGNOSIS FOR DTC P0600

A/T Control (DTC: 0504)

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 A/T control unit.

* Freeze frame data is not stored in the ECM for the "A/T control". The MIL will not light for "A/T control" malfunction.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P0600 0504	<ul style="list-style-type: none">ECM receives incorrect voltage from A/T control unit continuously.	<ul style="list-style-type: none">Harness or connectors (The circuit between ECM and A/T control unit is open or shorted.)A/T control unit

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Note: If any diagnostic trouble code is displayed performing self-diagnosis for A/T (Refer to AT section.), perform the trouble diagnosis for the DTC first (Refer to AT section.).

- 1) Jack up drive wheels.
- 2) Make sure that selector lever is set in "P" or "N" position.
- 3) Turn ignition switch "ON".
- 4) Select "DATA MONITOR" mode with CONSULT.
- 5) Start engine and rise engine speed to more than 1,000 rpm at once.
- 6) Run engine for at least 10 seconds at idle speed.
- 7) Run engine for at least 10 seconds at 2,000 rpm.
- 8) Set selector lever in "D" position and run engine for at least 10 seconds at idle speed (with vehicle stopped).
- 9) Drive vehicle at 12 to 20 km/h (7 to 12 MPH) for at least 10 seconds in "D" position.

OR

- 4) Start engine and rise engine speed to more than 1,000 rpm at once.
- 5) Run engine for at least 10 seconds at idle speed.
- 6) Run engine for at least 10 seconds at 2,000 rpm.
- 7) Set selector lever in "D" position and run engine for at least 10 seconds at idle speed (with vehicle stopped).
- 8) Drive vehicle at 12 to 20 km/h (7 to 12 MPH) for at least 10 seconds in "D" position.
- 9) Select "Mode 3" with GST.

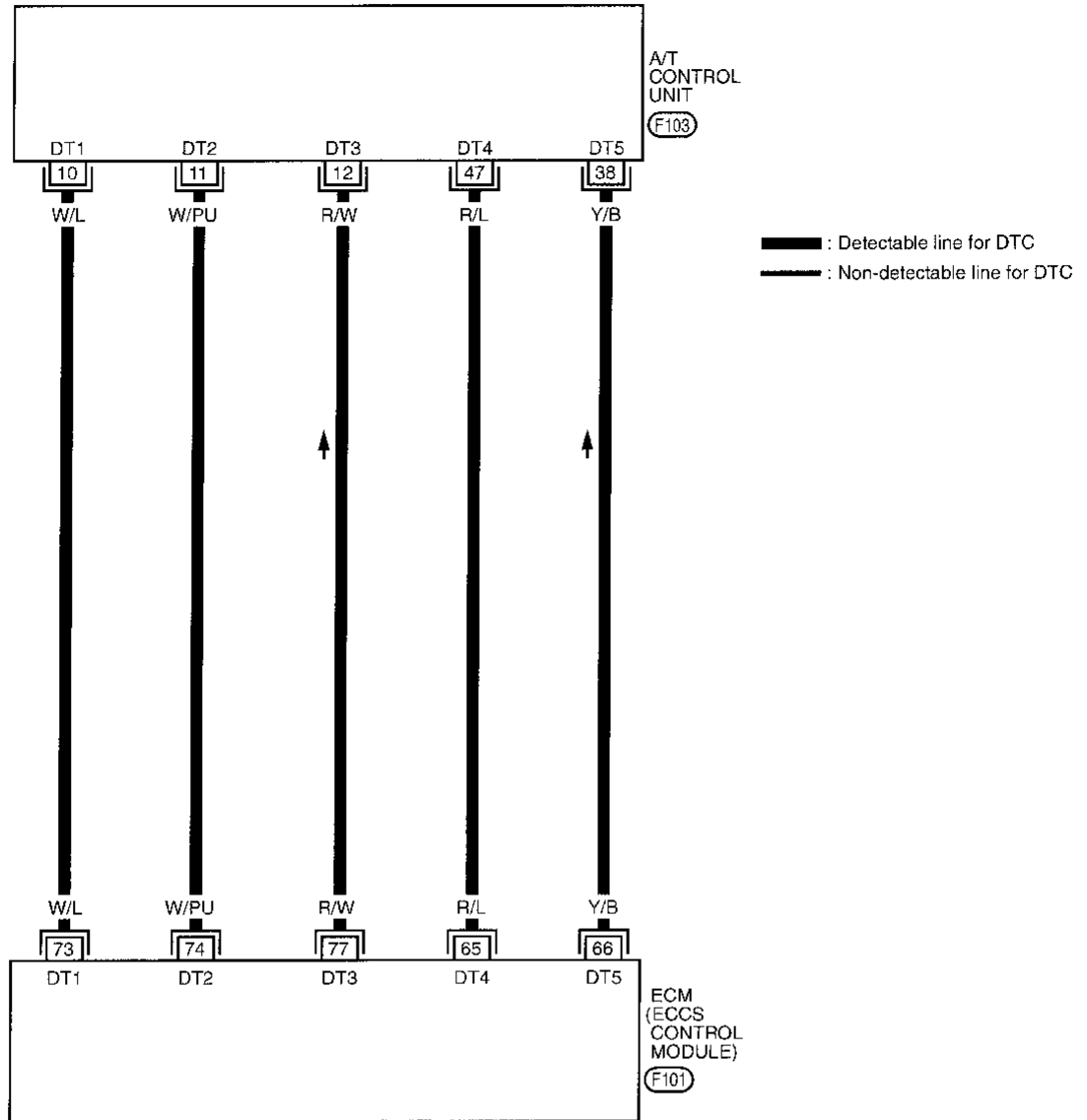
OR

- 4) Start engine and rise engine speed to more than 1,000 rpm at once.
- 5) Run engine for at least 10 seconds at idle speed.
- 6) Run engine for at least 10 seconds at 2,000 rpm.
- 7) Set selector lever in "D" position and run engine for at least 10 seconds at idle speed (with vehicle stopped).
- 8) Drive vehicle at 12 to 20 km/h (7 to 12 MPH) for at least 10 seconds in "D" position.
- 9) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 10) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

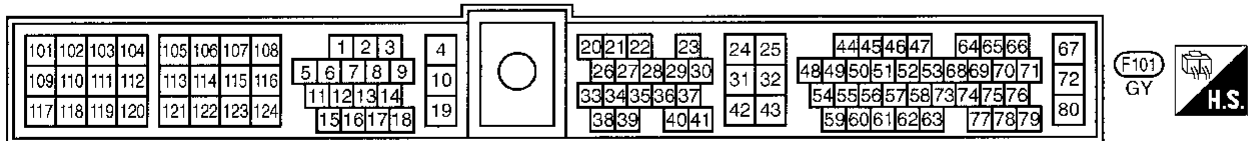
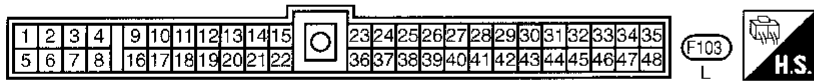
TROUBLE DIAGNOSIS FOR DTC P0600

A/T Control (DTC: 0504) (Cont'd)

EC-AT/C-01



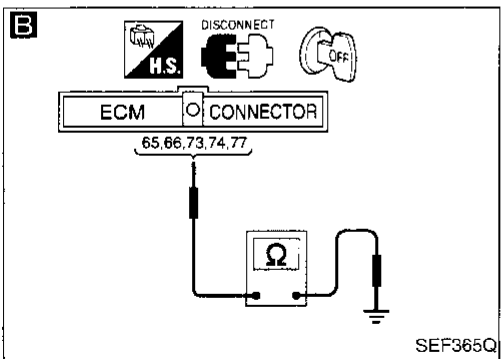
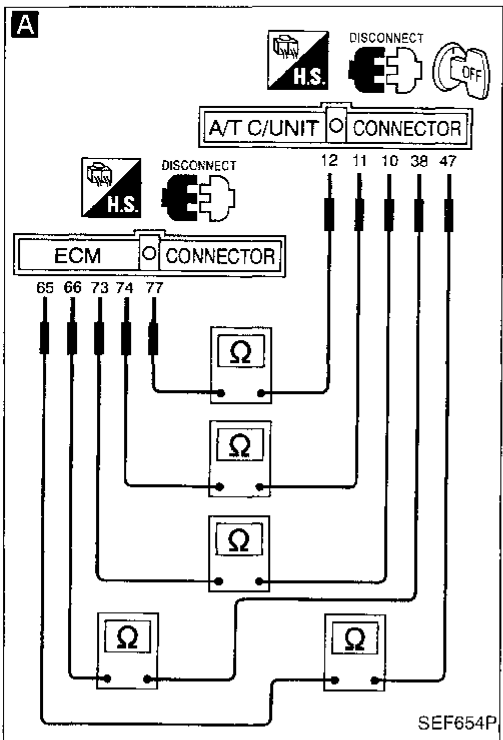
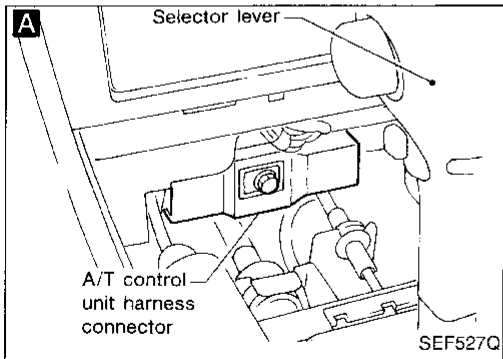
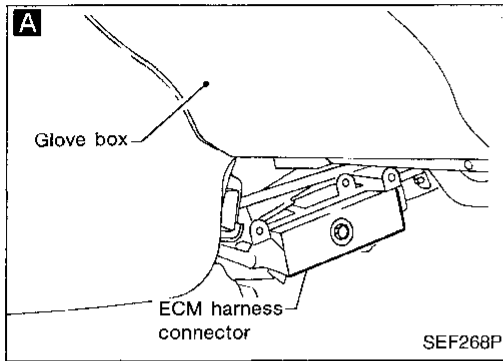
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TROUBLE DIAGNOSIS FOR DTC P0600

A/T Control (DTC: 0504) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A
CHECK INPUT SIGNAL CIRCUIT.
 1. Turn ignition switch "OFF".
 2. Disconnect ECM harness connector and A/T control unit harness connector.
 3. Check harness continuity between ECM terminal 65 and terminal 12, ECM terminal 66 and terminal 11, ECM terminal 73 and terminal 10, ECM terminal 74 and terminal 11, ECM terminal 77 and terminal 12.
Continuity should exist.
 If OK, check harness for short.

NG → Repair harness or connectors.

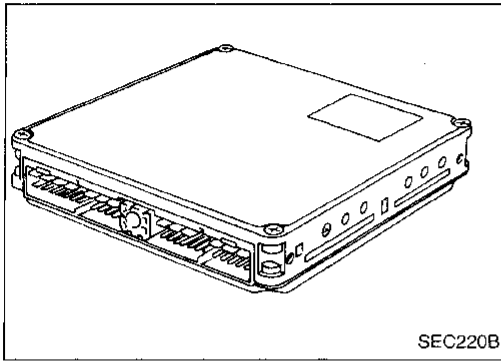
B
CHECK INPUT SIGNAL CIRCUIT.
 Check harness continuity between ECM terminal 65 and ground, ECM terminal 66 and ground, ECM terminal 73 and ground, ECM terminal 74 and ground, ECM terminal 77 and ground.
Continuity should not exist.
 If OK, check harness for short.

NG → Repair harness or connectors.

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.
 Check ECM and A/T control unit pin terminals for damage and check the connection of ECM and A/T control unit harness connectors. Reconnect ECM and A/T control unit harness connectors and retest.

INSPECTION END



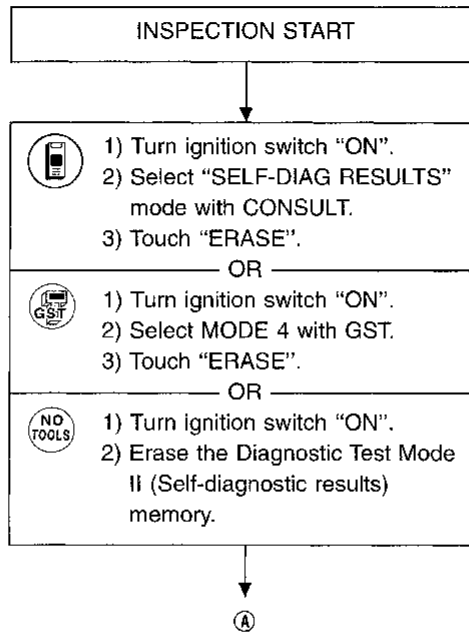
Engine Control Module (ECM) — ECCS Control Module (DTC: 0301)

The ECM consists of a microcomputer, a diagnostic test mode selector, and connectors for signal input and output and for power supply. The unit controls the engine.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Item (Possible Cause)
P0605 0301	<ul style="list-style-type: none"> • ECM calculation function is malfunctioning. 	<ul style="list-style-type: none"> • ECM (ECCS control module)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

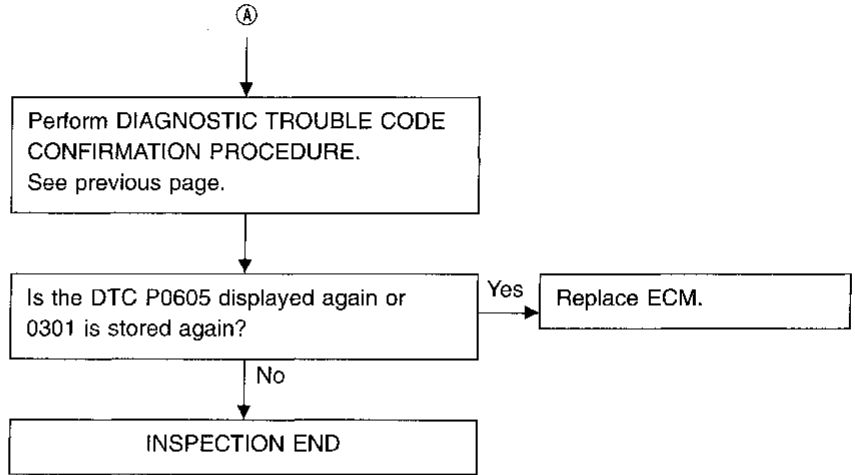
- CONSULT
 - 1) Turn ignition switch "ON".
 - 2) Select "DATA MONITOR" mode with CONSULT.
 - 3) Start engine and wait at least 30 seconds.
- OR
- GST
 - 1) Turn ignition switch "ON".
 - 2) Select "Mode 3" with GST.
 - 3) Start engine and wait at least 30 seconds.
- OR
- NO TOOLS
 - 1) Turn ignition switch "ON".
 - 2) Start engine and wait at least 30 seconds.
 - 3) Turn ignition switch "OFF" and wait at least 5 seconds.
 - 4) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.



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TROUBLE DIAGNOSIS FOR DTC P0605

Engine Control Module (ECM) — ECCS Control Module (DTC: 0301) (Cont'd)



TROUBLE DIAGNOSIS FOR DTC P0705

Park/Neutral Position Switch (DTC: 1003)

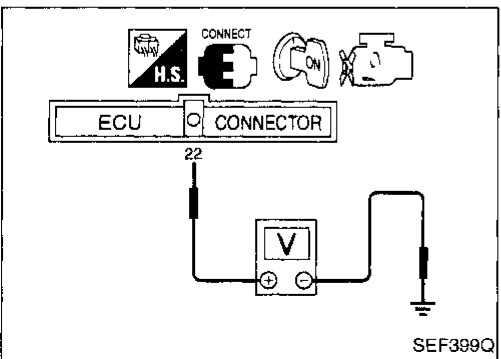
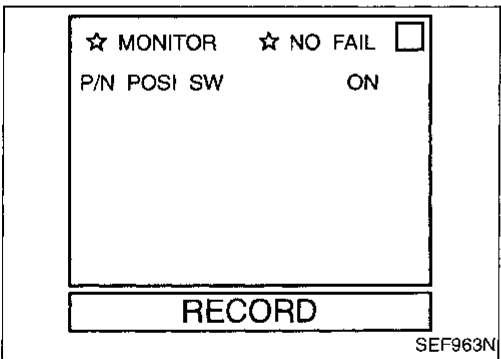
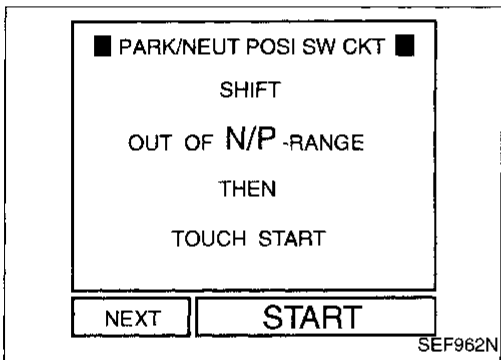
When the gear position is in "P" (A/T models only) or "N", park/neutral position is "ON". ECM detects the position because the continuity of the line (the "ON" signal) exists.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P0705 1003	<ul style="list-style-type: none"> The signal of the park/neutral position switch is not changed in the process of engine starting and driving. 	<ul style="list-style-type: none"> Harness or connectors (The neutral position switch or inhibitor switch circuit is open or shorted.) Neutral position switch (M/T models) Inhibitor switch (A/T models)

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OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the park/neutral position switch circuit. During this check, a DTC might not be confirmed.

- 1) Turn ignition switch "ON".
 - 2) Perform "PARK/NEUT POSI SW CKT" in "FUNCTION TEST" mode with CONSULT.
- _____ OR _____
- 2) Select "P/N POSI SW" in "DATA MONITOR" mode with CONSULT.
 - 3) Check the "P/N POSI SW" signal under the following conditions.

Condition (Gear position)	Known good signal
"P" (A/T only) and "N" position	ON
Except the above position	OFF

- _____ OR _____
- 1) Turn ignition switch "ON".
 - 2) Check voltage between ECM terminal ② and body ground under the following conditions.

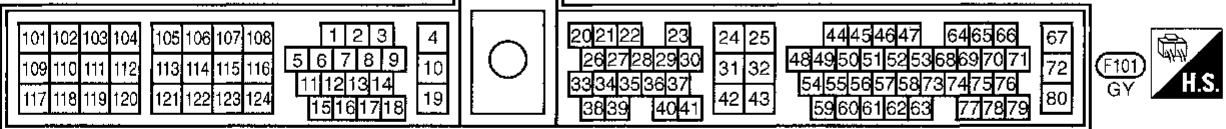
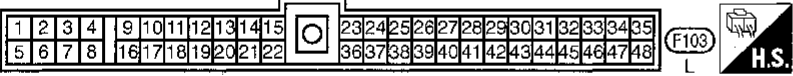
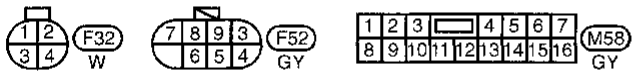
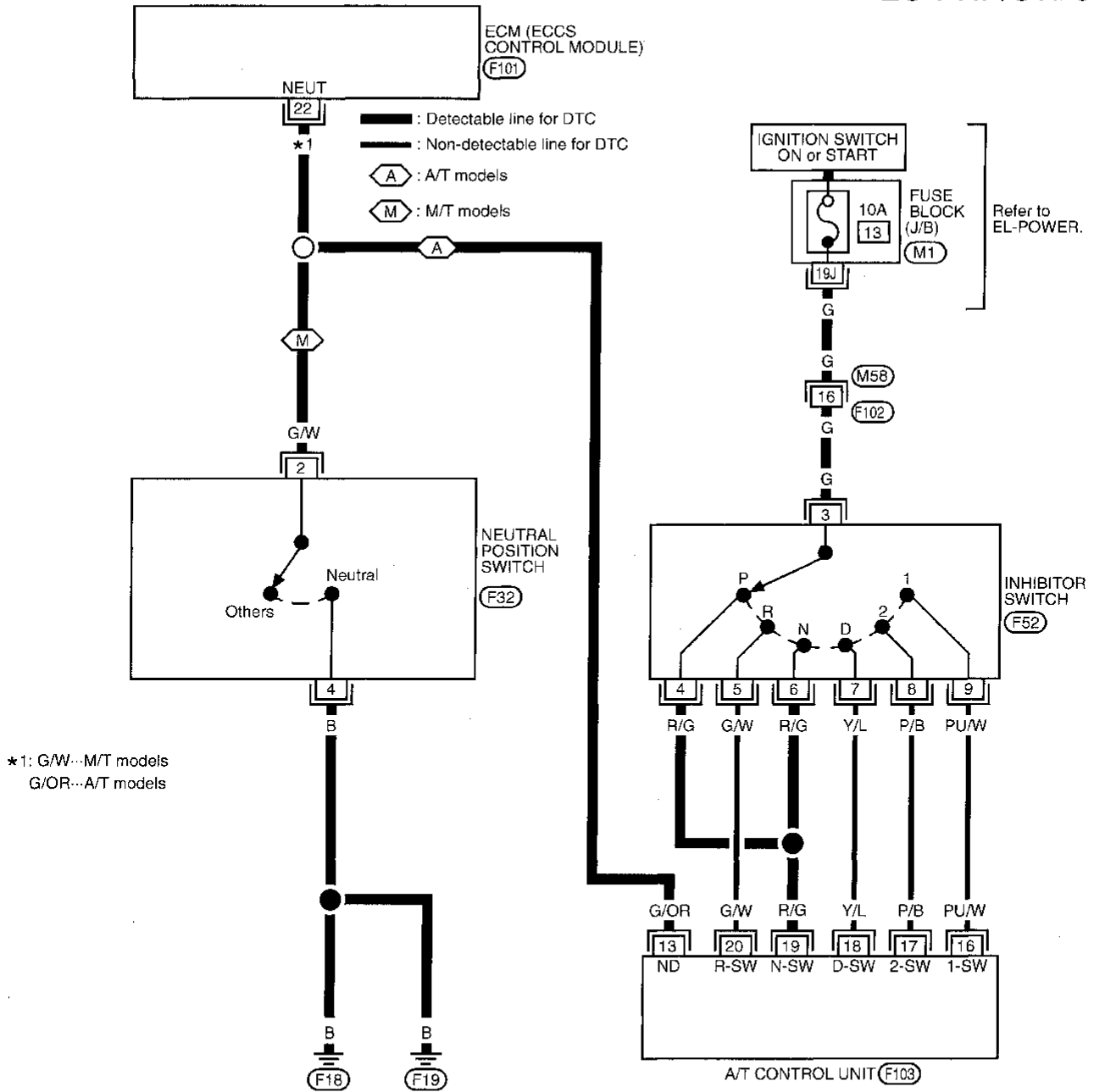
Condition (Gear position)	Voltage (V) (Known good data)
"P" (A/T only) and "N" position	Approx. 0
Except the above position	Approx. 5

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TROUBLE DIAGNOSIS FOR DTC P0705

Park/Neutral Position Switch (DTC: 1003) (Cont'd)

EC-PNP/SW-01



TROUBLE DIAGNOSIS FOR DTC P0705

Park/Neutral Position Switch (DTC: 1003) (Cont'd)

DIAGNOSTIC PROCEDURE

Neutral position switch (M/T models)

INSPECTION START

A

CHECK GROUND CIRCUIT.

1. Disconnect neutral position switch harness connector.
2. Check harness continuity between terminal ④ and body ground.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

B

CHECK INPUT SIGNAL CIRCUIT.

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ② and terminal ②.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

CHECK COMPONENT
(Neutral position switch).
Refer to MT section.

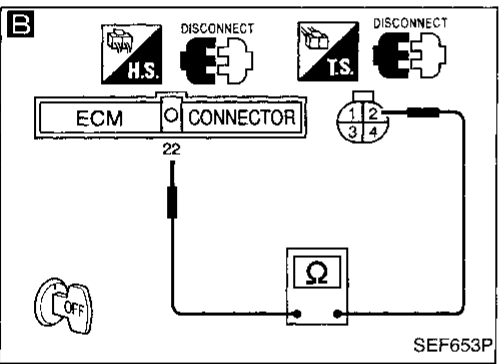
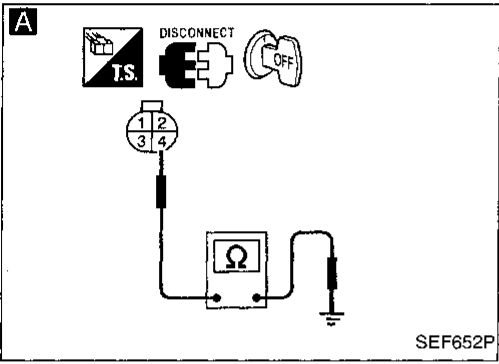
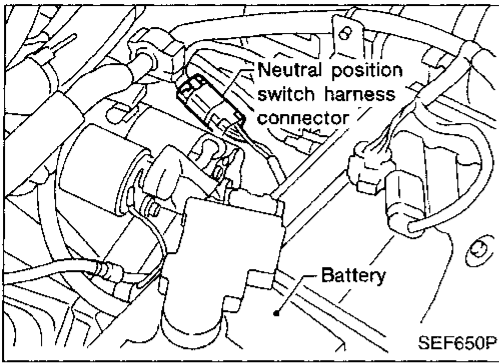
NG → Replace neutral position switch.

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

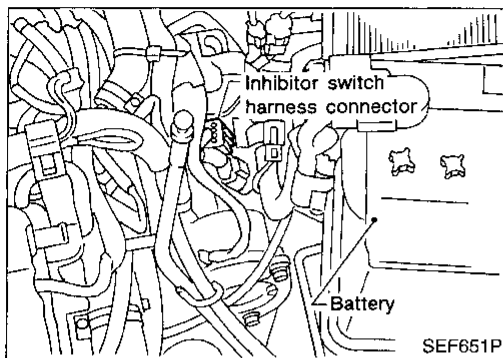


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TROUBLE DIAGNOSIS FOR DTC P0705

Park/Neutral Position Switch (DTC: 1003) (Cont'd)

DIAGNOSTIC PROCEDURE



Inhibitor switch

INSPECTION START

A

CHECK POWER SUPPLY.

1. Disconnect inhibitor switch harness connector.
 2. Turn ignition switch "ON".
 3. Check voltage between terminal ③ and ground with CONSULT or tester.
- Voltage: Battery voltage**

NG

Check the following.

- Harness connectors
- F102, M58
- 10A fuse
- Harness for open or short between inhibitor switch and fuse

If NG, repair harness or connectors.

OK

B

CHECK OUTPUT SIGNAL CIRCUIT-I.

1. Disconnect A/T control unit harness connector.
 2. Check harness continuity between A/T control unit terminal ⑱ and terminals ④, ⑥.
- Continuity should exist.**

NG

Repair harness or connectors.

OK

C

CHECK OUTPUT SIGNAL CIRCUIT-II.

1. Disconnect ECM harness connector.
 2. Check harness continuity between ECM terminal ⑳ and terminal ⑱.
- Continuity should exist.**

NG

Repair harness or connectors.

OK

CHECK COMPONENT

(Inhibitor switch).
Refer to AT section.

NG

Replace inhibitor switch.

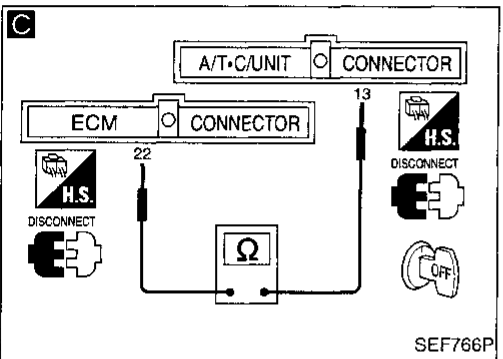
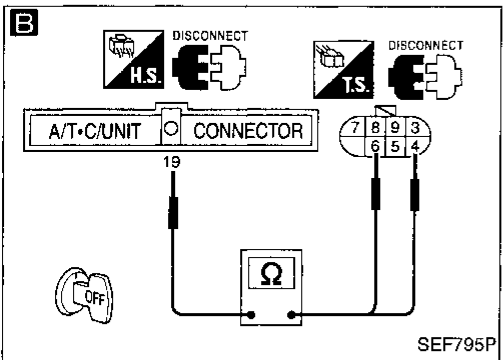
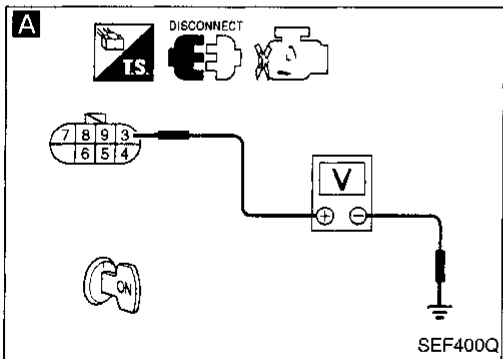
OK

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

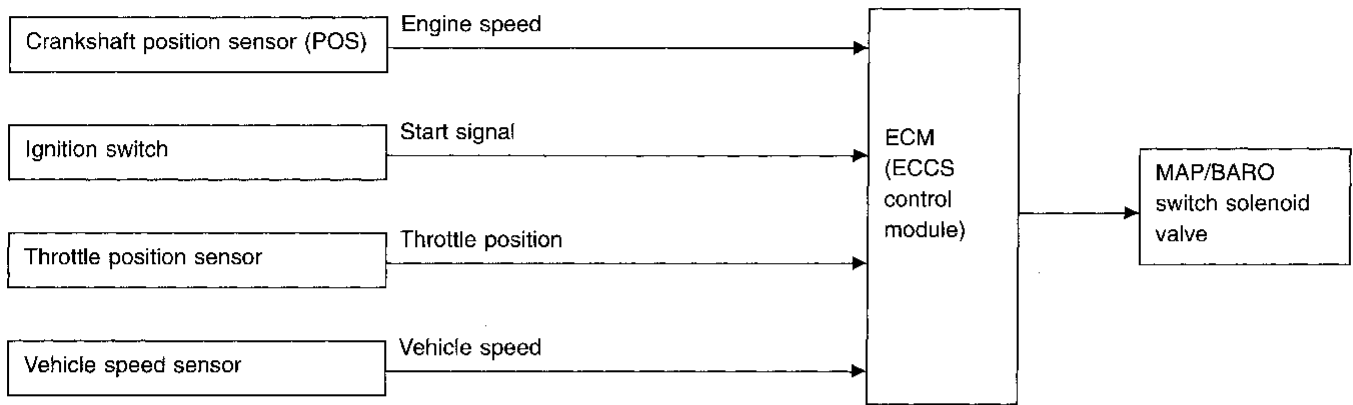
Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END



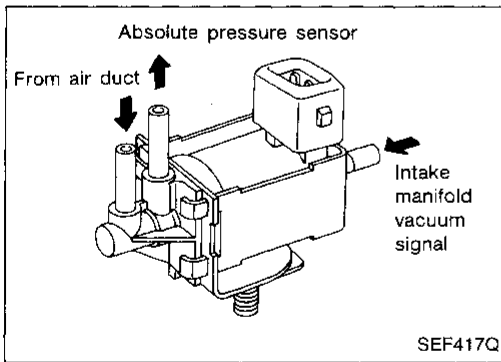
Manifold Absolute Pressure (MAP)/Barometric Pressure (BARO) Switch Solenoid Valve (DTC: 1302)

SYSTEM DESCRIPTION



This system allows the absolute pressure sensor to monitor either ambient barometric pressure or intake manifold pressure. The MAP/BARO switch solenoid valve switches between two passages by ON-OFF pulse signals from the ECM. (One passage is from the intake air duct, the other is from the intake manifold.) Either ambient barometric pressure or intake manifold pressure is applied to the absolute pressure sensor.

Solenoid	Conditions
ON	<ul style="list-style-type: none"> Immediately after starting engine or More than 5 minutes after the solenoid valve shuts OFF.
	<ul style="list-style-type: none"> and Throttle valve is shut or almost fully shut for more than 1 second and Vehicle speed is less than 100 km/h (62 MPH).



COMPONENT DESCRIPTION

The MAP/BARO switch solenoid valve switches its air flow passage according to the voltage signal sent from the ECM. When voltage is supplied from the ECM, the MAP/BARO switch solenoid turns "ON". Then, the absolute pressure sensor can monitor the ambient barometric pressure. When voltage is not supplied from the ECM, the MAP/BARO switch solenoid valve turns "OFF". Then, the sensor monitors intake manifold pressure.

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TROUBLE DIAGNOSIS FOR DTC P1105

Manifold Absolute Pressure (MAP)/Barometric Pressure (BARO) Switch Solenoid Valve (DTC: 1302) (Cont'd)

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1105 1302	<ul style="list-style-type: none">• MAP/BARO switch solenoid valve receives the voltage supplied though ECM does not supply the voltage to the valve.• There is little difference between MAP/BARO switch solenoid valve input voltage at ambient barometric pressure and voltage at intake manifold pressure.	<ul style="list-style-type: none">• Harness or connectors (MAP/BARO switch solenoid valve circuit is open or shorted.)• Hoses (Hoses are clogged or disconnected.)• Absolute pressure sensor• MAP/BARO switch solenoid valve

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 4) Start engine and let it idle.
- 5) Wait at least 8 seconds.

OR



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Start engine and let it idle.
- 4) Wait at least 8 seconds.
- 5) Select "MODE 3" with GST.

OR

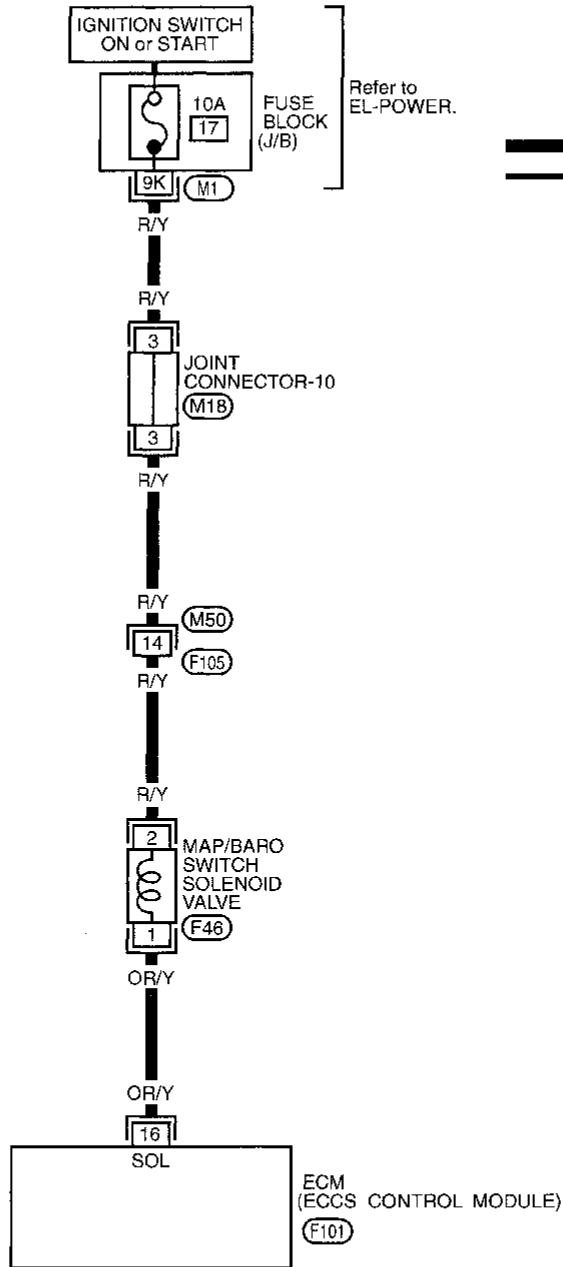


- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Start engine and let it idle.
- 4) Wait at least 8 seconds.
- 5) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 6) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P1105

Manifold Absolute Pressure (MAP)/Barometric Pressure (BARO) Switch Solenoid Valve (DTC: 1302) (Cont'd)

EC-SW/V-01



— : Detectable line for DTC
 — : Non-detectable line for DTC

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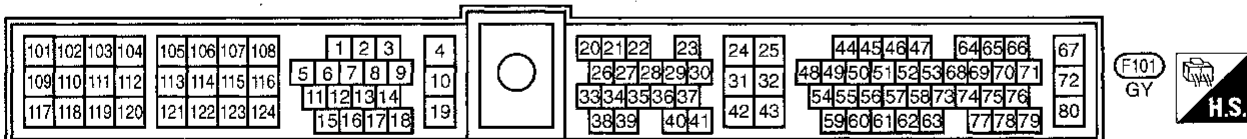
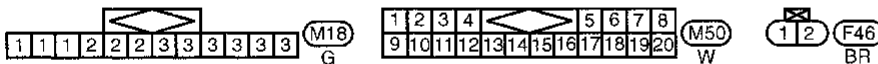
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Refer to last page (Foldout page).

M1

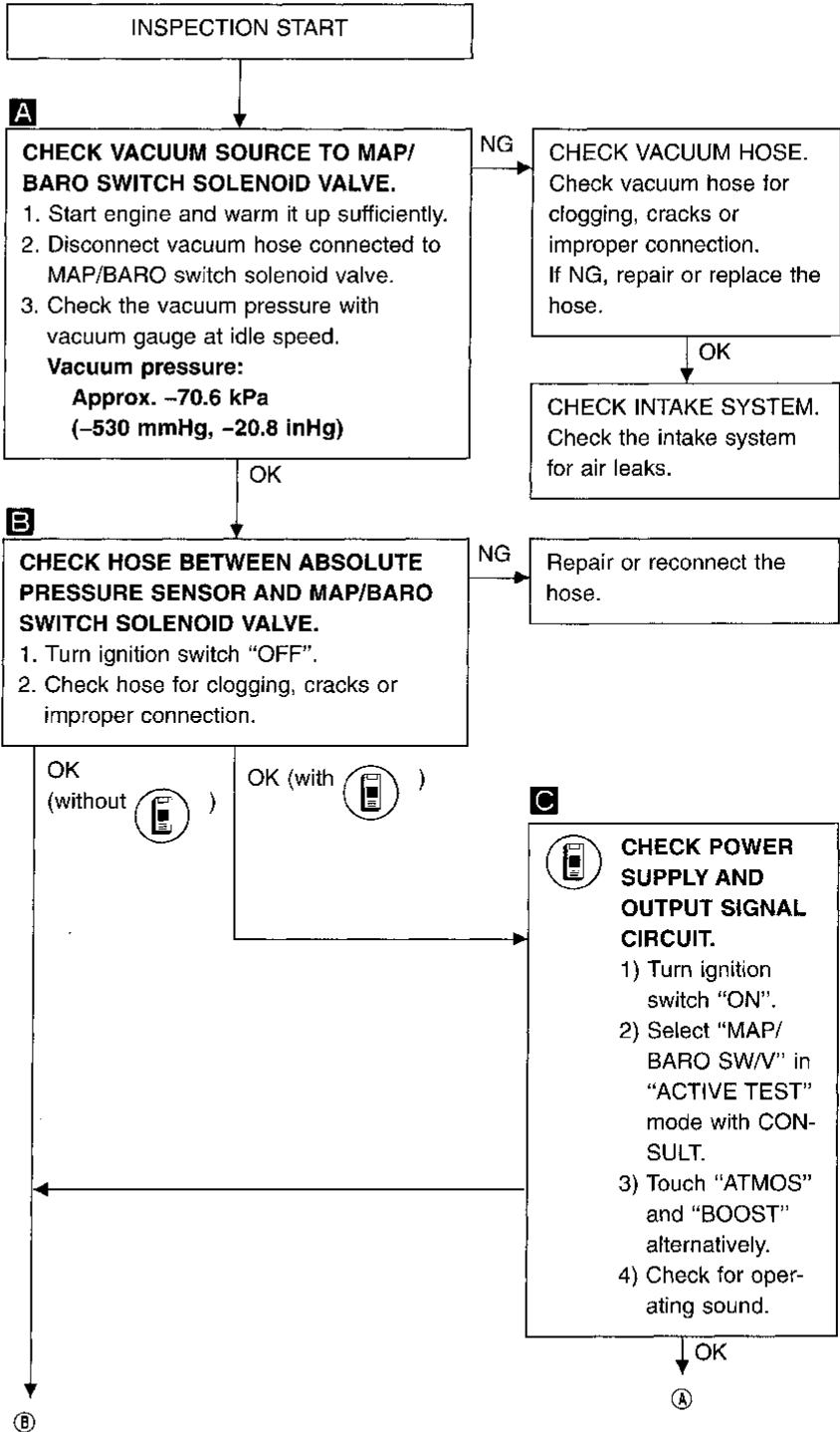
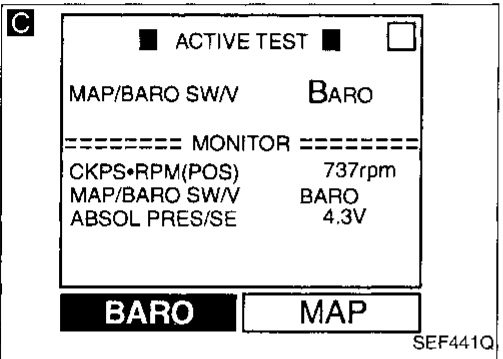
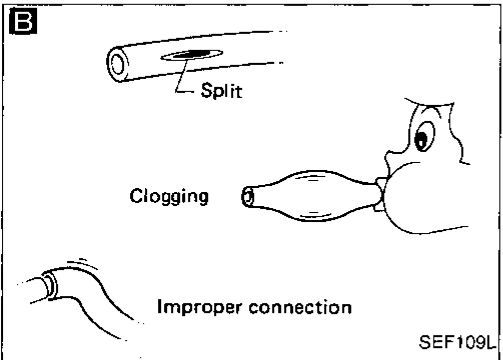
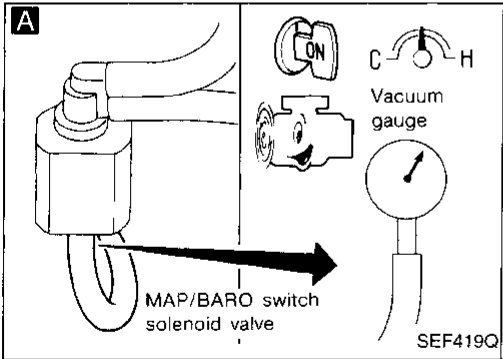
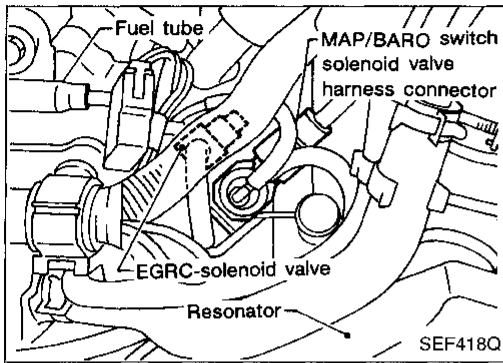


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TROUBLE DIAGNOSIS FOR DTC P1105

Manifold Absolute Pressure (MAP)/Barometric Pressure (BARO) Switch Solenoid Valve (DTC: 1302) (Cont'd)

DIAGNOSTIC PROCEDURE



TROUBLE DIAGNOSIS FOR DTC P1105

Manifold Absolute Pressure (MAP)/Barometric Pressure (BARO) Switch Solenoid Valve (DTC: 1302) (Cont'd)

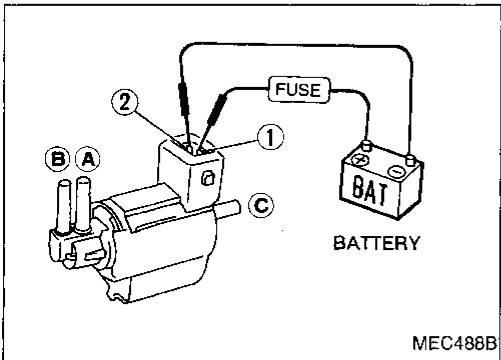
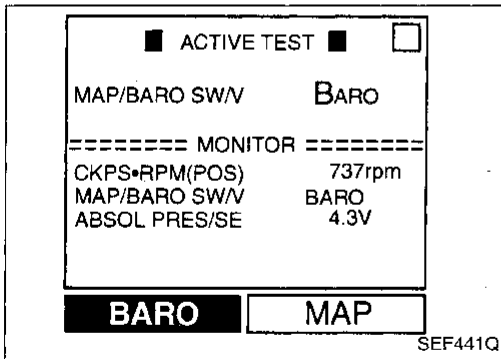
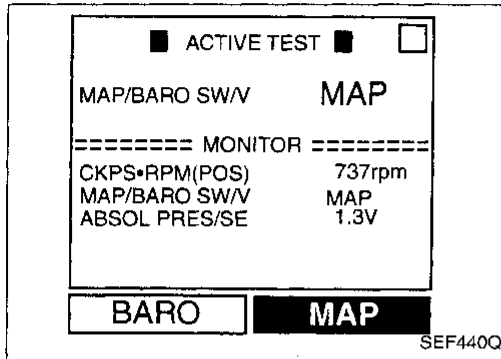
COMPONENT INSPECTION

MAP/BARO switch solenoid valve

1. Start engine and warm it up sufficiently.
2. Perform "MAP/BARO SW/V" in "ACTIVE TEST" mode with CONSULT.
3. Check the following.
 - When "MAP" is selected, "ABSOL PRES/SE" indicates approximately 1.3V.
 - When "BARO" is selected, "ABSOL PRES/SE" indicates approximately 4.3V.
4. If NG, replace solenoid valve.

OR

1. Remove MAP/BARO switch solenoid valve.
2. Check air passage continuity.

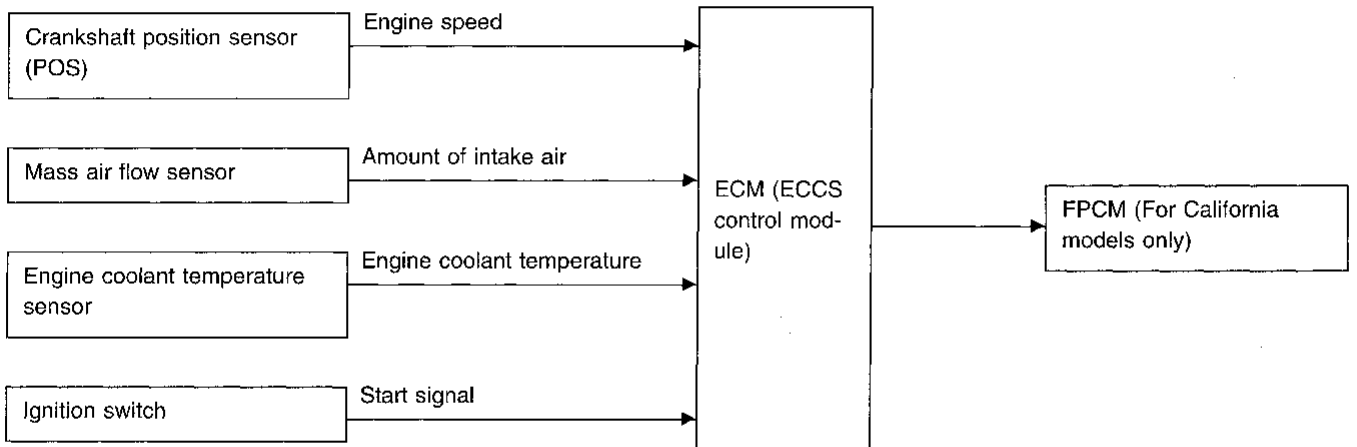


Condition	Air passage continuity between ① and ②	Air passage continuity between ① and ③
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

3. If NG, replace solenoid valve.

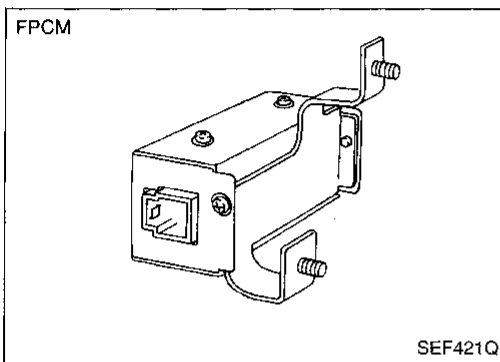
Fuel Pump Control Module (FPCM) (DTC: 1305)

SYSTEM DESCRIPTION



This system controls the fuel pump operation. The amount of fuel flow delivered from the fuel pump is altered between two flow rates by the FPCM operation. The FPCM determines the voltage supplied to the fuel pump (and therefore fuel flow) according to the following conditions.

Conditions	Amount of fuel flow	Supplied voltage
<ul style="list-style-type: none"> • Engine cranking • Engine coolant temperature below 7°C (45°F) • Within 30 seconds after starting engine [above 50°C (122°F)] • Engine is running under heavy load and high speed conditions 	high	Battery voltage (11 - 14V)
Except the above	low	Approximately 9.5V



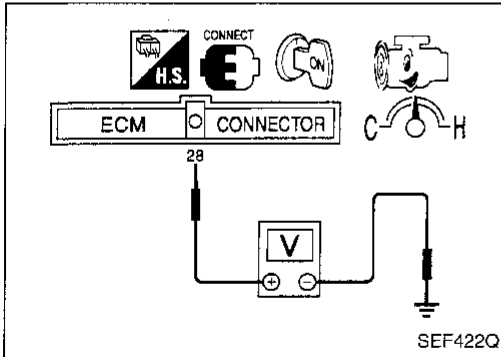
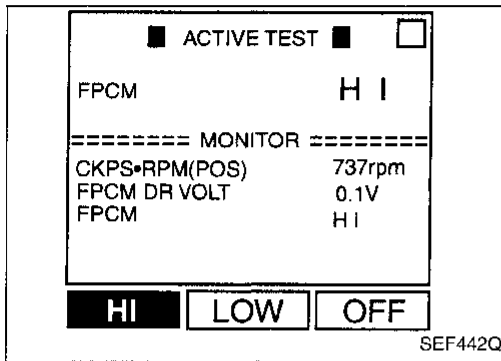
COMPONENT DESCRIPTION

The FPCM adjusts the voltage supplied to the fuel pump to control the amount of fuel flow. When the FPCM increases the voltage supplied to the fuel pump, the fuel flow is increased. When the FPCM decreases the voltage, the fuel flow is decreased.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1220 1305	<ul style="list-style-type: none"> • An improper voltage signal from the FPCM, which is supplied to a point between the fuel pump and the dropping resistor, is detected by ECM. 	<ul style="list-style-type: none"> • Harness or connectors (FPCM circuit is open or shorted.) • Dropping resistor • FPCM

TROUBLE DIAGNOSIS FOR DTC P1220

Fuel Pump Control Module (FPCM) (DTC: 1305) (Cont'd)



OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the FPCM circuit. During this check, a DTC might not be confirmed.



- 1) Start engine.
- 2) Select "FPCM" in "ACTIVE TEST" mode with CONSULT.
- 3) Touch "HI" then "LOW" respectively.
- 4) Check voltage between ECM terminal ②⑧ and ground.

HI: Approximately 0V

LOW: Approximately 3.7V

OR



- 1) Start engine and warm it up sufficiently.
- 2) Turn ignition switch "OFF" and wait at least 5 seconds.
- 3) Start engine and let it idle.
- 4) Check voltage between ECM terminal ②⑧ and ground.

Within 30 seconds of starting engine:

Approximately 0V

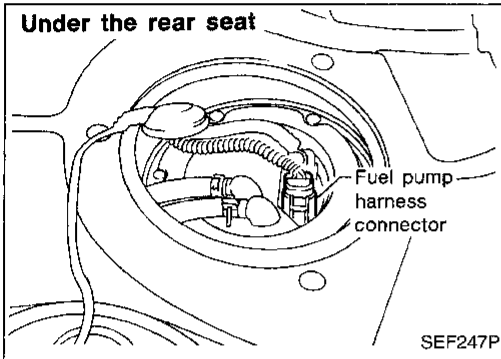
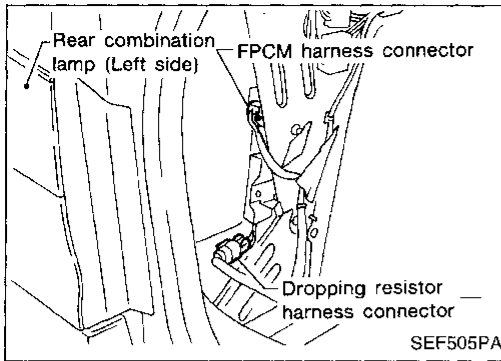
More than 30 seconds after starting engine:

Approximately 3.7V

TROUBLE DIAGNOSIS FOR DTC P1220

Fuel Pump Control Module (FPCM) (DTC: 1305) (Cont'd)

DIAGNOSTIC PROCEDURE



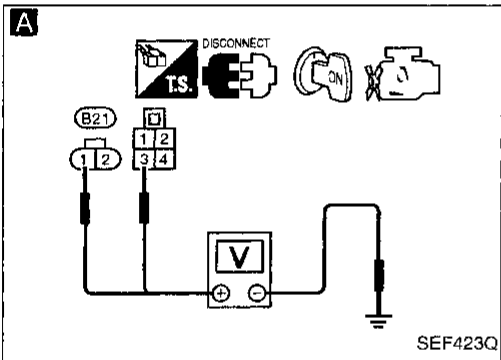
INSPECTION START

A
CHECK POWER SUPPLY.
1. Turn ignition switch "OFF".
2. Disconnect FPCM harness connector and fuel pump harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ③ and engine ground, terminal ① and engine ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
• Harness connectors
• B1, M4
• Fuel pump relay
• 15A fuse
• Harness for open or short between FPCM and fuse
If NG, repair harness or connectors.

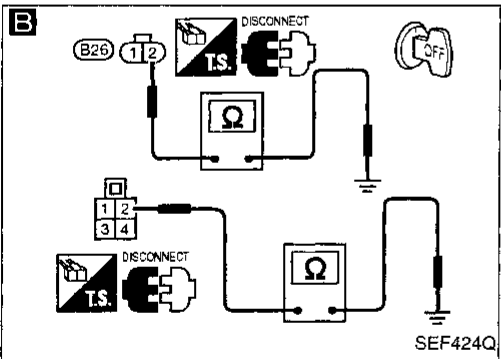
OK
B
CHECK GROUND CIRCUIT-I.
1. Turn ignition switch "OFF".
2. Disconnect dropping resistor harness connector.
3. Check harness continuity between terminal ② and engine ground, terminal ② and engine ground.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.



OK
C
CHECK GROUND CIRCUIT-II.
1. Check harness continuity between terminal ② and terminal ①, terminal ① and terminal ①.
Continuity should exist.
2. Check harness continuity between terminal ①, terminal ② and engine ground.
Continuity should not exist.

NG → Repair harness or connectors.



OK
D
CHECK OUTPUT SIGNAL CIRCUIT.
1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ⑬ and terminal ④.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.

OK
E
CHECK INPUT SIGNAL CIRCUIT.
1. Check harness continuity between ECM terminal ⑳ and terminal ① (or terminal ②).
Continuity should exist.
2. Check harness continuity between ECM terminal ⑳ and engine ground.
Continuity should not exist.

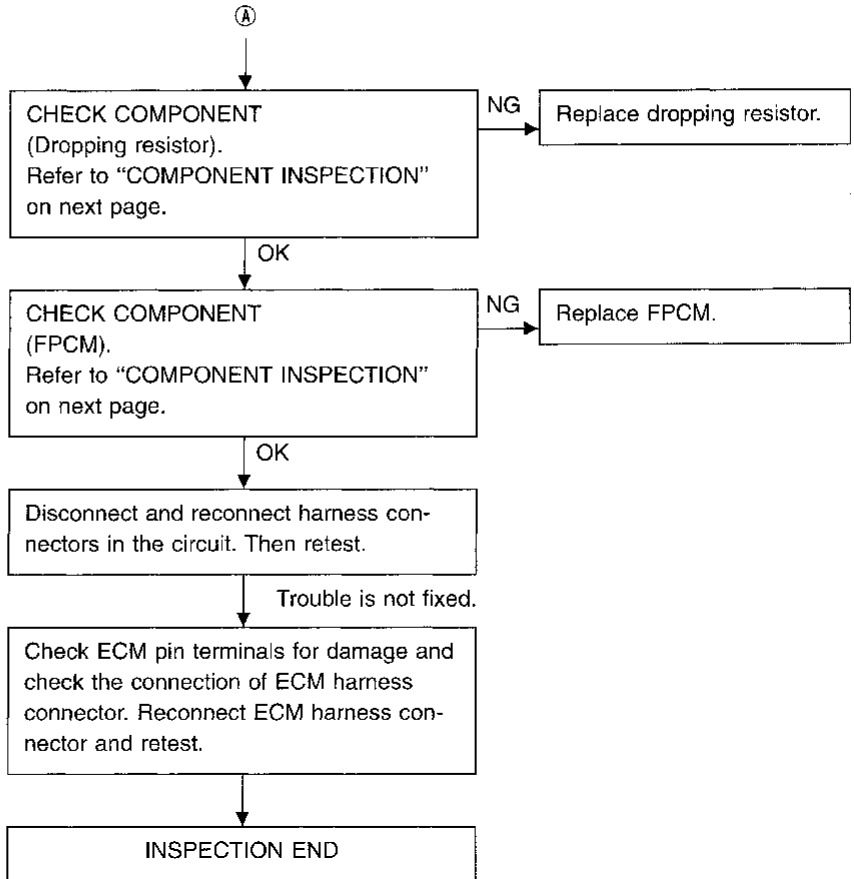
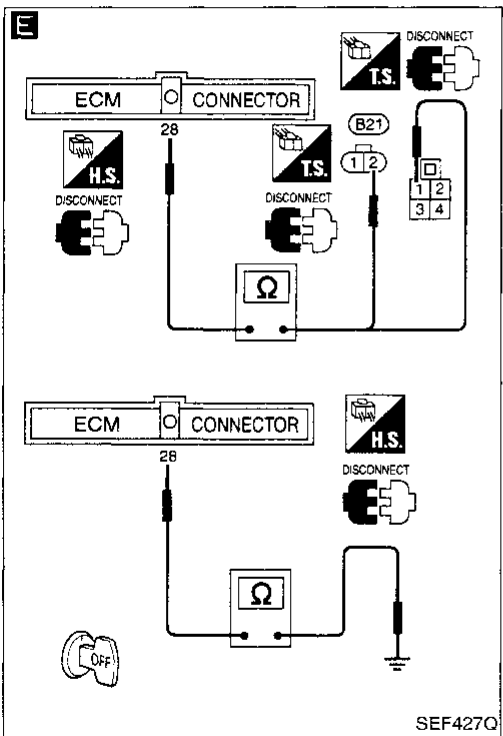
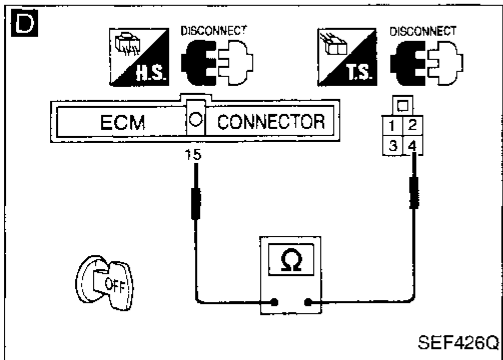
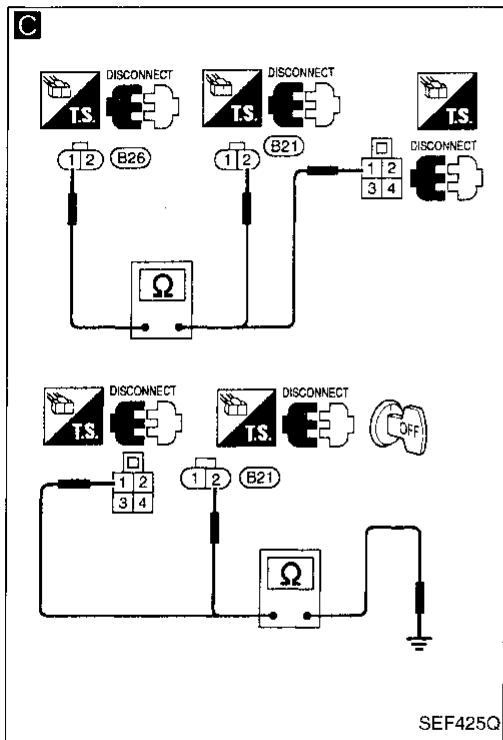
NG → Repair harness or connectors.

OK

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TROUBLE DIAGNOSIS FOR DTC P1220

Fuel Pump Control Module (FPCM) (DTC: 1305) (Cont'd)



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TROUBLE DIAGNOSIS FOR DTC P1220

Fuel Pump Control Module (FPCM) (DTC: 1305) (Cont'd)

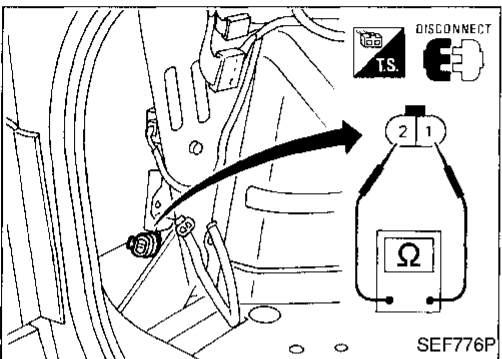
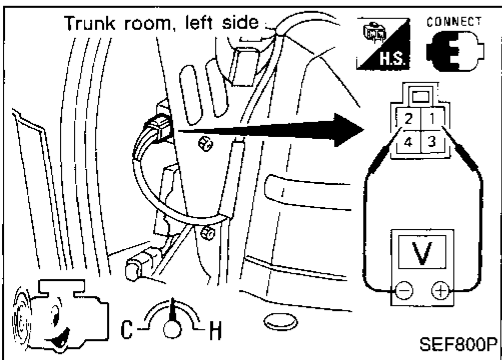
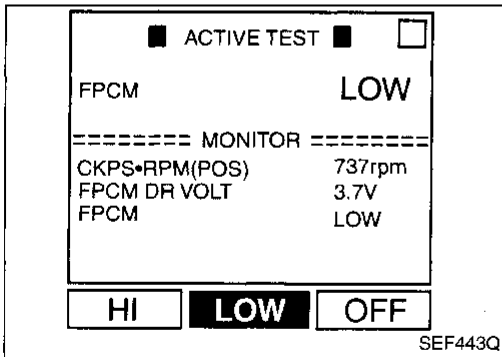
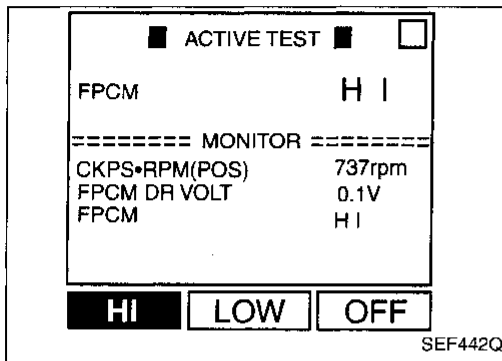
COMPONENT INSPECTION

FPCM

1. Start engine and let it idle.
2. Perform "FPCM" in "ACTIVE TEST" mode with CONSULT.
3. Check the following.
 - When "HI" is selected, "FPCM DR VOLT" indicates approximately 0V.
 - When "LOW" is selected, "FPCM DR VOLT" indicates approximately 3.7V.
4. If NG, replace FPCM.

OR

1. Start engine and warm it up sufficiently.
2. Turn ignition switch "OFF" and wait at least 5 seconds.
3. Start engine and let it idle.
4. Check voltage between terminals ① and ② .
Within 30 seconds of starting engine:
 Approximately 0V
More than 30 seconds after starting engine:
 Approximately 3.7V
5. If NG, replace FPCM.

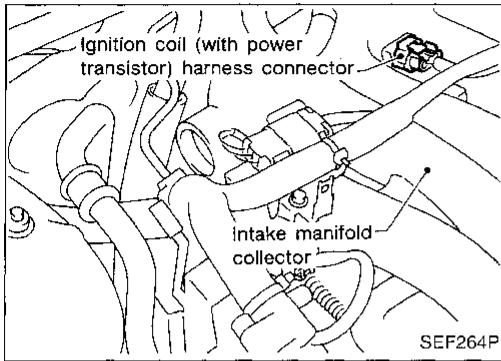


Dropping resistor

Check resistance between terminals ① and ② .

Resistance: Approximately 0.9Ω at 25°C (77°F)

TROUBLE DIAGNOSIS FOR DTC P1320



Ignition Signal (DTC: 0201)

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.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1320 0201	<ul style="list-style-type: none"> The ignition signal in the primary circuit is not sent during engine cranking or running. 	<ul style="list-style-type: none"> Harness or connectors (The ignition primary circuit is open or shorted.) Power transistor unit built into ignition coil Condenser Crankshaft position sensor (REF) Crankshaft position sensor (REF) circuit

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Note: If both DTC P1320 and DTC P0340, P1335, P0335 or P1336 are displayed, perform TROUBLE DIAGNOSIS FOR DTC P0340, P1335, P0335 or P1336 first. (See EC-192, 197, 283, or 287.)



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Start engine. (If engine does not run, turn ignition switch to "START" for at least 5 seconds.)

OR



- 1) Turn ignition switch "ON".
- 2) Start engine. (If engine does not run, turn ignition switch to "START" for at least 5 seconds.)
- 3) Select MODE 3 with GST.

OR

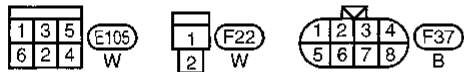
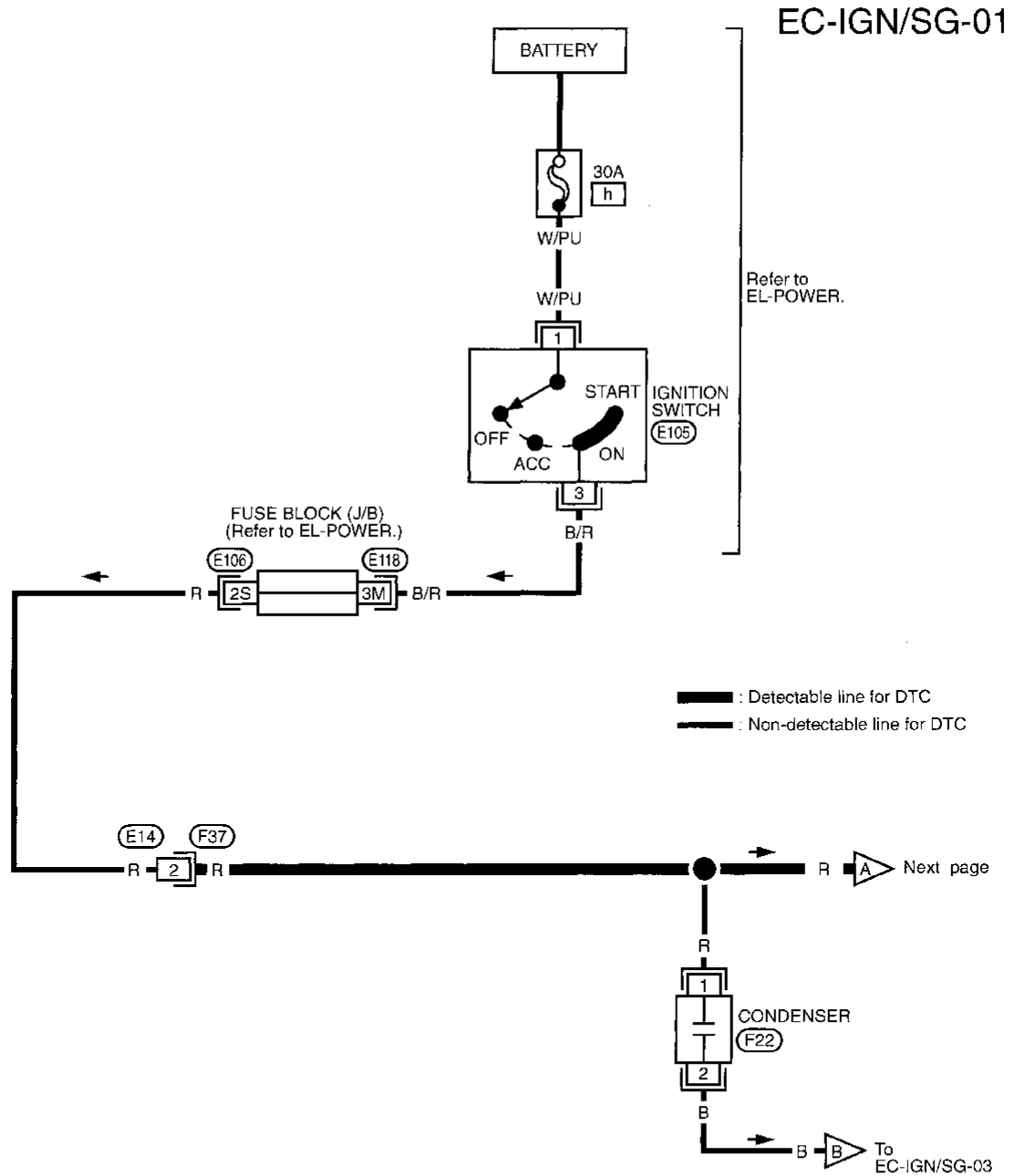


- 1) Turn ignition switch "ON".
- 2) Start engine. (If engine does not run, turn ignition switch to "START" for at least 5 seconds.)
- 3) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 4) Perform diagnostic test mode II (Self-diagnostic results) with ECM.

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TROUBLE DIAGNOSIS FOR DTC P1320

Ignition Signal (DTC: 0201) (Cont'd)



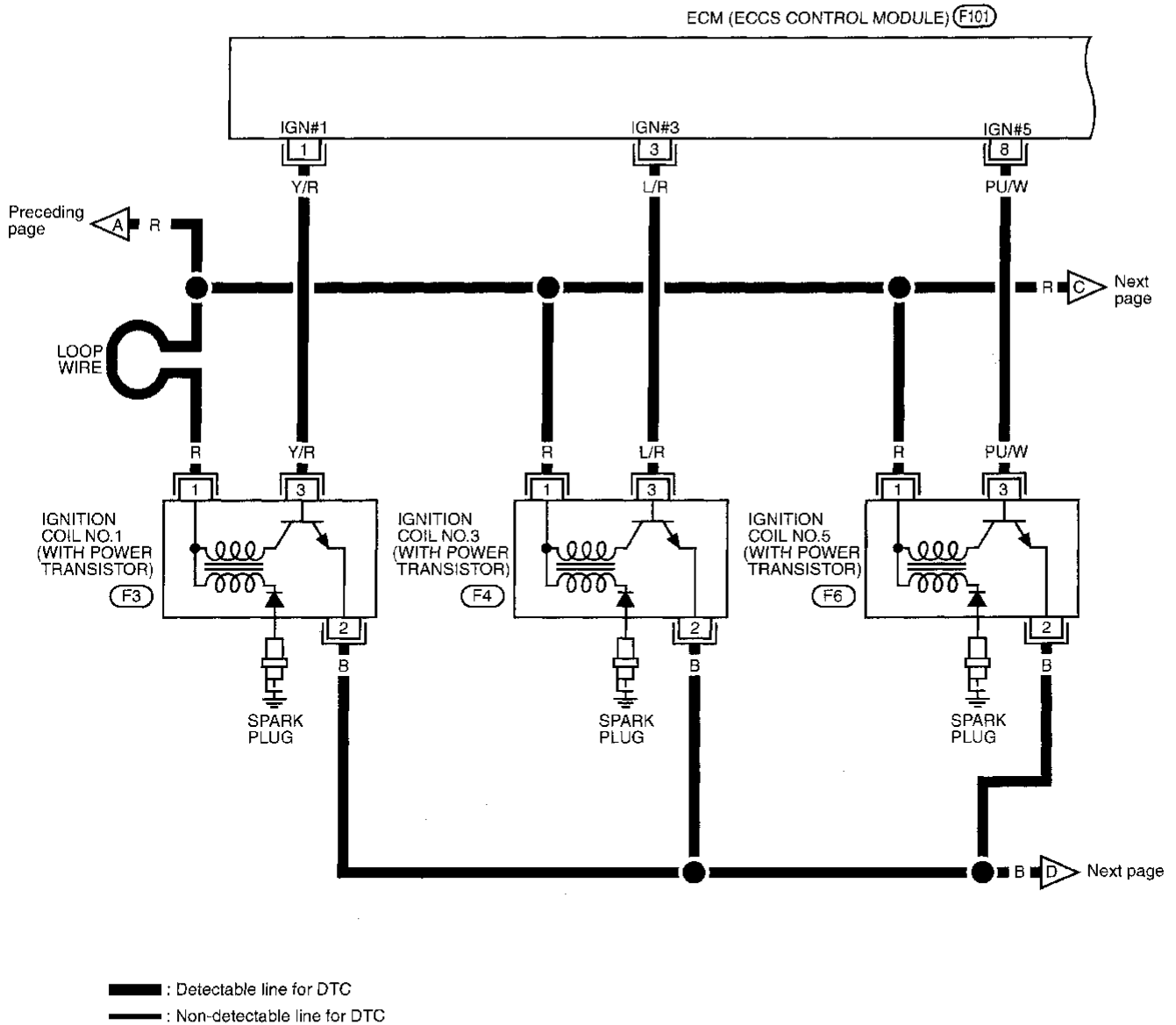
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E106
E118

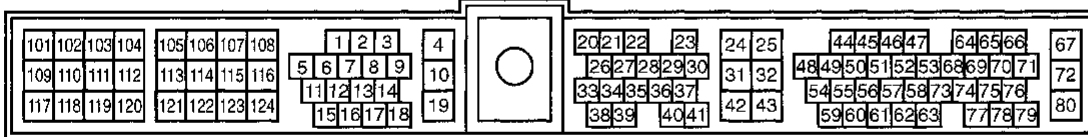
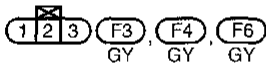
TROUBLE DIAGNOSIS FOR DTC P1320

Ignition Signal (DTC: 0201) (Cont'd)

EC-IGN/SG-02



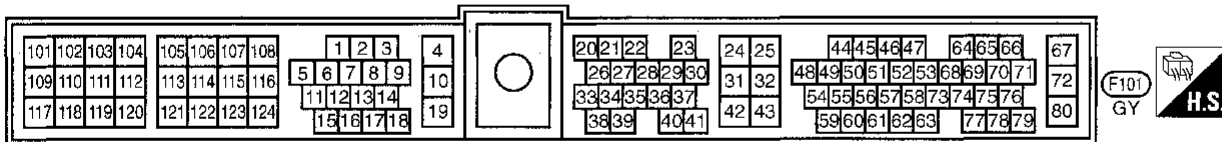
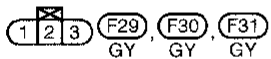
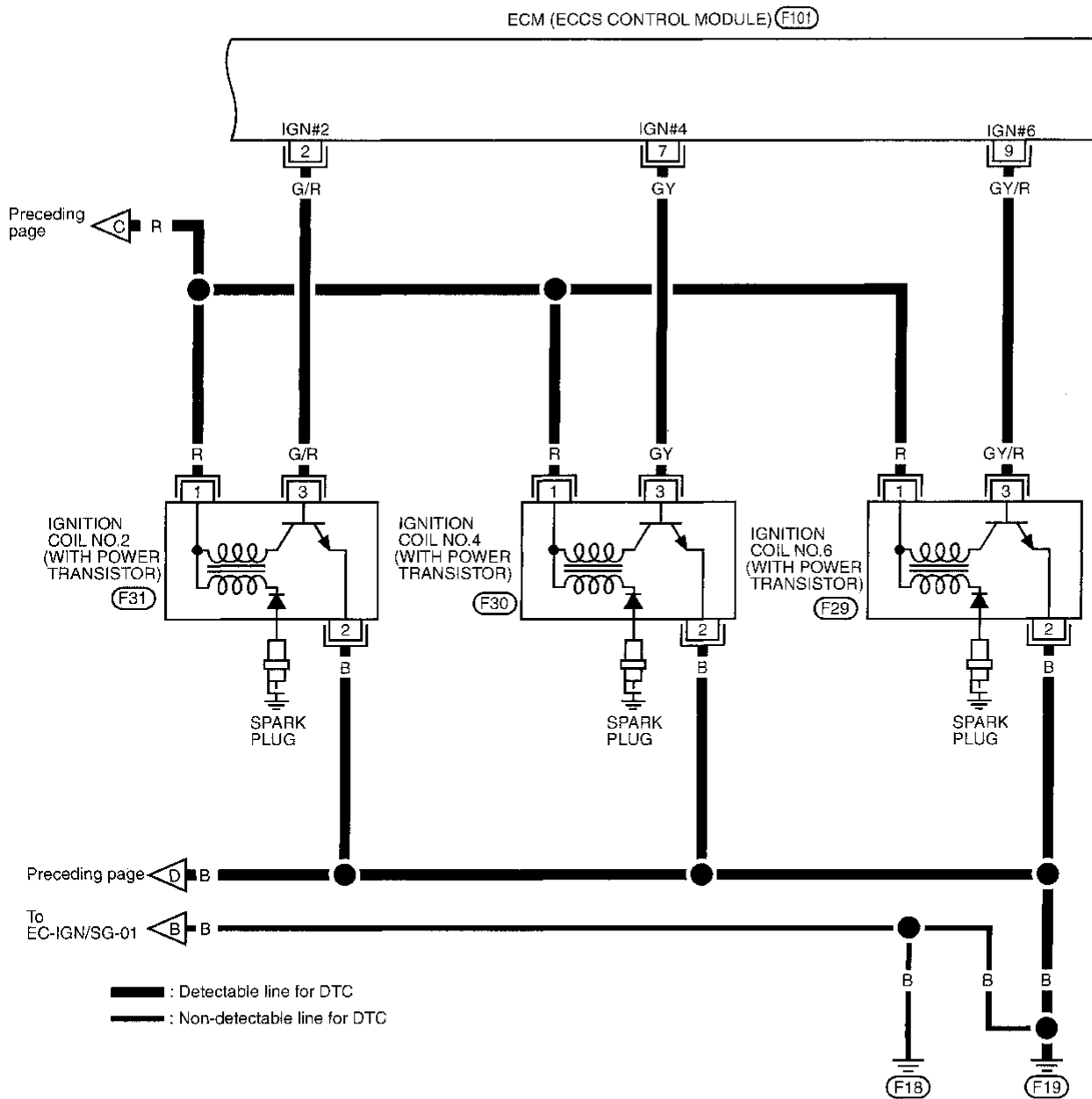
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TROUBLE DIAGNOSIS FOR DTC P1320

Ignition Signal (DTC: 0201) (Cont'd)

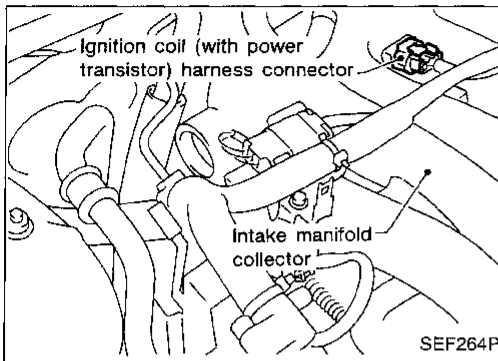
EC-IGN/SG-03



TROUBLE DIAGNOSIS FOR DTC P1320

Ignition Signal (DTC: 0201) (Cont'd)


DIAGNOSTIC PROCEDURE




INSPECTION START

Does engine start?


No

Yes (without )

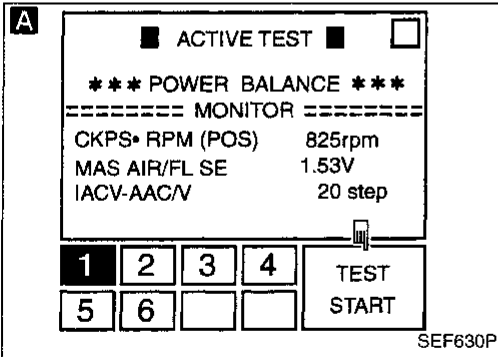
Yes (with )

B

SEARCH FOR MALFUNCTIONING CIRCUIT-2.

1. Turn ignition switch "ON".
2. Check voltage between each ignition coil harness connector terminal  and ground.

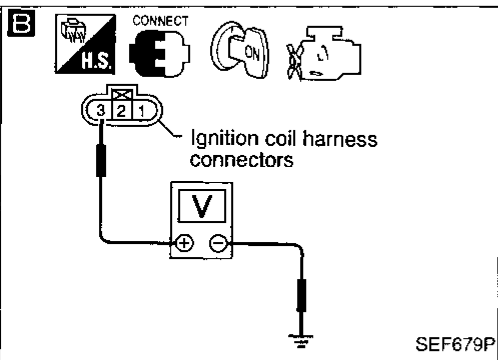
Voltage: 0.01 - 0.1V



A



SEARCH FOR MALFUNCTIONING CIRCUIT-1.

1. Start engine.
2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
3. Search for circuit which does not produce a momentary engine speed drop.



C





CHECK POWER SUPPLY.

1. Disconnect ignition harness connectors and condenser harness connector.
2. Turn ignition switch "ON".
3. Check voltage between each ignition coil harness connector terminal  and ground, condenser harness connector terminal  and ground.

Voltage: Battery voltage

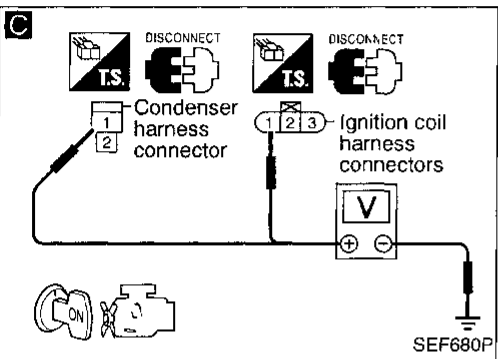
NG

Check the following.

- Harness connectors
, 
, 
- Harness for open or short between ignition switch and ignition coils or condenser
- Condenser


Refer to "COMPONENT INSPECTION" on next page.

If NG, repair harness, connectors or component.



D

CHECK GROUND CIRCUIT.

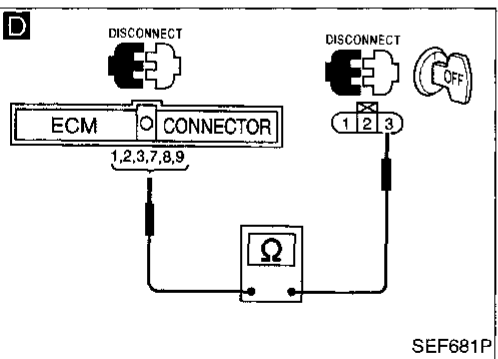
1. Disconnect each ignition coil harness connector and ECM harness connector.
2. Check harness continuity between each ignition coil harness connector terminal  and each ECM harness connector terminal.

Continuity should exist.

If OK, check harness for short.

NG

Repair harness or connectors.



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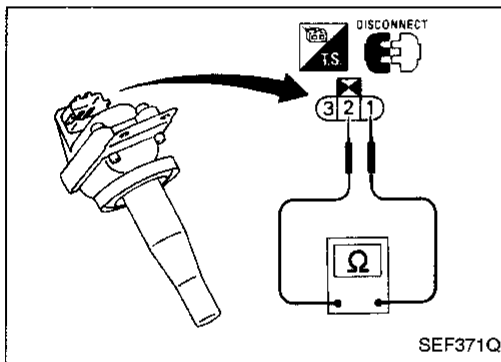
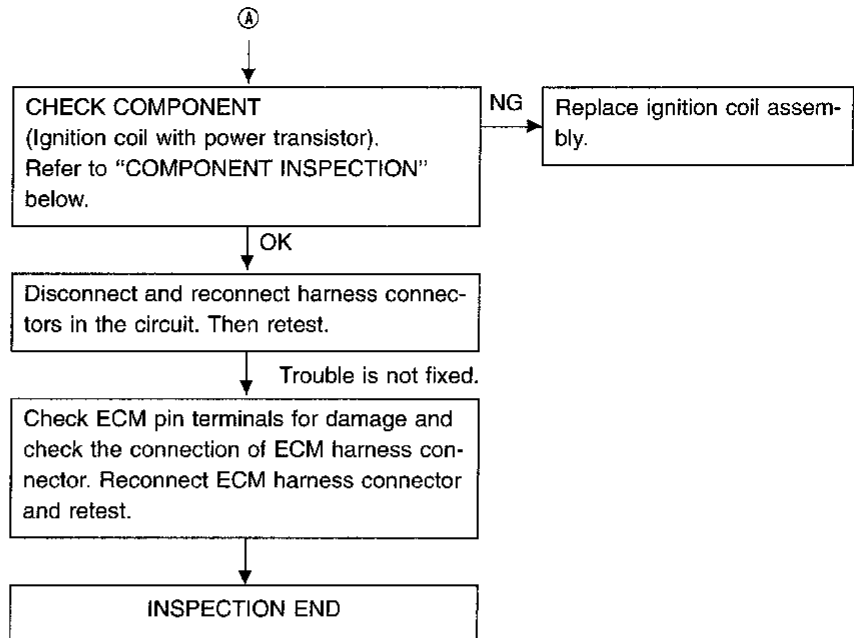
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TROUBLE DIAGNOSIS FOR DTC P1320

Ignition Signal (DTC: 0201) (Cont'd)



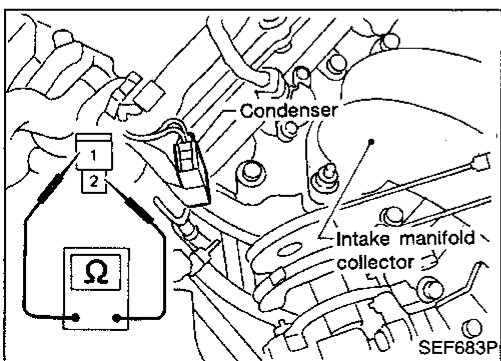
COMPONENT INSPECTION

Ignition coil with power transistor

1. Disconnect ignition coil with power transistor harness connector.
2. Check ignition coil with power transistor for resistance between terminals ① and ②.

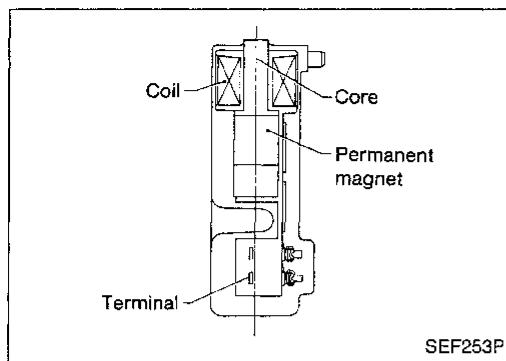
Terminals	Resistance	Result
① and ②	Not 0Ω	OK
	0Ω	NG

If NG, replace ignition coil with power transistor assembly.



Condenser

1. Disconnect condenser harness connector.
2. Check condenser continuity between terminals ① and ②.
Resistance: Above 1 MΩ at 25°C (77°F)



Crankshaft Position Sensor (CKPS) (REF) (DTC: 0407)

The crankshaft position sensor (REF) is located on the oil pan (upper) facing the crankshaft pulley. It detects the TDC (Top Dead Center) signal (120° signal).

The sensor consists of a permanent magnet, core and coil.

When engine is running, the gap between the sensor and the crankshaft pulley will periodically change. Permeability near the sensor also changes.

Due to the permeability change, the magnetic flux near the core is changed. Therefore, the voltage signal generated in the coil is changed.

The ECM receives the voltage signal and detects the TDC signal (120° signal).

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1335 0407	<ul style="list-style-type: none"> • 120° signal is not sent to ECM for the first few seconds during engine cranking. • 120° signal is not sent to ECM during engine running. • 120° signal cycle excessively changes during engine running. 	<ul style="list-style-type: none"> • Harness or connectors (The crankshaft position sensor (REF) circuit is open or shorted.) • Crankshaft position sensor (REF) • Starter motor (Refer to EL section.) • Starting system circuit (Refer to EL section.) • Dead (Weak) battery

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Before performing the following procedure, confirm that battery voltage is more than 10.5V.

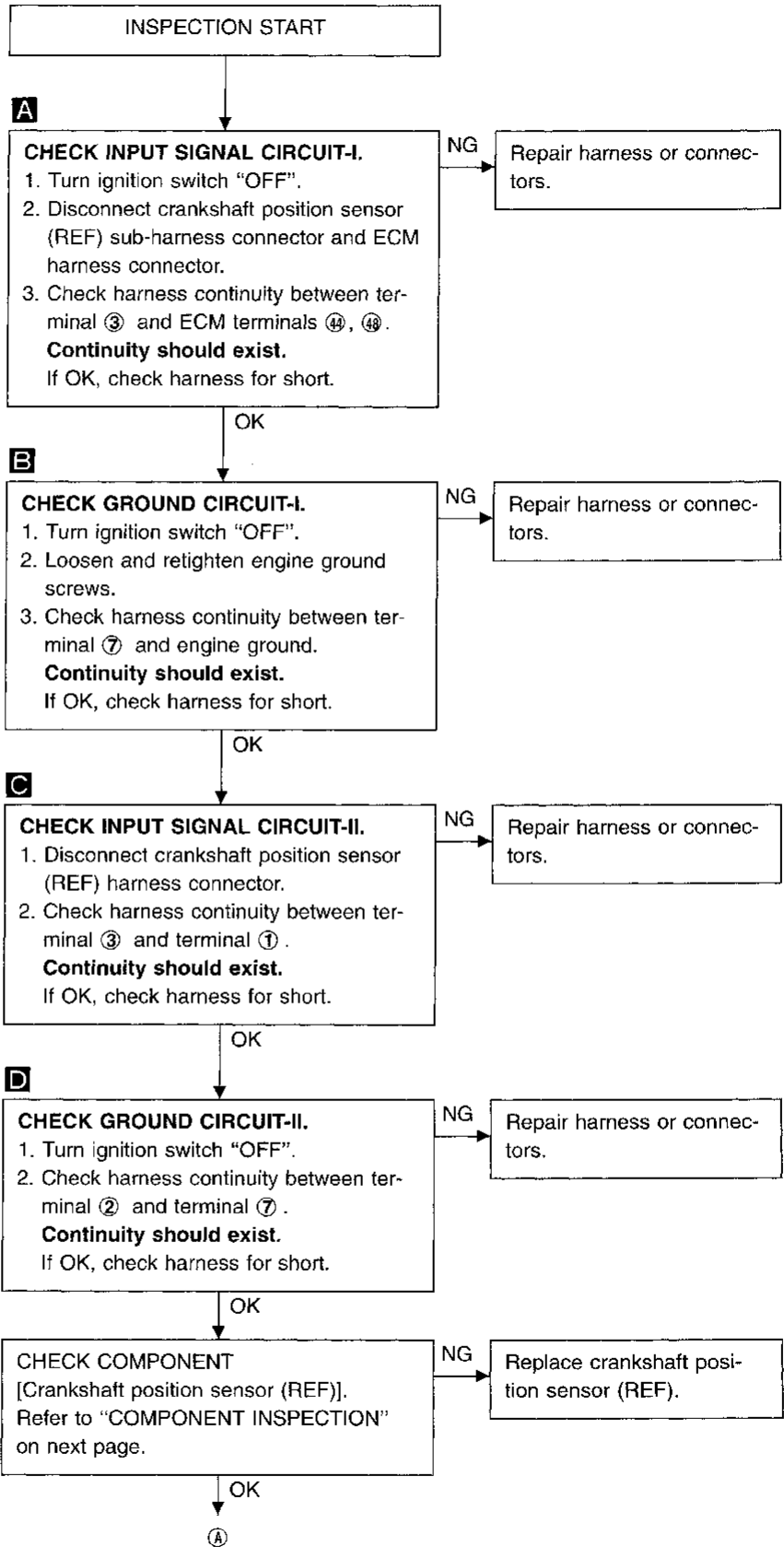
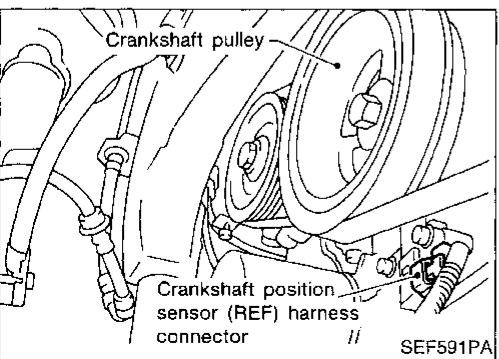
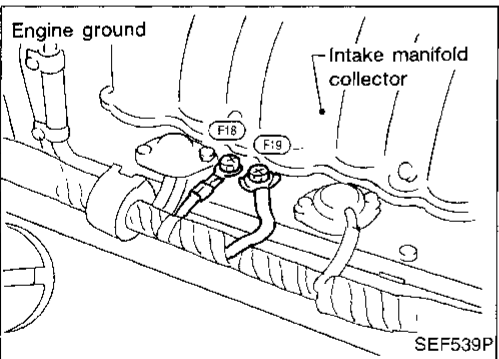
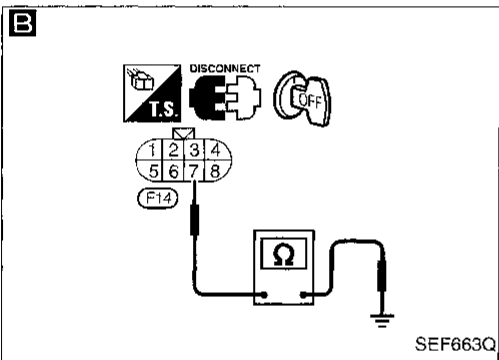
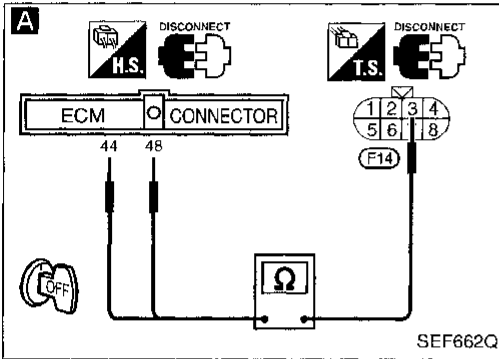
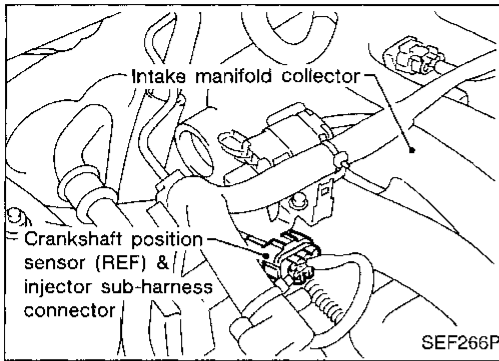
- 📱
 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 2) Start engine and run it for at least 2 seconds at idle speed.
- OR
- 🔧
 1) Start engine and run it for at least 2 seconds at idle speed.
- 2) Select "MODE 3" with GST.
- OR
- 🚫
 1) Start engine and run it for at least 2 seconds at idle speed.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

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TROUBLE DIAGNOSIS FOR DTC P1335

Crankshaft Position Sensor (CKPS) (REF) (DTC: 0407) (Cont'd)

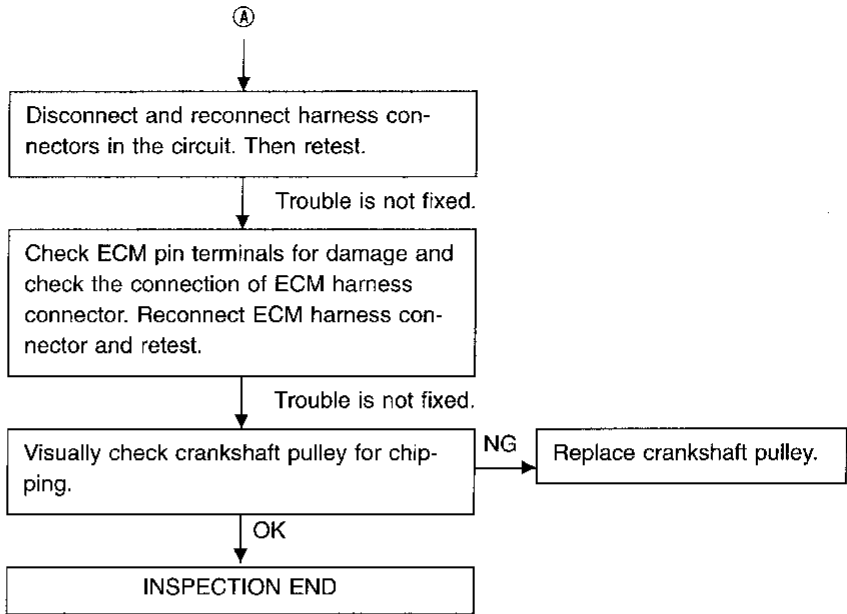
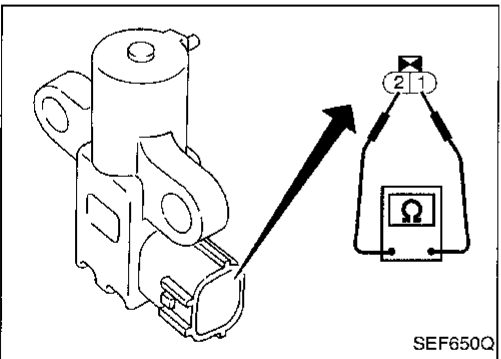
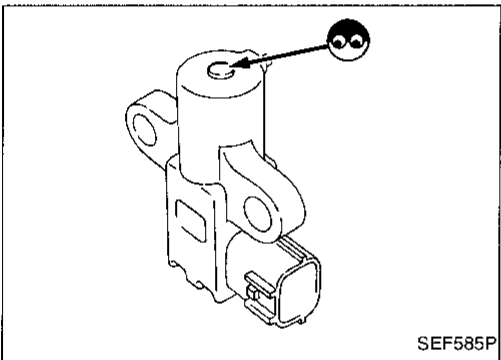
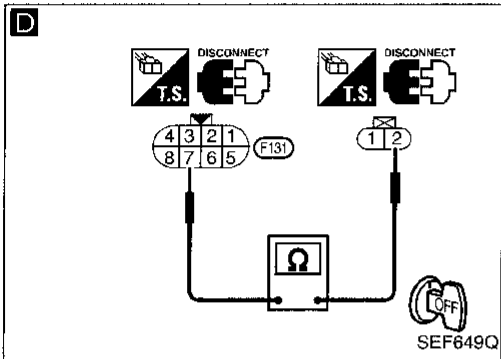
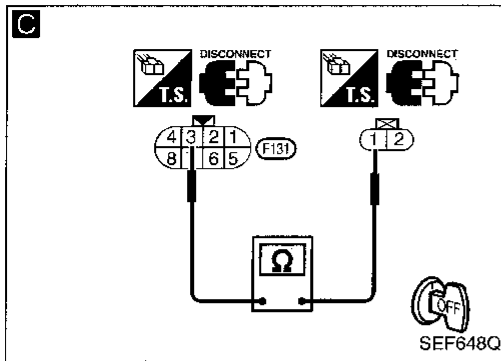
DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR DTC P1335

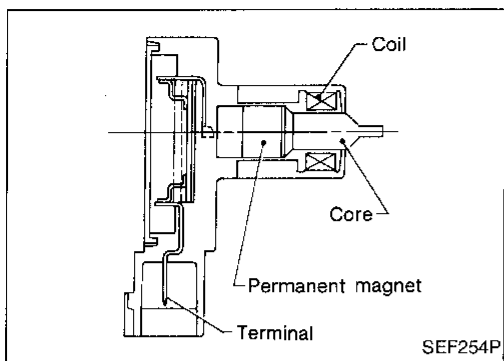
Crankshaft Position Sensor (CKPS) (REF) (DTC: 0407) (Cont'd)



COMPONENT INSPECTION

Crankshaft position sensor (REF)

1. Disconnect crankshaft position sensor (REF) 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: Approximately 470 - 570Ω [At 20°C (68°F)]



Crankshaft Position Sensor (CKPS) (POS) (COG) (DTC: 0905)

The crankshaft position sensor (POS) is located on the oil pan facing the gear teeth (cogs) of the signal plate (flywheel). It detects the crankshaft position signal (1° signal).

The sensor consists of a permanent magnet, core and coil.

When engine is running, the gap between the sensor and the gear teeth (cogs) will periodically change. Permeability near the sensor also changes.

Due to the permeability change, the magnetic flux near the core is changed. Therefore, the voltage signal generated in the coil is changed.

The ECM receives the voltage signal and detects the crankshaft position signal (1° signal).

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1336 0905	<ul style="list-style-type: none"> • Chipping of the signal plate (on flywheel) gear teeth (cogs) is detected by the ECM. 	<ul style="list-style-type: none"> • Harness or connectors • Crankshaft position sensor (POS) • Signal plate (flywheel) • Dead (Weak) battery

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Before performing the following procedure, confirm that battery voltage is more than 10.5V.



- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 2) Start engine and run it for at least 70 seconds at idle speed.

OR



- 1) Start engine and run it for at least 70 seconds at idle speed.
- 2) Select "MODE 3" with GST.

OR

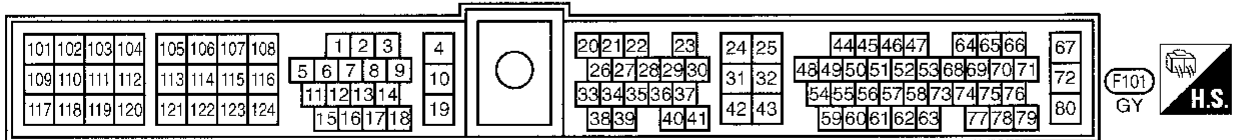
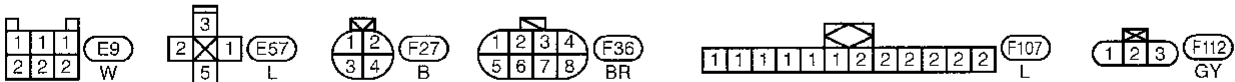
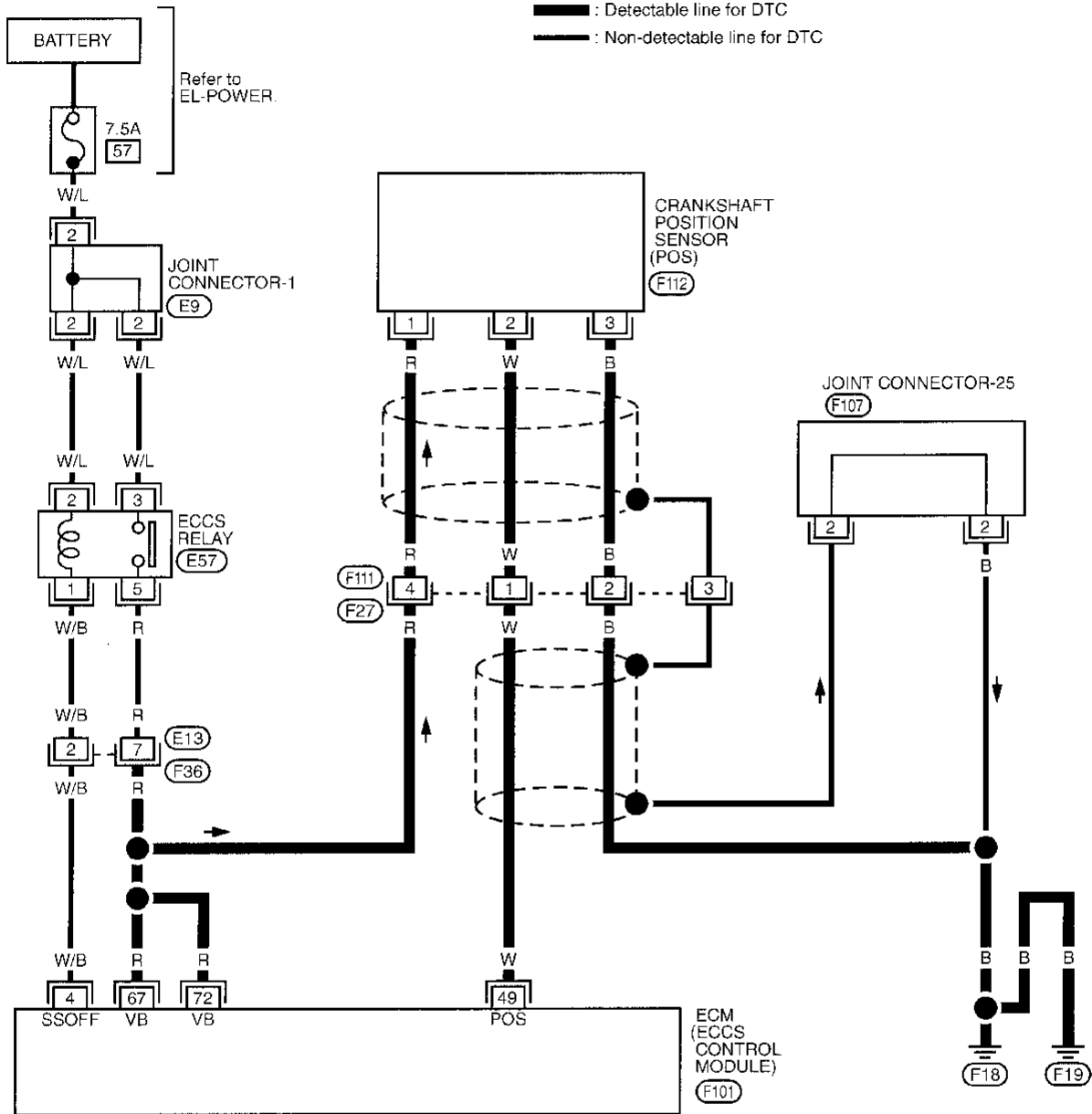


- 1) Start engine and run it for at least 70 seconds at idle speed.
- 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.

TROUBLE DIAGNOSIS FOR DTC P1336

Crankshaft Position Sensor (CKPS) (POS) (COG) (DTC: 0905) (Cont'd)

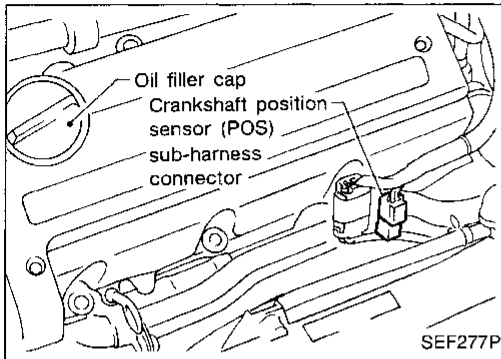
EC-POS-01



TROUBLE DIAGNOSIS FOR DTC P1336

Crankshaft Position Sensor (CKPS) (POS) (COG) (DTC: 0905) (Cont'd)

DIAGNOSTIC PROCEDURE



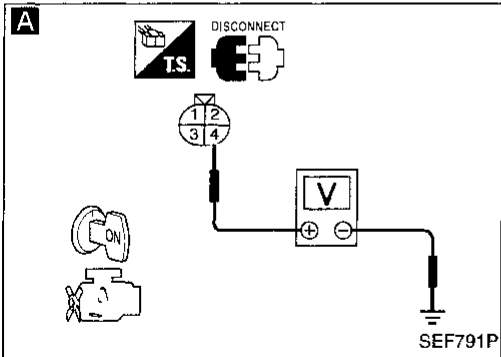
INSPECTION START

A
CHECK POWER SUPPLY-I.
1. Turn ignition switch "OFF".
2. Disconnect crankshaft position sensor (POS) sub-harness connector.
3. Turn ignition switch "ON".
4. Check voltage between terminal ④ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.

- Harness connectors (F36, E13)
- Harness continuity between crankshaft position sensor (POS) sub-harness connector and ECCS relay
- Harness for open or short between crankshaft position sensor (POS) sub-harness connector and ECM

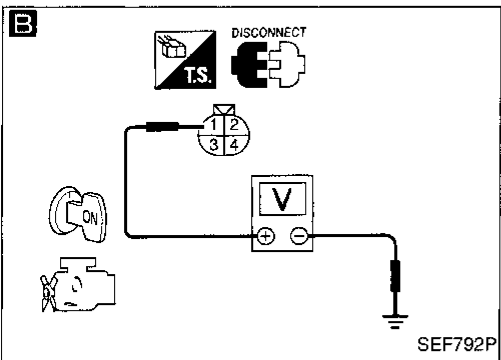
If NG, repair harness or connectors.



OK →

B
CHECK POWER SUPPLY-II.
Check voltage between terminal ① and ground with CONSULT or tester.
Voltage: Approximately 5V

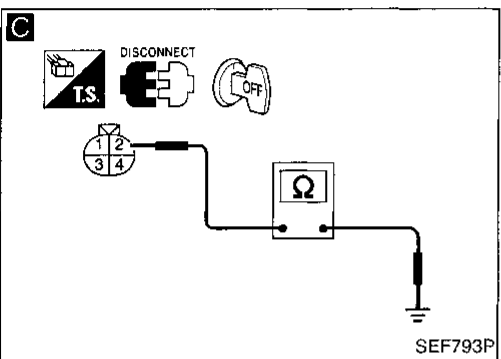
NG → Repair harness or connectors.



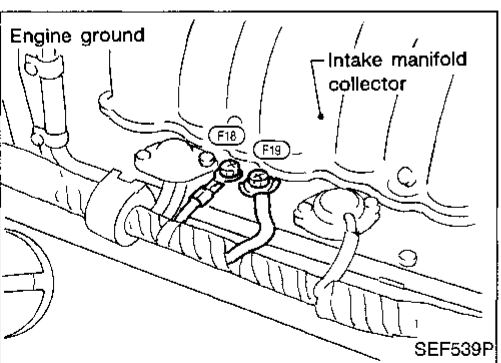
OK →

C
CHECK GROUND CIRCUIT-I.
1. Turn ignition switch "OFF".
2. Loosen and retighten engine ground screws.
3. Check harness continuity between terminal ② and engine ground.
Continuity should exist.
If OK, check harness for short.

NG → Repair harness or connectors.



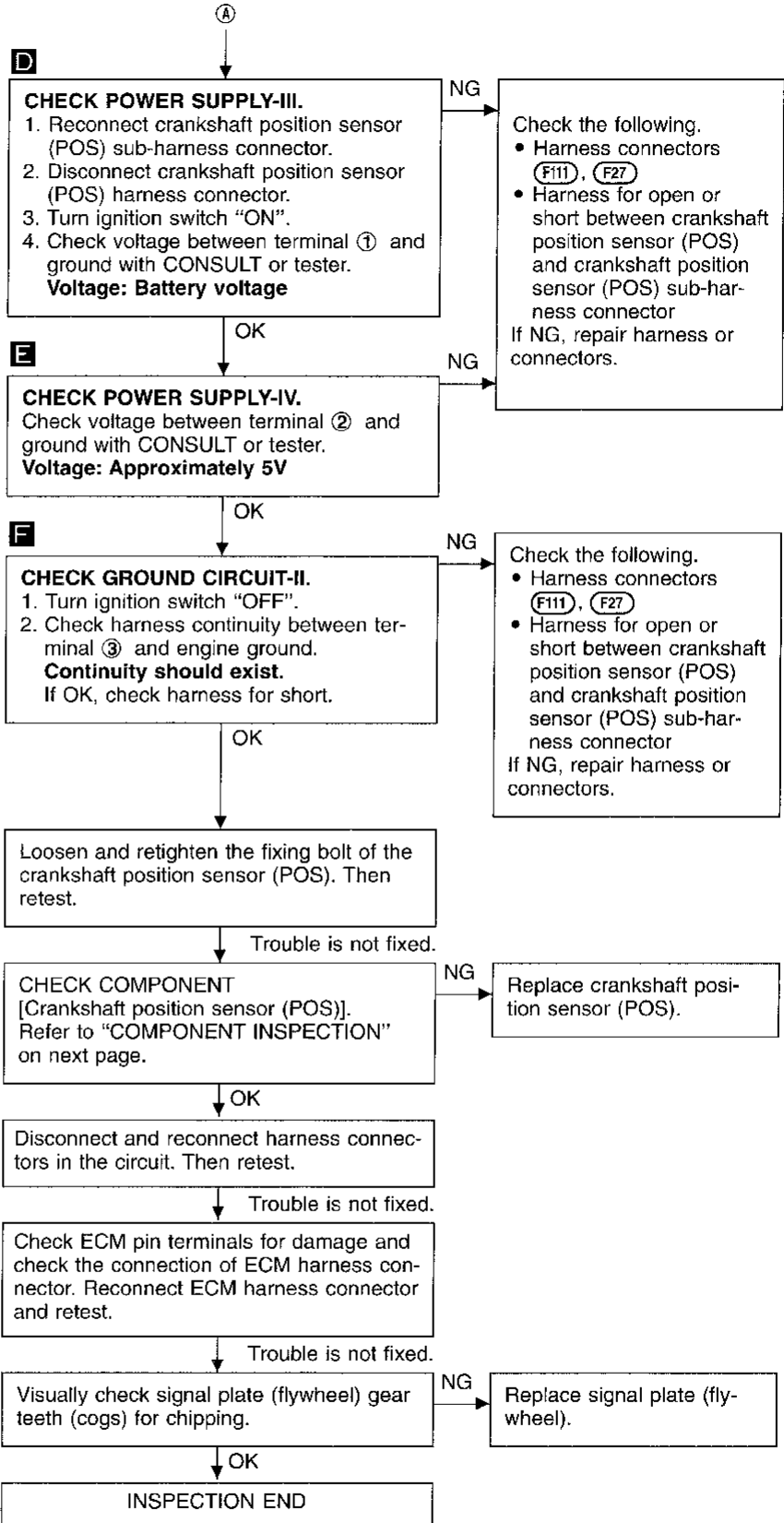
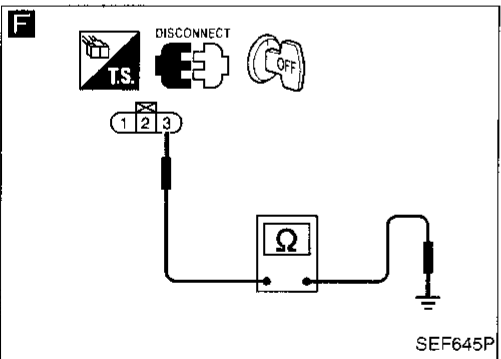
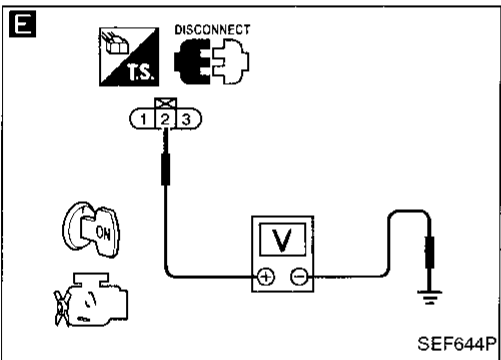
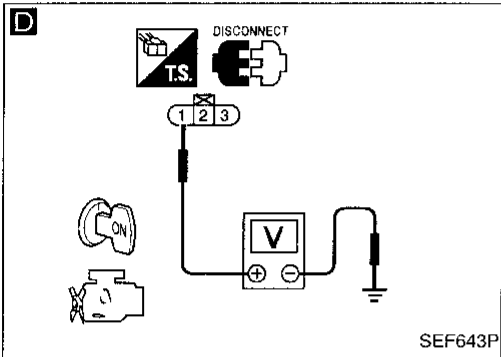
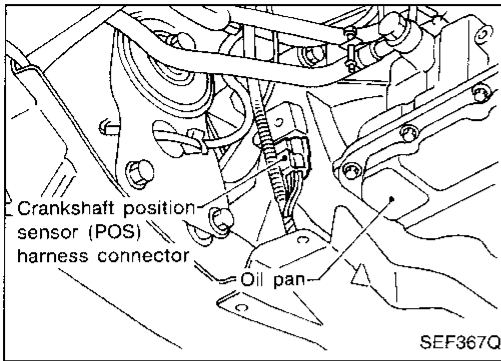
OK → (A)



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TROUBLE DIAGNOSIS FOR DTC P1336

Crankshaft Position Sensor (CKPS) (POS) (COG) (DTC: 0905) (Cont'd)



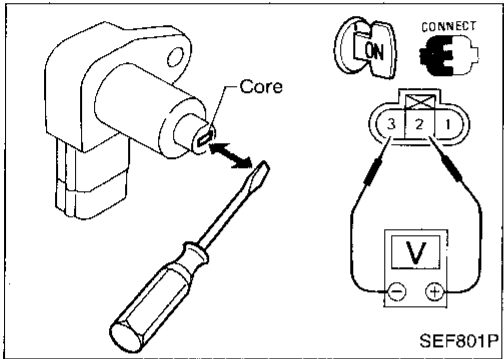
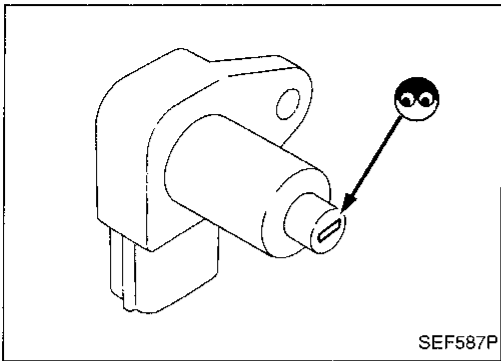
TROUBLE DIAGNOSIS FOR DTC P1336

Crankshaft Position Sensor (CKPS) (POS) (COG) (DTC: 0905) (Cont'd)

COMPONENT INSPECTION

Crankshaft position sensor (POS)

1. Disconnect crankshaft position sensor (POS) harness connector. GI
2. Loosen the fixing bolt of the sensor. MA
3. Remove the sensor. EM
4. Visually check the sensor for chipping. LC



5. Reconnect crankshaft position sensor (POS) harness connector. EC
6. Turn ignition switch "ON".
7. Check voltage between terminals ② and ③ when bringing a screwdriver into contact with, and quickly pulling away from the sensor core. FE

Terminal	Condition	Voltage
② , ③	Contacted	Approximately 5V
	Pulled away	Approximately 0V

There should be a steady 5V as the screwdriver is drawn away slowly.
If NG, replace crankshaft position sensor (POS). CL

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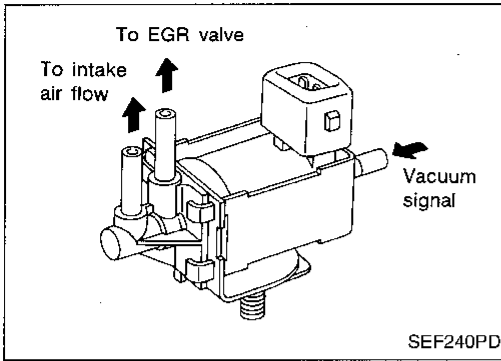
BT

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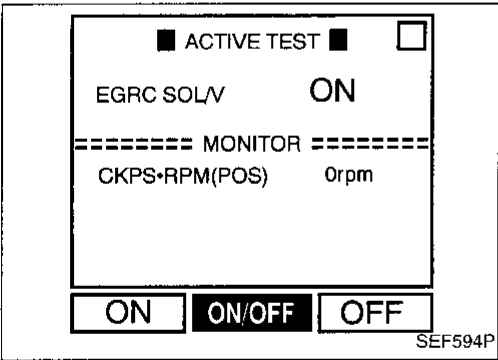
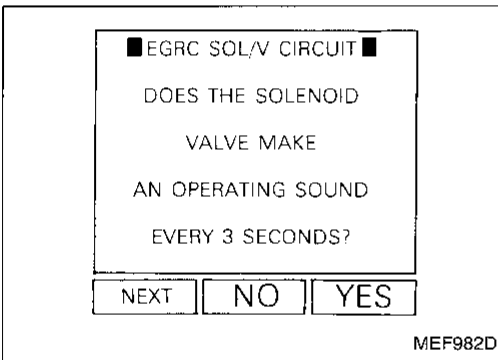
TROUBLE DIAGNOSIS FOR DTC P1400



EGRC-Solenoid Valve (DTC: 1005)

The EGRC-solenoid valve responds to signals from the ECM. When the ECM sends an ON (ground) signal, the coil in the solenoid valve is energized. A plunger will then move to cut the vacuum signal (from the throttle body to the EGR valve.) When the ECM sends an OFF signal, the vacuum signal passes through the solenoid valve. The signal then reaches the EGR valve.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1400 1005	<ul style="list-style-type: none"> The improper voltage signal is sent to ECM through EGRC-solenoid valve. 	<ul style="list-style-type: none"> Harness or connectors (The EGRC-solenoid valve circuit is open or shorted.) EGRC-solenoid valve



OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the EGRC-solenoid valve circuit.

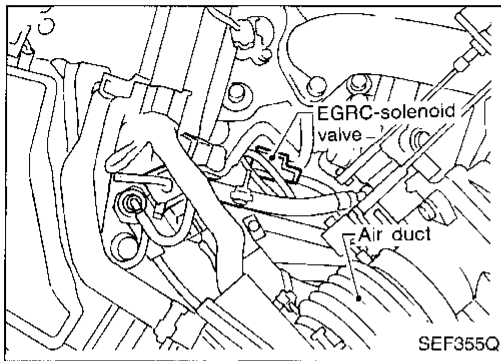
During this check, a DTC might not be confirmed.

- 1) Turn ignition switch "ON".
 - 2) Perform "EGRC SOL/V CIRCUIT" in "FUNCTION TEST" mode with CONSULT.
- OR
- 1) Turn ignition switch "ON".
 - 2) Perform "EGRC SOLENOID VALVE" in "ACTIVE TEST" mode with CONSULT and check the operating sound, according to ON/OFF switching.
- OR
- 1) Turn ignition switch "ON".
 - 2) When disconnecting and reconnecting the EGRC-solenoid valve harness connector, make sure that the solenoid valve makes operating sound.

TROUBLE DIAGNOSIS FOR DTC P1400

EGRC-Solenoid Valve (DTC: 1005) (Cont'd)

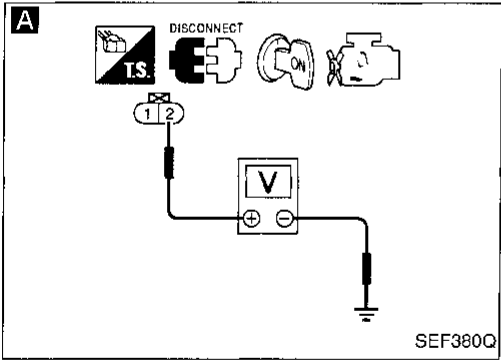
DIAGNOSTIC PROCEDURE



INSPECTION START

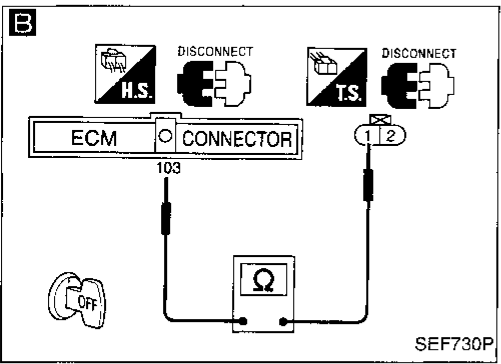
A
CHECK POWER SUPPLY.
 1. Disconnect EGRC-solenoid valve harness connector.
 2. Turn ignition switch "ON".
 3. Check voltage between terminal ② and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
 • Harness connectors
 • M50, F105
 • 10A fuse
 • Joint connector-10
 • Harness for open or short between EGRC-solenoid valve and fuse
 If NG, repair harness or connectors.



B
CHECK OUTPUT SIGNAL CIRCUIT.
 1. Disconnect ECM harness connector.
 2. Check harness continuity between ECM terminal ⑩③ and terminal ①.
Continuity should exist.
 If OK, check harness for short.

NG → Repair harness or connectors.



CHECK COMPONENT
 (EGRC-solenoid valve).
 Refer to "COMPONENT INSPECTION" below.

NG → Replace EGRC-solenoid valve.

OK → Disconnect and reconnect harness connectors in the circuit. Then retest.

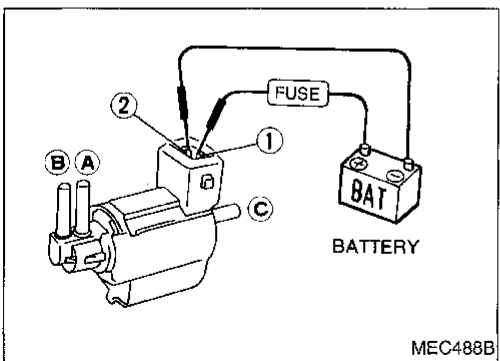
Trouble is not fixed.
 Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

COMPONENT INSPECTION

EGRC-solenoid valve

Check air passage continuity.



Condition	Air passage continuity between ① and ②	Air passage continuity between ① and ③
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

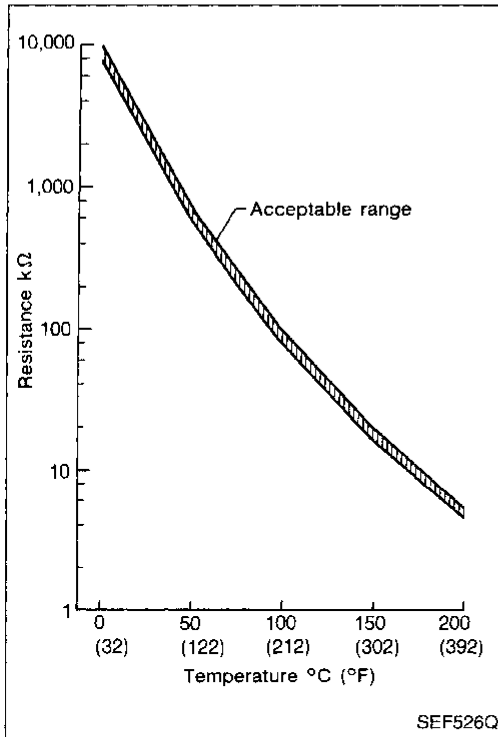
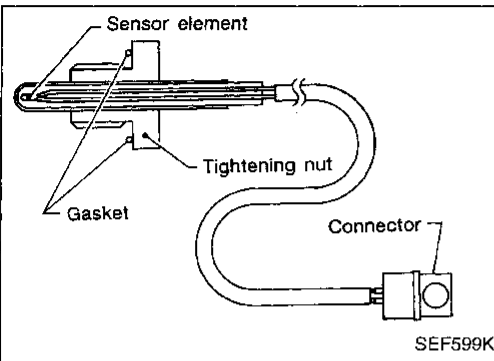
If NG, replace solenoid valve.

TROUBLE DIAGNOSIS FOR DTC P1401

EGR Temperature Sensor (DTC: 0305)

The EGR temperature sensor detects temperature changes in the EGR passage way. When the EGR 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.



<Reference data>

EGR temperature °C (°F)	Voltage (V)	Resistance (MΩ)
0 (32)	4.81	7.9 - 9.7
50 (122)	2.82	0.57 - 0.70
100 (212)	0.8	0.08 - 0.10
150 (302)	0.16	0.01 - 0.02

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1401 0305	A) An excessively low voltage from the EGR temperature sensor is sent to ECM, even when engine coolant temperature is low.	<ul style="list-style-type: none"> • Harness or connectors (The EGR temperature sensor circuit is shorted.) • EGR temperature sensor • Malfunction of EGR function, EGRC-BPT valve or EGRC-solenoid valve
	B) An excessively high voltage from the EGR temperature sensor is sent to ECM, even when engine coolant temperature is high.	<ul style="list-style-type: none"> • Harness or connectors (The EGR temperature sensor circuit is open.) • EGR temperature sensor • Malfunction of EGR function, EGRC-BPT valve or EGRC-solenoid valve

TROUBLE DIAGNOSIS FOR DTC P1401

EGR Temperature Sensor (DTC: 0305) (Cont'd)

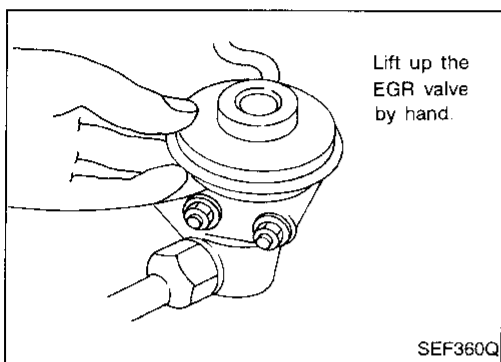
OVERALL FUNCTION CHECK

Use this procedure to check the overall function of the EGR temperature sensor. During this check, a DTC might not be confirmed.

Procedure for malfunctions A and B

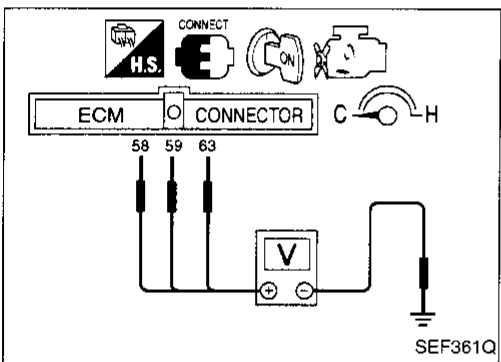
★ MONITOR	★ NO FILE	<input type="checkbox"/>
CKPS•RPM (POS)	0rpm	
COOLAN TEMP/S	20°C	
EGR TEMP SEN	4.3V	
INT/A TEMP SE	22°C	

SEF358Q

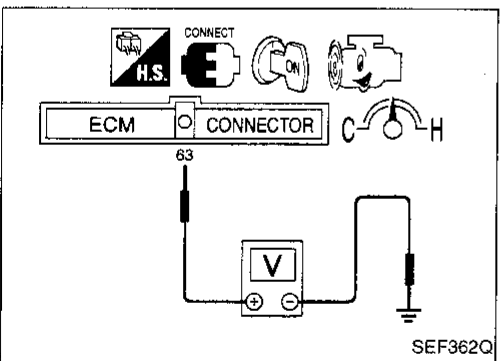


- 1) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
- 2) Confirm that engine coolant temperature and intake air temperature are lower than 40°C (104°F). (If necessary, wait until the temperatures equal atmospheric temperature.)
- 3) Confirm that "EGR TEMP SEN" reading is between 3.45V and 5.0V.
- 4) Start engine and warm it up sufficiently.
- 5) Run engine at idle for at least 2 minutes.
- 6) Confirm that EGR valve is not lifting. If NG, go to TROUBLE DIAGNOSES FOR DTC P0400 and P0402. (See pages EC-201 and 210.)
- 7) Read "EGR TEMP SEN" at about 1,500 rpm with EGR valve lifted up to the full position by hand.
Voltage should decrease to less than 1.0V.
- 8) If step 7 is OK, perform TROUBLE DIAGNOSES FOR DTC P0400, P0402 and P1400. (See pages EC-201, 210 and 292.)

OR



- 1) Turn ignition switch "ON".
- 2) Confirm that voltage between ECM terminals ⑤⑧, ⑤⑨ and ground are more than 2.72V. (If necessary, wait until engine coolant temperature and intake air temperature equal atmospheric temperature.)
- 3) Confirm that voltage between ECM terminal ⑥③ and ground is between 3.45V and 5.0V.
- 4) Start engine and warm it up sufficiently.
- 5) Run engine at idle for at least 2 minutes.
- 6) Confirm that EGR valve is not lifting. If NG, go to TROUBLE DIAGNOSES FOR DTC P0400 and P0402. (See pages EC-201 and 210.)
- 7) Check voltage between ECM terminal ⑥③ and ground at about 1,500 rpm with EGR valve lifted up to the full position by hand.
Voltage should decrease to less than 1.0V.
- 8) If step 7 is OK, perform TROUBLE DIAGNOSES FOR DTC P0400, P0402 and P1400. (See pages EC-201, 210 and 292.)

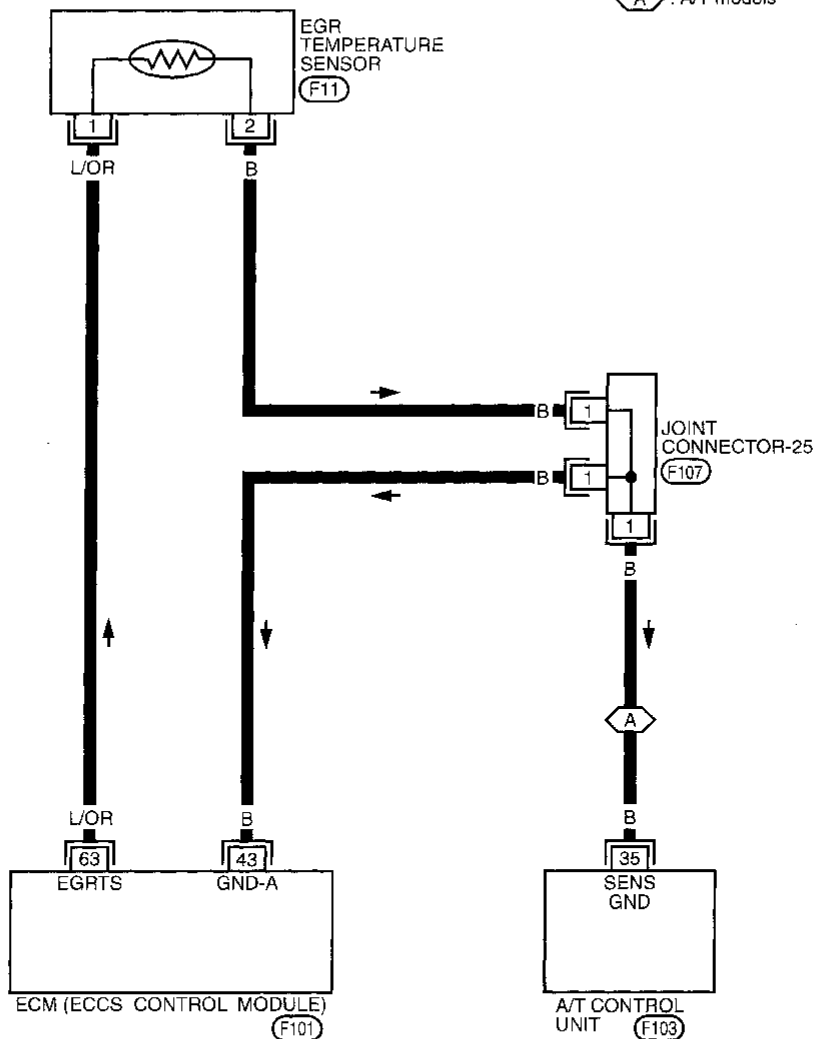


TROUBLE DIAGNOSIS FOR DTC P1401

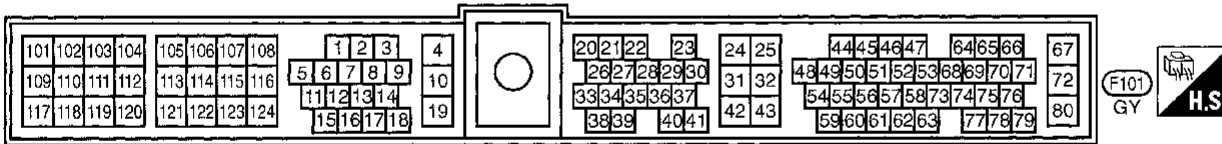
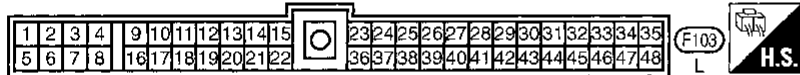
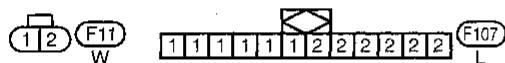
EGR Temperature Sensor (DTC: 0305) (Cont'd)

EC-EGR/TS-01

: Detectable line for DTC
 : Non-detectable line for DTC
A : A/T models

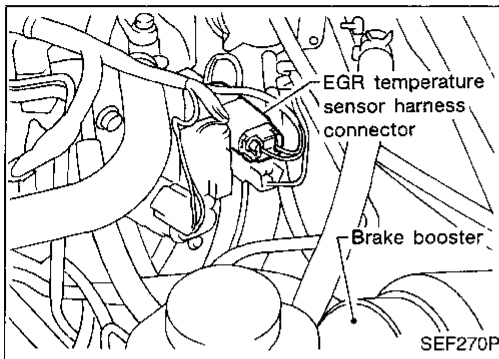


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TROUBLE DIAGNOSIS FOR DTC P1401

EGR Temperature Sensor (DTC: 0305) (Cont'd) DIAGNOSTIC PROCEDURE



INSPECTION START

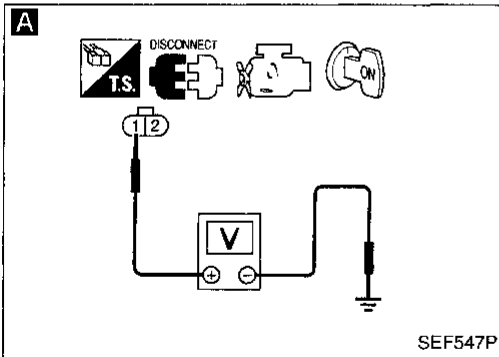
A

CHECK POWER SUPPLY.

1. Disconnect EGR temperature sensor harness connector.
2. Turn ignition switch "ON".
3. Check voltage between terminal ① and ground with CONSULT or tester.

Voltage: Approximately 5V

NG → Repair harness or connectors.



B

CHECK GROUND CIRCUIT.

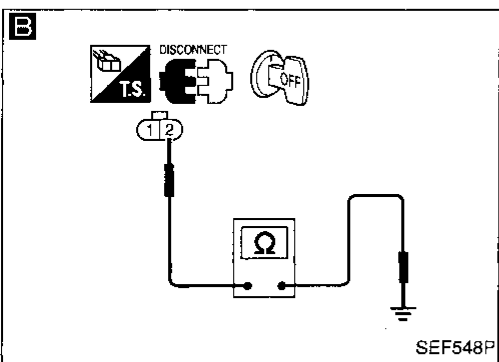
1. Turn ignition switch "OFF".
2. Check harness continuity between terminal ② and engine ground.

Continuity should exist.
If OK, check harness for short.

NG → Check the following.

- Joint connector-25
- Harness for open or short between ECM and EGR temperature sensor
- Harness for open or short between A/T control unit and EGR temperature sensor

If NG, repair harness or connector.



CHECK COMPONENT
(EGR temperature sensor).
Refer to "COMPONENT INSPECTION" on next page.

NG → Replace EGR temperature sensor.

OK

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

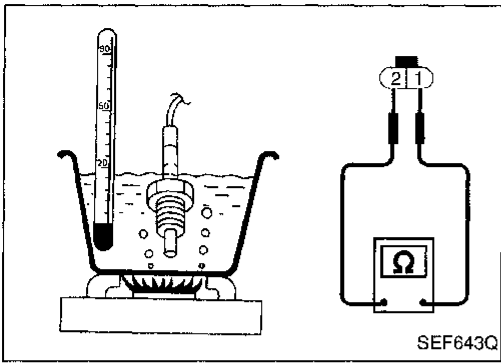
INSPECTION END

TROUBLE DIAGNOSIS FOR DTC P1401

EGR Temperature Sensor (DTC: 0305) (Cont'd) COMPONENT INSPECTION

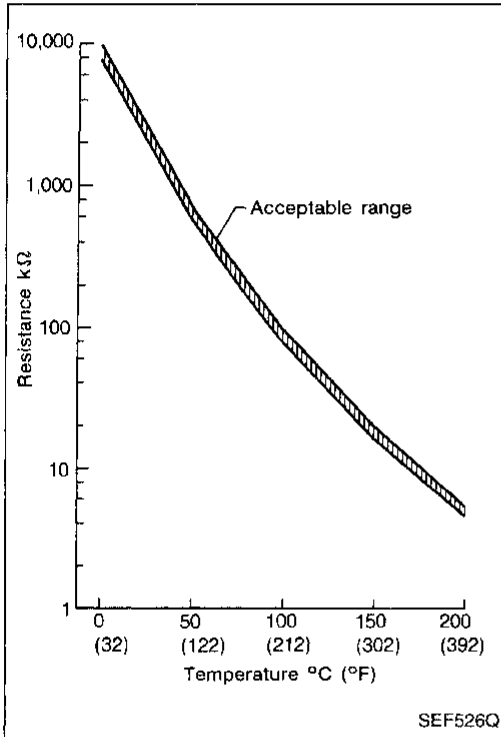
EGR temperature sensor

Check resistance change and resistance value.



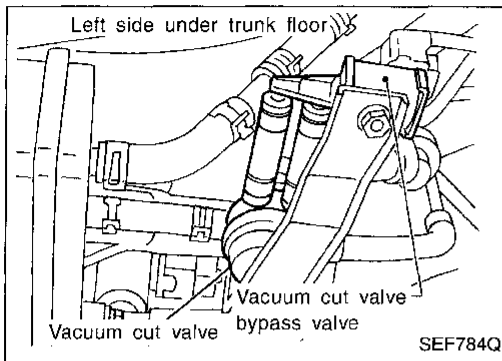
EGR temperature °C (°F)	Voltage (V)	Resistance (MΩ)
0 (32)	4.81	7.9 - 9.7
50 (122)	2.82	0.57 - 0.70
100 (212)	0.8	0.08 - 0.10
150 (302)	0.16	0.01 - 0.02

If NG, replace EGR temperature sensor.



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TROUBLE DIAGNOSIS FOR DTC P1441



Vacuum Cut Valve Bypass Valve (DTC: 0801)

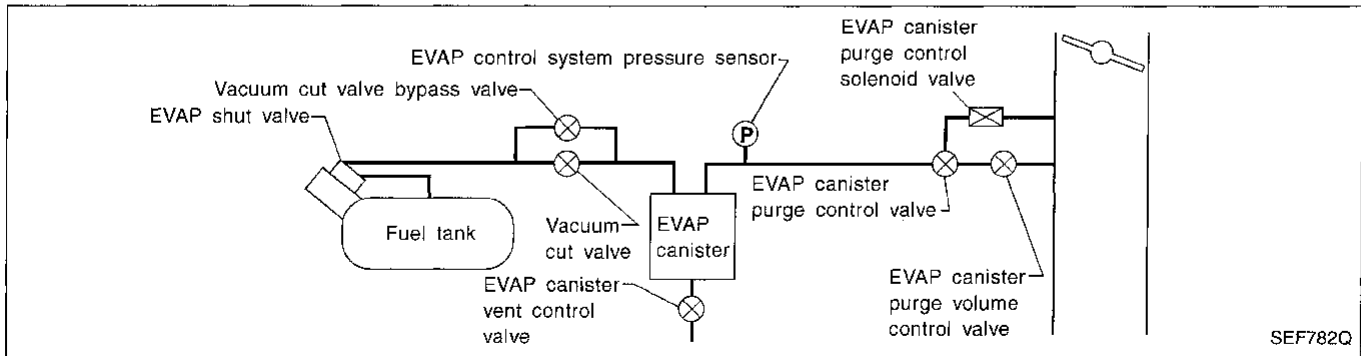
The vacuum cut valve and vacuum cut valve bypass valve are installed in parallel on the EVAP purge line between the fuel tank and the EVAP canister.

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



Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1441 0801	A) An improper voltage signal is sent to ECM through vacuum cut valve bypass valve. B) Vacuum cut valve bypass valve does not operate properly.	<ul style="list-style-type: none"> • Harness or connectors (The vacuum cut valve bypass valve circuit is open or shorted.) • Vacuum cut valve bypass valve <hr style="border-top: 1px dotted black;"/> <ul style="list-style-type: none"> • Vacuum cut valve bypass valve • Vacuum cut valve • Bypass hoses for clogging • EVAP control system pressure sensor

TROUBLE DIAGNOSIS FOR DTC P1441

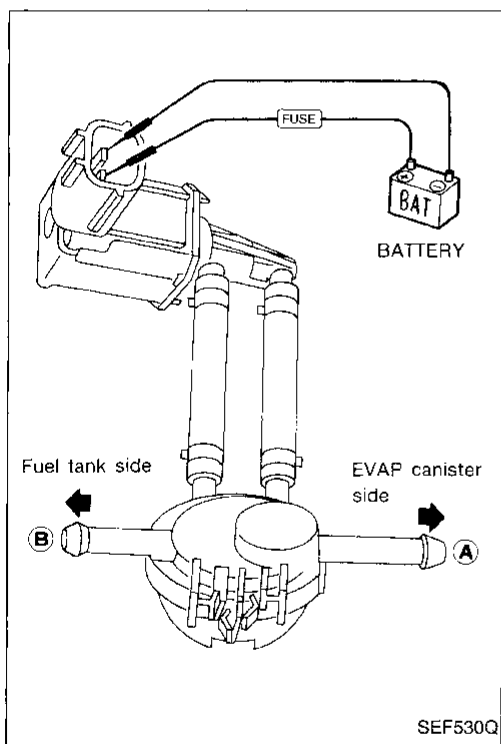
Vacuum Cut Valve Bypass Valve (DTC: 0801) (Cont'd)

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Perform "Procedure for malfunction A" first. If DTC cannot be confirmed, perform "OVERALL FUNCTION CHECK", "Procedure for malfunction B".

Procedure for malfunction A

- 1) Turn ignition switch "ON".
 - 2) Select "DATA MONITOR" mode with CONSULT.
 - 3) Start engine and wait at least 5 seconds.
- OR
- 1) Start engine and wait at least 5 seconds.
 - 2) Select "MODE 3" with GST.
- OR
- 1) Start engine and wait at least 5 seconds.
 - 2) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
 - 3) Perform "Diagnostic Test Mode II (Self-diagnostic results)" with ECM.



OVERALL FUNCTION CHECK

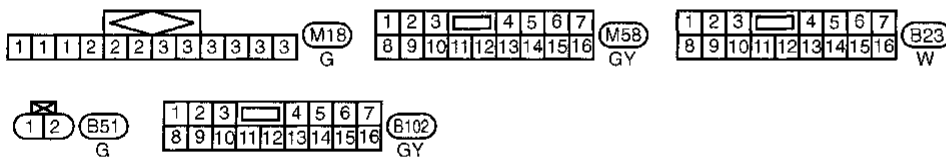
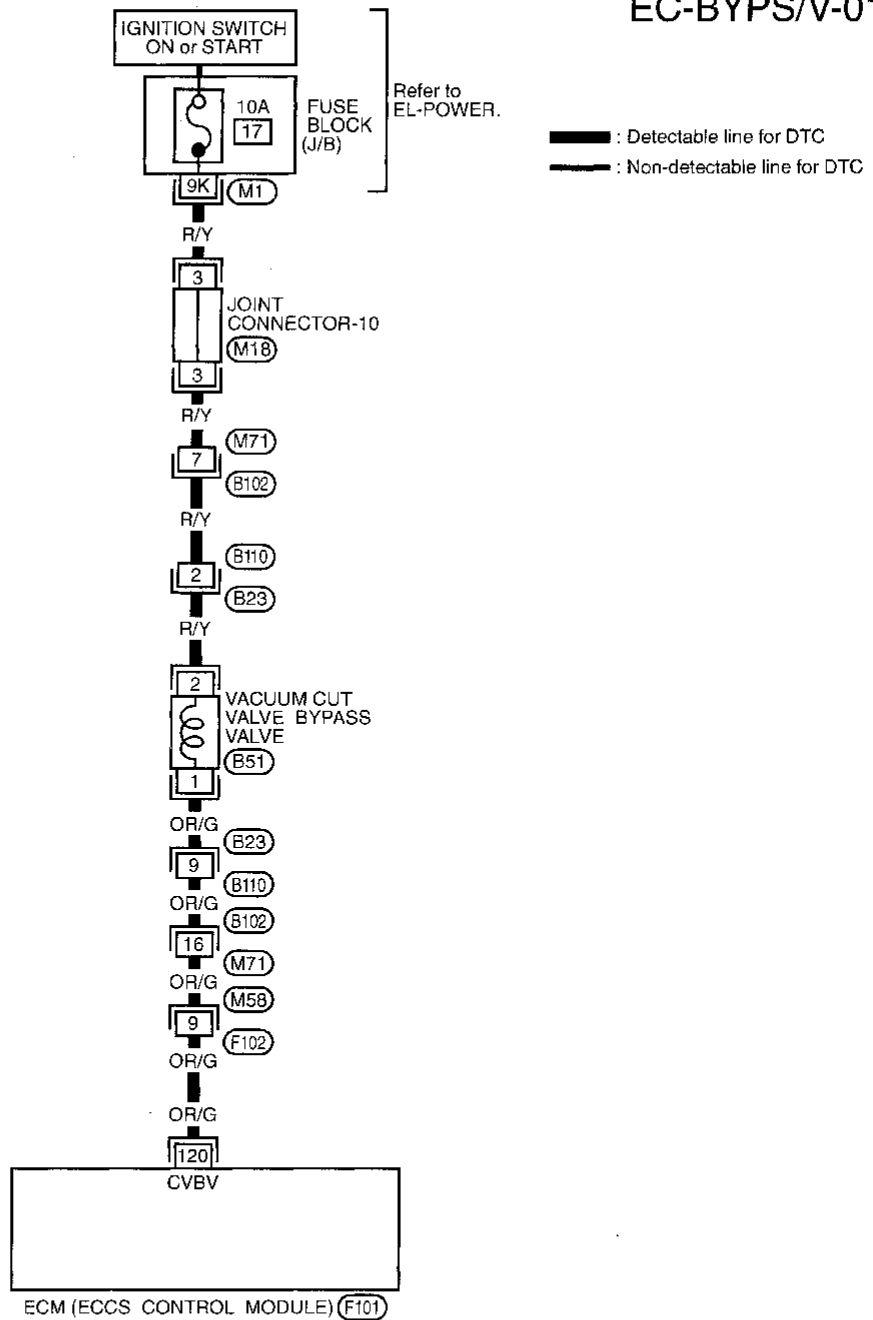
Procedure for malfunction B

- 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.

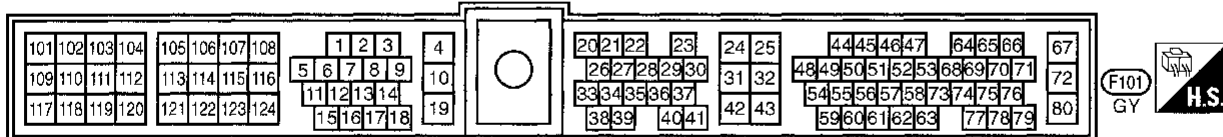
TROUBLE DIAGNOSIS FOR DTC P1441

Vacuum Cut Valve Bypass Valve (DTC: 0801) (Cont'd)

EC-BYPS/V-01



Refer to last page (Foldout page).

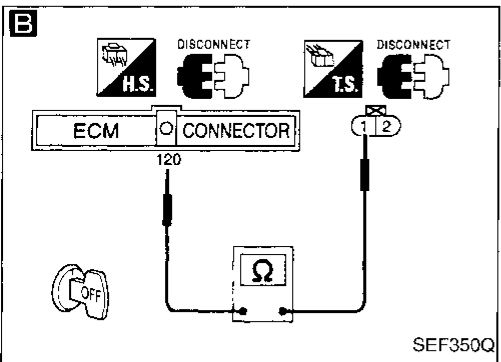
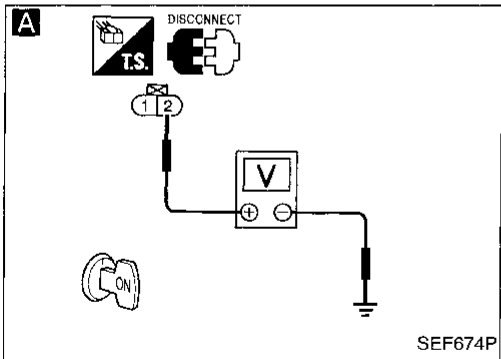
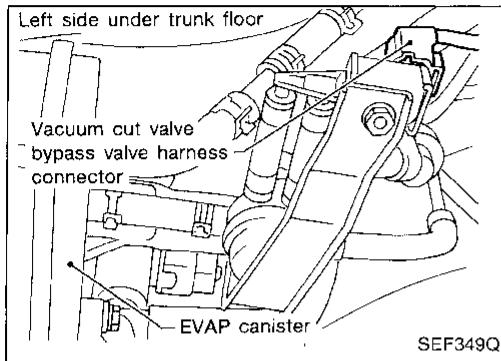


TROUBLE DIAGNOSIS FOR DTC P1441

Vacuum Cut Valve Bypass Valve (DTC: 0801) (Cont'd)

DIAGNOSTIC PROCEDURE

Procedure for malfunction A



INSPECTION START

A

CHECK POWER SUPPLY.

1. Disconnect vacuum cut valve bypass valve harness connector.
2. Turn ignition switch "ON".
3. Check voltage between terminal ② and ground with CONSULT or tester.

Voltage: Battery voltage

NG

Check the following.

- Harness connectors (M71, B102)
 - Harness connectors (B110, B23)
 - 10A fuse
 - Joint connector-10
 - Harness for open or short between vacuum cut valve bypass valve and fuse
- If NG, repair harness or connectors.

OK

B

CHECK OUTPUT SIGNAL CIRCUIT.

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ⑫ and terminal ①.

Continuity should exist.

If OK, check harness for short.

NG

Check the following.

- Harness connectors (B23, B110)
 - Harness connectors (B102, M71)
 - Harness connectors (M58, F102)
 - Harness for open or short between vacuum cut valve bypass valve and ECM.
- If NG, repair harness or connectors.

OK

CHECK COMPONENT

(Vacuum cut valve bypass valve). Refer to "COMPONENT INSPECTION" on next page.

NG

Replace vacuum cut valve bypass valve.

OK

Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.

Check ECM pin terminals for damage and check the connection of ECM harness connector. Reconnect ECM harness connector and retest.

INSPECTION END

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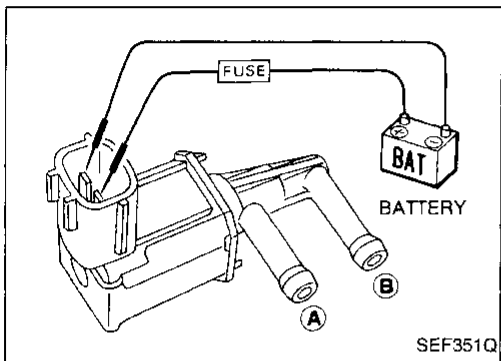
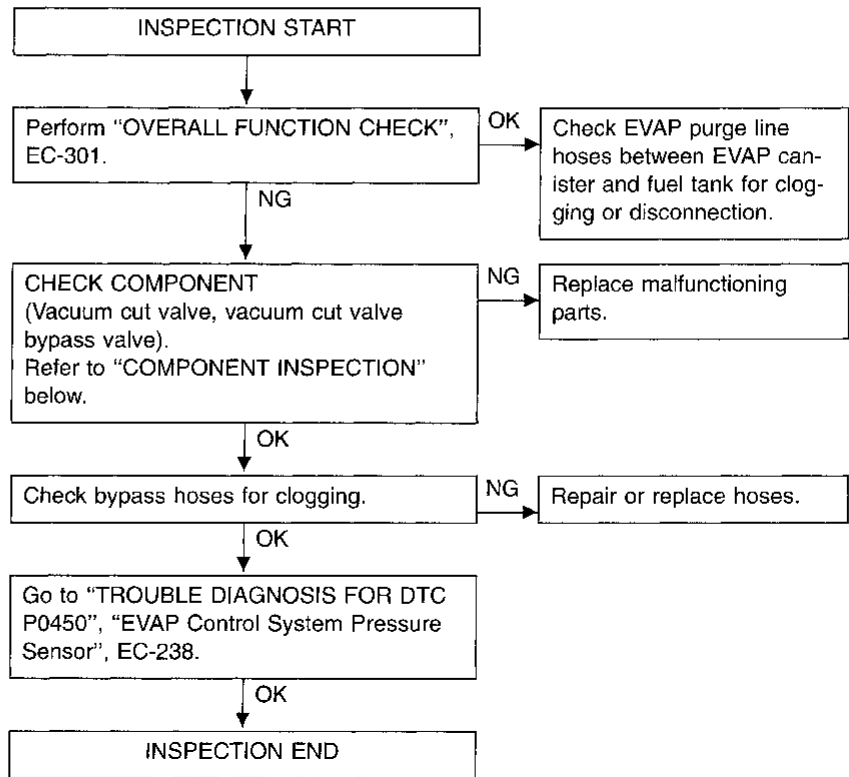
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TROUBLE DIAGNOSIS FOR DTC P1441

Vacuum Cut Valve Bypass Valve (DTC: 0801) (Cont'd)

DIAGNOSTIC PROCEDURE

Procedure for malfunction B



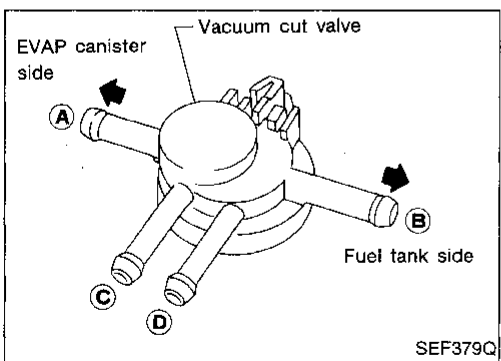
COMPONENT INSPECTION

Vacuum cut valve bypass valve

Check air passage continuity.

Condition	Air passage continuity between (A) and (B)
12V direct current supply between terminals	Yes
No supply	No

If NG, replace vacuum cut valve bypass valve.



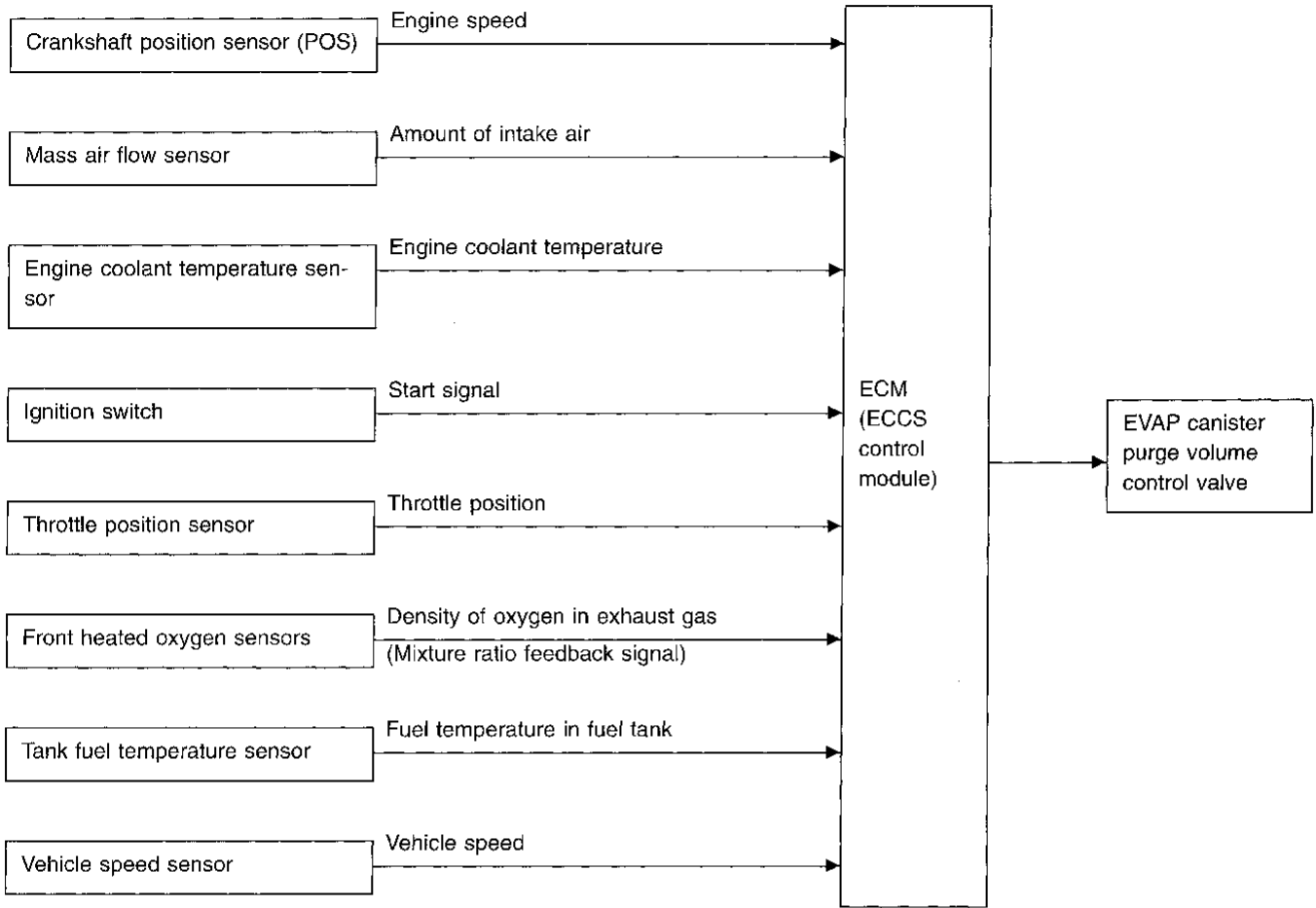
Vacuum cut valve

Check vacuum cut valve as follows:

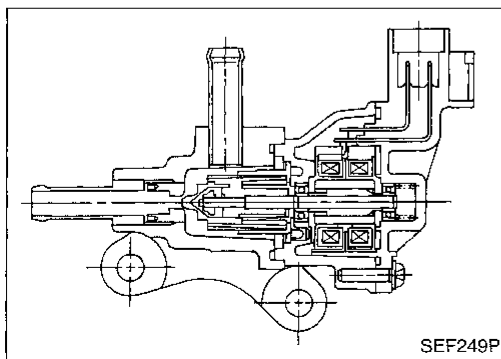
1. Plug port (C) and (D) with fingers.
2. Apply vacuum to port (A) and check that there is no suction from port (B).
3. Apply vacuum to port (B) and check that there is suction from port (A).
4. Blow air in port (B) and check that there is a resistance to flow out of port (A).
5. Open port (C) and (D).
6. Blow air in port (A) check that air flows freely out of port (C).
7. Blow air in port (B) check that air flows freely out of port (D).

Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008)

SYSTEM DESCRIPTION



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 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. When the engine is operating, the flow rate of fuel vapor from the EVAP canister is regulated as the air flow changes.



COMPONENT DESCRIPTION

The EVAP canister purge volume control valve uses a step motor to control the flow rate of fuel vapor from the EVAP canister. 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.

TROUBLE DIAGNOSIS FOR DTC P1445


Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008) (Cont'd)

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1445 1008	A) An improper voltage signal is sent to ECM through the valve.	<ul style="list-style-type: none"> • Harness or connectors (The valve circuit is open or shorted.) • EVAP canister purge volume control valve
	B) The canister purge flow is detected during the specified driving conditions, even when EVAP canister purge volume control valve is completely closed.	<ul style="list-style-type: none"> • EVAP control system pressure sensor • EVAP canister purge volume control valve (The valve is stuck open.) • EVAP canister purge control valve • Hoses (Hoses are connected incorrectly.)


DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Perform "Procedure for malfunction A" first. If the DTC cannot be confirmed, perform "Procedure for malfunction B".


Procedure for malfunction A

-  1) Jack up drive wheels.
 2) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
 3) Start engine and let it idle for at least 90 seconds.
 4) Move selector/gearshift lever to "1" range (A/T) or "1st" gear (M/T).
 5) Race engine from idle to 2,000 to 3,000 rpm more than 10 times.


OR

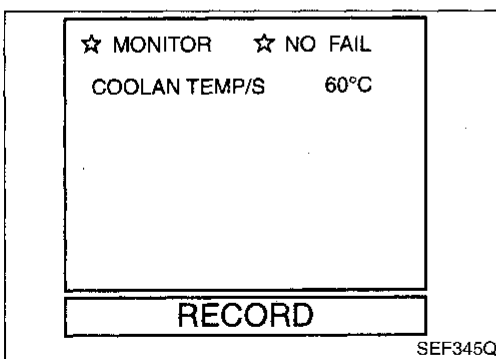
-  1) Jack up drive wheels.
 2) Start engine and let it idle for at least 90 seconds.
 3) Move selector/gearshift lever to "1" range (A/T) or "1st" gear (M/T).
 4) Race engine from idle to 2,000 to 3,000 rpm more than 10 times.
 5) Select "MODE 3" with GST.

OR

-  1) Jack up drive wheels.
 2) Start engine and let it idle for at least 90 seconds.
 3) Move selector/gearshift lever to "1" range (A/T) or "1st" gear (M/T).
 4) Race engine from idle to 2,000 to 3,000 rpm more than 10 times.
 5) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
 6) Perform Diagnostic Test Mode II (Self-diagnostic results) with ECM.

Procedure for malfunction B

-  1) Jack up drive wheels.
 2) Turn ignition switch "ON" and select "DATA MONITOR" mode with CONSULT.
 3) Start engine and warm it up until the engine coolant temperature rises to 60 to 80°C (140 to 176°F), then stop engine. (If the engine coolant temperature exceeds the above range, stop engine and wait until the temperature falls to within this range.)
 4) Start engine and let it idle for at least 70 seconds.



TROUBLE DIAGNOSIS FOR DTC P1445

Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008) (Cont'd)

- 5) Maintain the following conditions for at least 50 seconds.

Gear position:

- “2” or “D” range (A/T)
- “3rd” or “4th” gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

Engine speed:

1,500 - 2,500 rpm

Coolant temperature:

Less than 100°C (212°F)

OR

FUEL SYS #1	OLDRIVE
FUEL SYS #2	OLDRIVE
CALC LOAD	24.3%
COOLANT TEMP	60°C
SHORT FT #1	-0.7%
LONG FT #1	0%
SHORT FT #2	0.8%
LONG FT #2	0%
ENGINE SPD	737RPM
VEHICLE SPD	0MPH
IGN ADVANCE	9.0°
INTAKE AIR	25°C

SEF346Q



- 1) Jack up drive wheels.
- 2) Turn ignition switch “ON” and select “MODE 1” mode with GST.
- 3) Start engine and warm it up until the engine coolant temperature rises to 60 to 80°C (140 to 176°F), then stop engine. (If the engine coolant temperature exceeds the above range, stop engine and wait until the temperature falls to within this range.)
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Maintain the following conditions for at least 50 seconds.

Gear position:

- “2” or “D” range (A/T)
- “3rd” or “4th” gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

Engine speed:

1,500 - 2,500 rpm

Coolant temperature:

Less than 100°C (212°F)

- 6) Select “MODE 3” with GST.

OR



- 1) Jack up drive wheels.
- 2) Turn ignition switch “ON”.
- 3) Start engine and warm it up until the voltage between ECM terminal 59 and ground drops to 1.2 - 1.9V, then stop engine. (If the voltage drops below the above range, stop engine and wait until the voltage rises to within this range.)
- 4) Start engine and let it idle for at least 70 seconds.
- 5) Maintain the following conditions for at least 50 seconds.

Gear position:

- “2” or “D” range (A/T)
- “3rd” or “4th” gear (M/T)

Vehicle speed:

40 - 80 km/h (25 - 50 MPH)

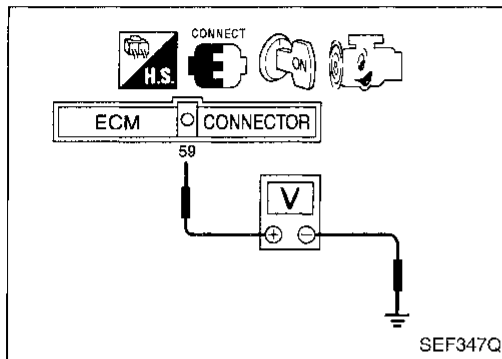
Engine speed:

1,500 - 2,500 rpm

Voltage between ECM terminal 59 and ground:

More than 0.8V

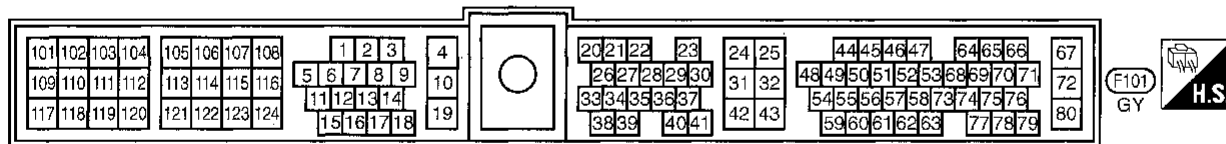
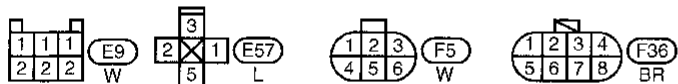
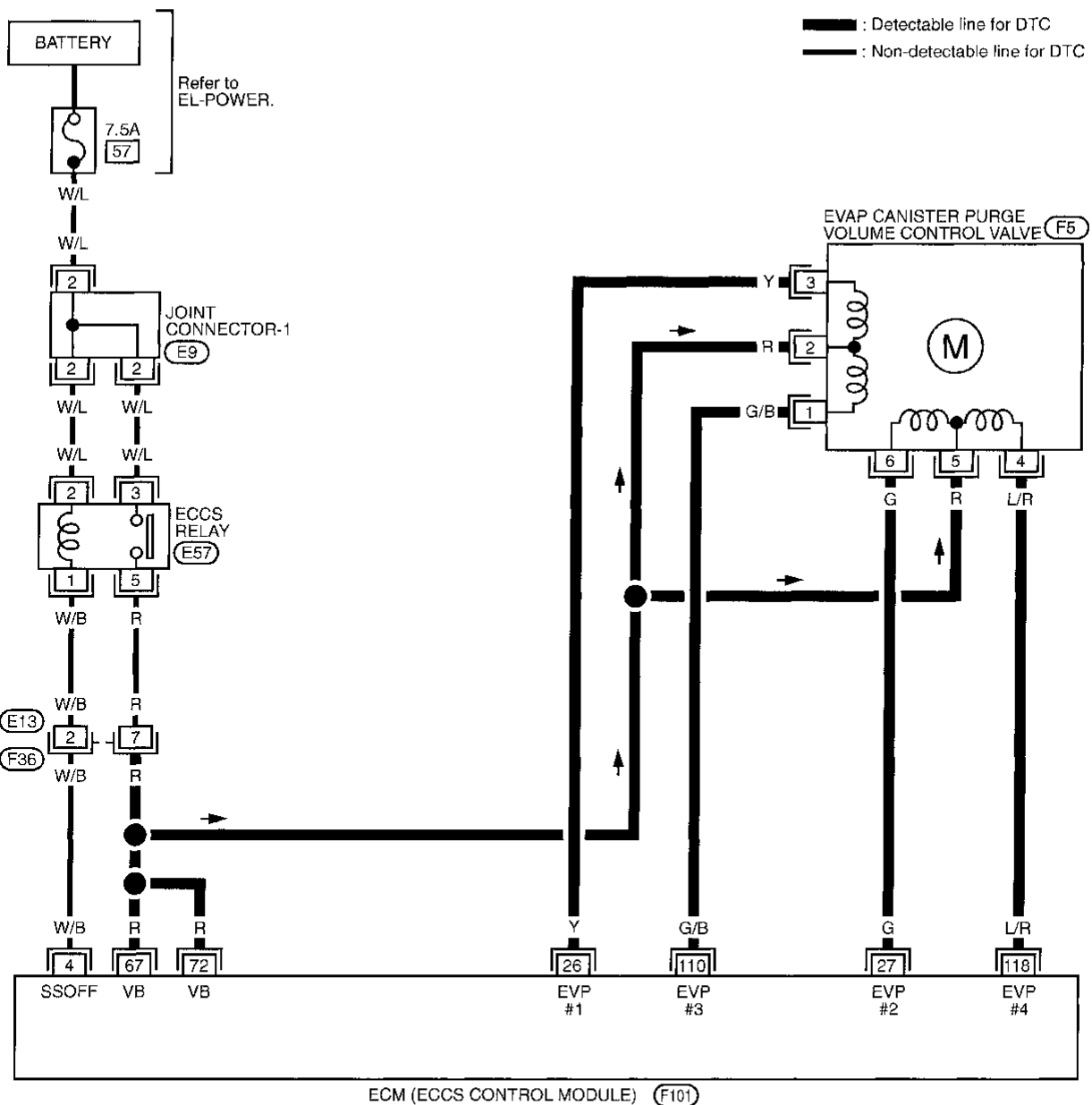
- 6) Turn ignition switch “OFF”, wait at least 5 seconds and then turn “ON”.
- 7) Perform “Diagnostic Test Mode II (Self-diagnostic results)” with ECM.



TROUBLE DIAGNOSIS FOR DTC P1445

Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008) (Cont'd)

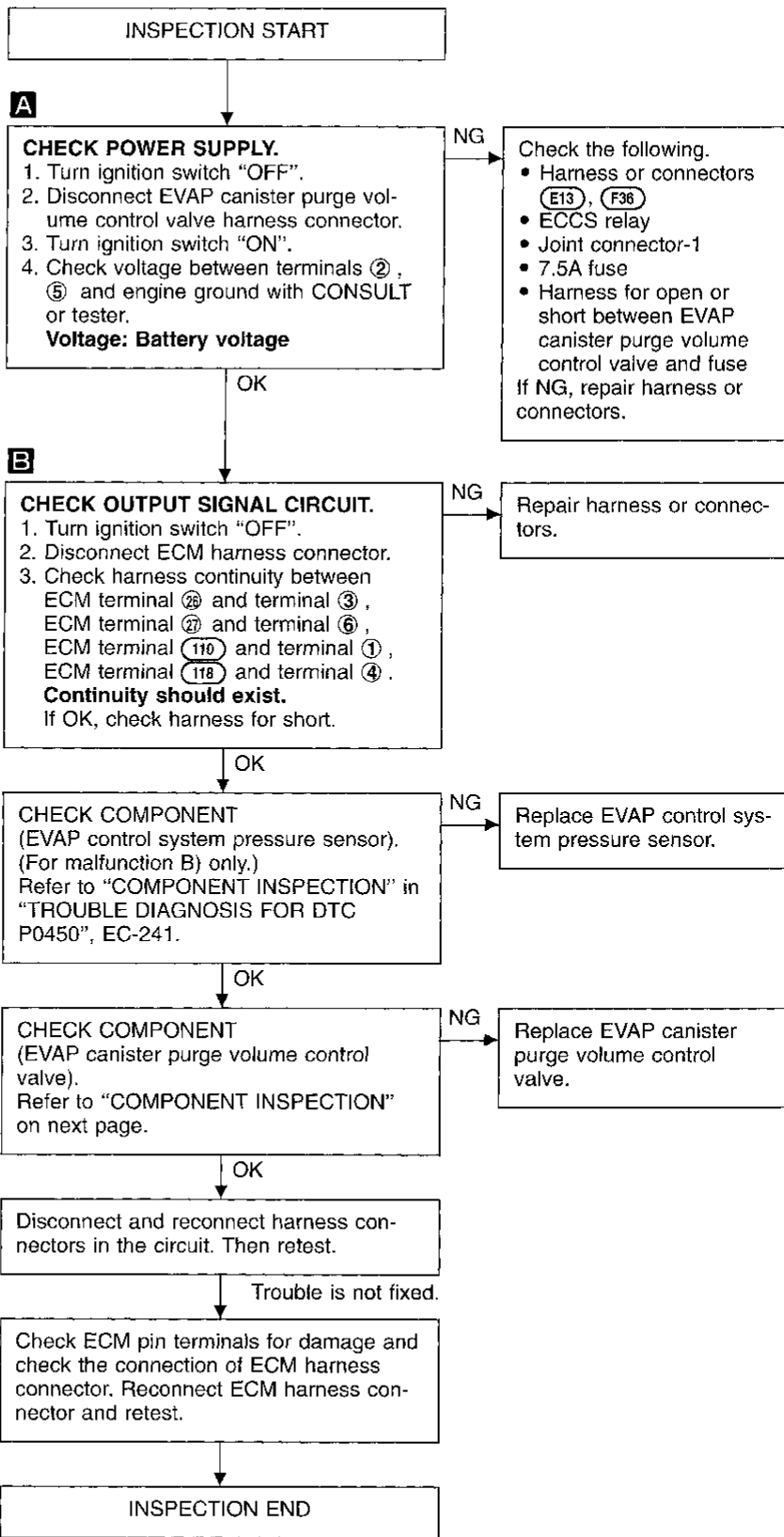
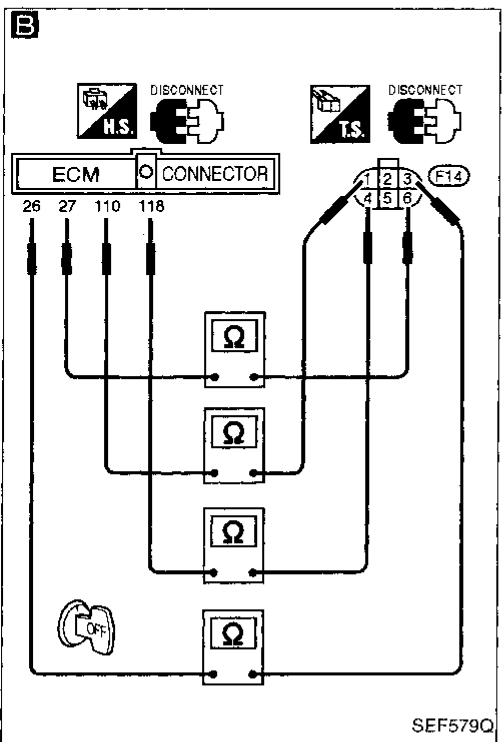
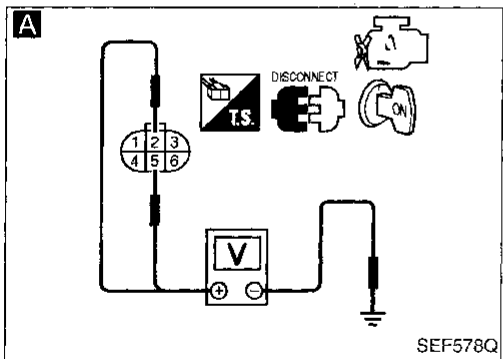
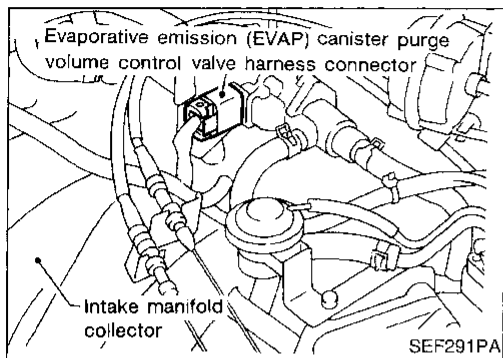
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TROUBLE DIAGNOSIS FOR DTC P1445

Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008) (Cont'd)

DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR DTC P1445

Evaporative Emission (EVAP) Canister Purge Volume Control Valve (DTC: 1008) (Cont'd)

COMPONENT INSPECTION

EVAP canister purge volume control valve

1. Disconnect EVAP canister purge volume control valve harness connector.
2. Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

Resistance:

Approximately 30Ω [At 25°C (77°F)]

3. Reconnect EVAP canister purge volume control valve harness connector.
4. Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
5. Turn ignition switch "ON".
6. Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT. Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the valve opening.
If NG, replace the EVAP canister purge volume control valve.

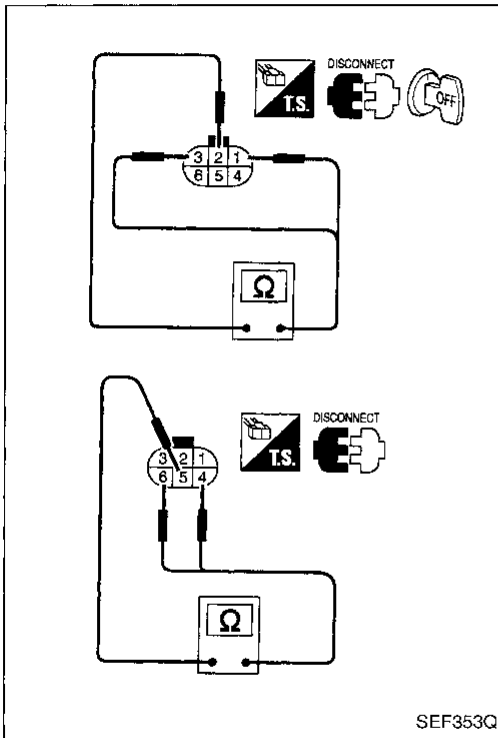
OR

1. Disconnect EVAP canister purge volume control valve harness connector.
2. Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

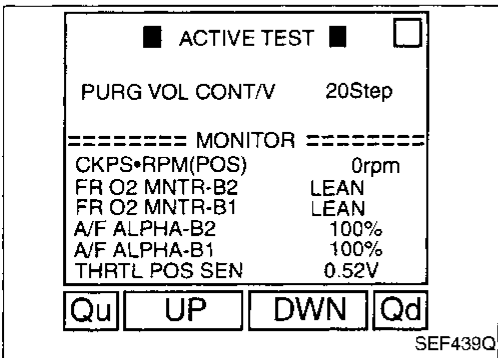
Resistance:

Approximately 30Ω [At 25°C (77°F)]

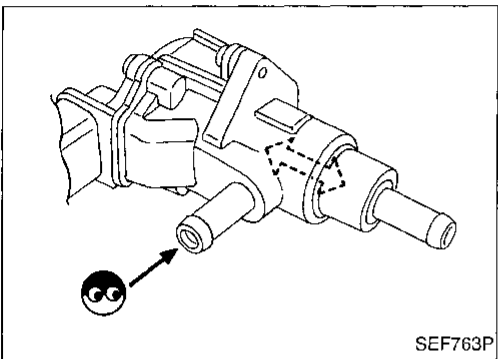
3. Reconnect EVAP canister purge volume control valve harness connector.
4. Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
5. Turn ignition switch "ON" and "OFF". Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the ignition switch position.
If NG, replace the EVAP canister purge volume control valve.



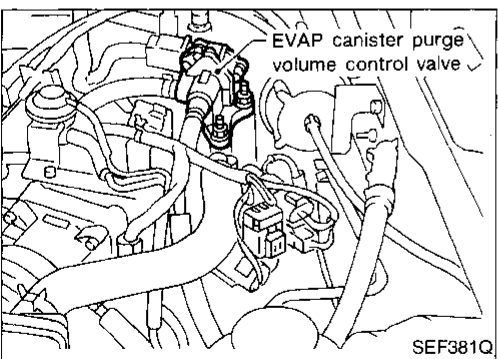
SEF353Q



SEF439Q

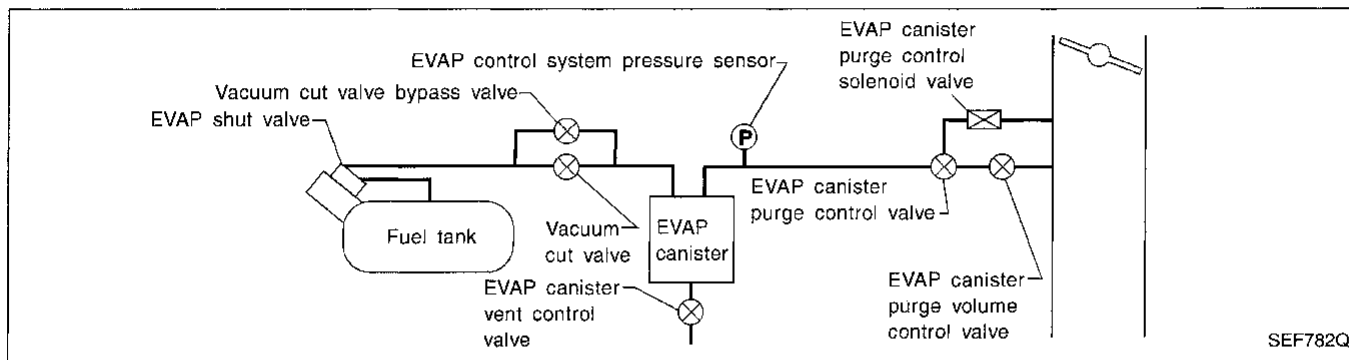


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SEF381Q

Evaporative Emission (EVAP) Control System
Purge Flow Monitoring (DTC: 0111)



SYSTEM DESCRIPTION

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 valve and EVAP canister purge control valve are open. Purge flow exposes the EVAP control system pressure sensor to intake manifold vacuum.

ON-BOARD DIAGNOSIS LOGIC

Under normal conditions (non-closed throttle), sensor output voltage indicates if pressure drop and purge flow are adequate. If not, a fault is determined.

Diagnostic Trouble Code No.	Malfunction is detected when	Check Items (Possible Cause)
P1447 0111	<ul style="list-style-type: none"> • EVAP control system does not operate properly. • EVAP control system has a leak between intake manifold and EVAP control system pressure sensor. 	<ul style="list-style-type: none"> • EVAP canister purge volume control valve stuck closed • EVAP canister purge control valve stuck closed • EVAP control system pressure sensor • Loose or disconnected rubber tube • Blocked rubber tube • EVAP canister purge control solenoid valve • Blocked or bent rubber tube to MAP/BARO switch solenoid valve • Cracked EVAP canister • Absolute pressure sensor • MAP/BARO switch solenoid valve

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TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)

OVERALL FUNCTION CHECK

Use this procedure to check the overall monitoring function of the EVAP control system purge flow. During this check, a DTC might not be confirmed.



- 1) Jack up drive wheels (M/T models).
- 2) Start engine.
- 3) Select "EVAP SYS PRES" in "DATA MONITOR" mode with CONSULT.
- 4) Check EVAP control system pressure sensor value at idle speed.
- 5) Select "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT and set "PURG VOL CONT/V" to 20 steps by touching "UP" or "Qu".
- 6) Maintain the following conditions for at least 30 seconds. Verify that EVAP control system pressure sensor value ("EVAP SYS PRES") stays 0.1V less than the value at idle speed for at least 2 seconds.

Engine speed:

Approx. 2,000 rpm

Gear position (for M/T models):

Any position other than "Neutral" or "Reverse"

CAUTION:

Do not run vehicle at speeds greater than 80 km/h (50 MPH).

OR



- 1) Jack up drive wheels.
- 2) Start engine and warm it up sufficiently.
- 3) Turn ignition switch "OFF", wait at least 5 seconds.
- 4) Start engine and wait at least 70 seconds.
- 5) Set voltmeter probes to ECM terminals ⑥② (EVAP control system pressure sensor signal) and ④③ (ground).
- 6) Check EVAP control system pressure sensor value at idle speed.
- 7) Establish and maintain the following conditions for at least 30 seconds.

Air conditioner switch: ON

Steering wheel: Fully turned

Headlamp switch: ON

Rear window defogger switch: ON

Engine speed: Approx. 3,500 rpm

Intake manifold vacuum:

-73.3 to -60.0 kPa (-550 to -450 mmHg,

-21.65 to -17.72 inHg)

Gear position:

M/T models

Any position other than "Neutral" or "Reverse"

A/T models

Any position other than "P", "N" or "R".

Return all conditions to normal. Repeat this procedure at least 5 times.

Verify that EVAP control system pressure sensor value stays 0.1V less than the value at idle speed for at least 2 seconds.

CAUTION:

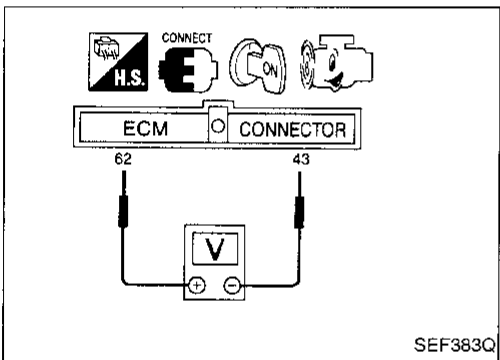
Do not run vehicle at speeds greater than 80 km/h (50 MPH).

☆ MONITOR	☆ NO FAIL	<input checked="" type="checkbox"/>
CKPS•RPM (POS)	800rpm	
COOLAN TEMP/S	89°C	
VHCL SPEED SE	0km/h	
CLSD THL/P SW	OFF	
B/FUEL SCHDL	1.4msec	
PURG VOL C/V	0step	
EVAP SYS PRES	3.38V	
VENT CONT/V	OFF	
V/CV BYPASS/V	OFF	
RECORD		

SEF382Q

■ ACTIVE TEST ■		<input type="checkbox"/>
PURG VOL CONT/V	20Step	
===== MONITOR =====		
CKPS•RPM(POS)	750rpm	
VHCL SPEED SE	0km/h	
B/FUEL SCHDL	1.4msec	
EVAP SYS PRES	3.38V	
PURG CONT S/V	ON	
Qu	UP	DWN
Qd		

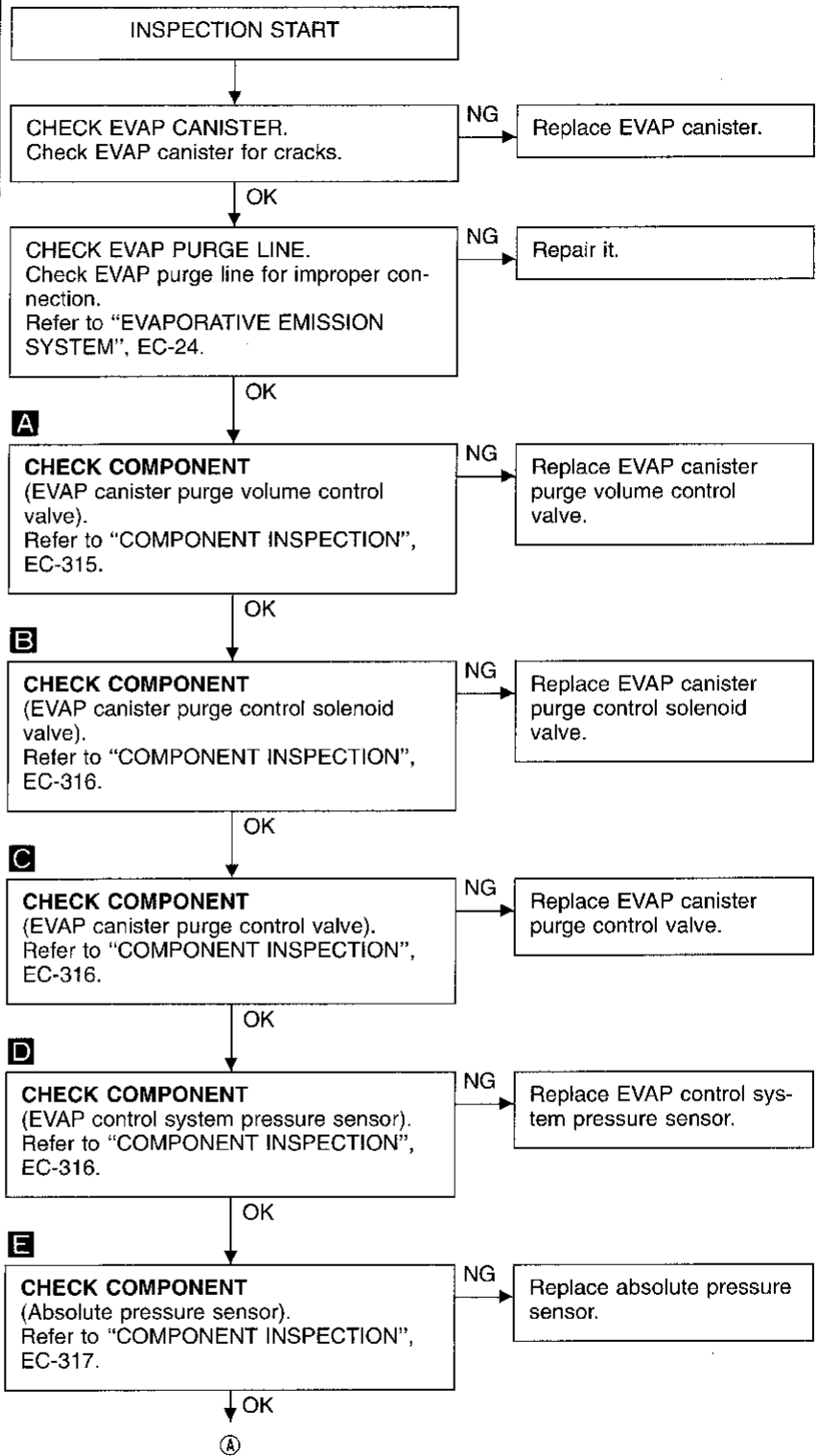
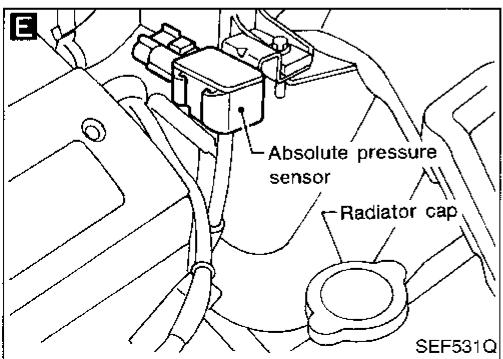
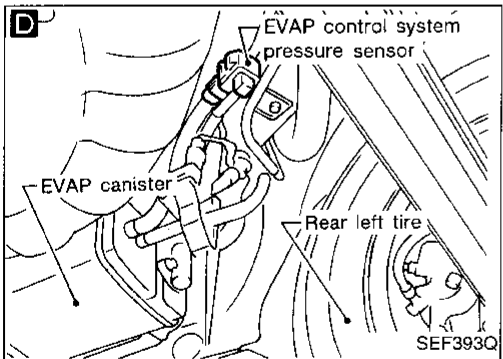
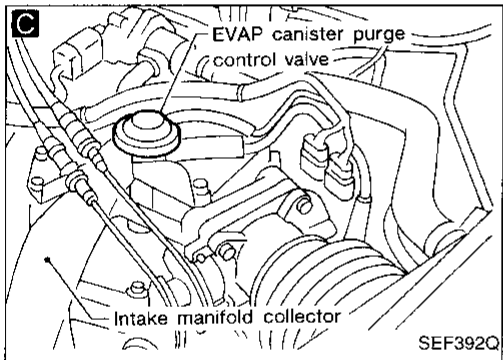
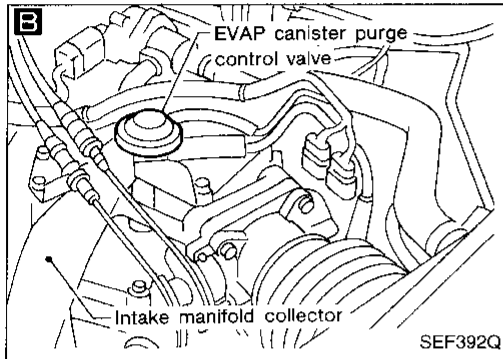
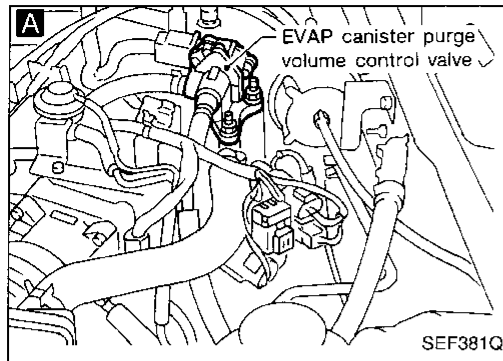
SEF533Q



TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)

DIAGNOSTIC PROCEDURE



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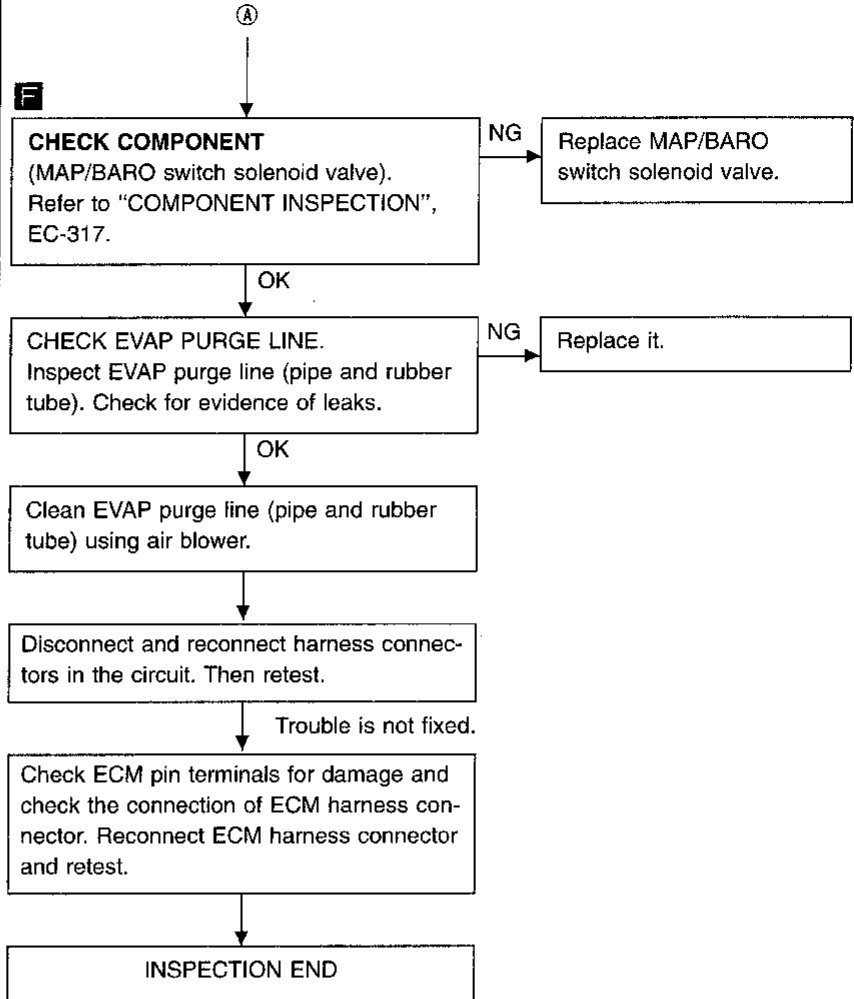
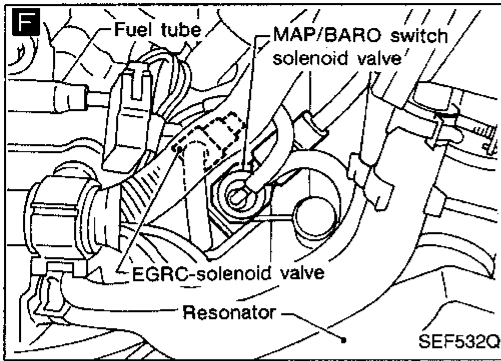
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TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)



TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)

COMPONENT INSPECTION

EVAP canister purge volume control valve

- 1) Disconnect EVAP canister purge volume control valve harness connector.
- 2) Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

Resistance:

Approximately 30Ω [At 25°C (77°F)]

- 3) Reconnect EVAP canister purge volume control valve harness connector.
- 4) Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
- 5) Turn ignition switch "ON".
- 6) Perform "PURG VOL CONT/V" in "ACTIVE TEST" mode with CONSULT. Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the valve opening.
If NG, replace the EVAP canister purge volume control valve.

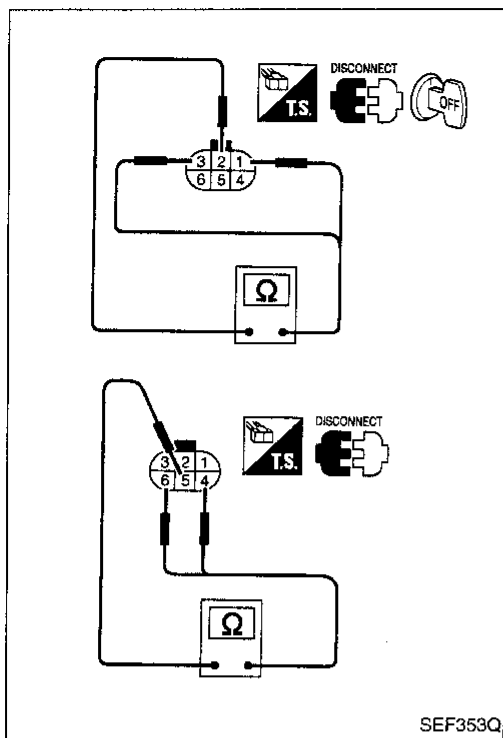
OR

- 1) Disconnect EVAP canister purge volume control valve harness connector.
- 2) Check resistance between the following terminals.
terminal ② and terminals ①, ③
terminal ⑤ and terminals ④, ⑥

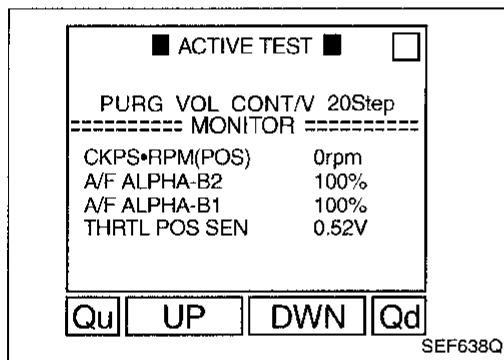
Resistance:

Approximately 30Ω [At 25°C (77°F)]

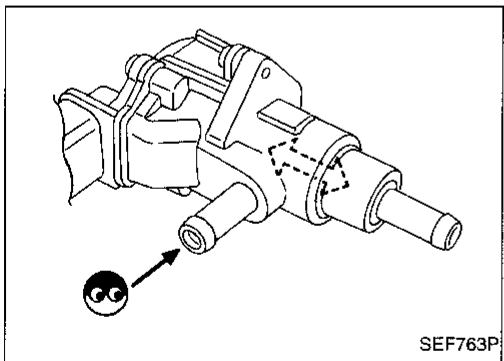
- 3) Reconnect EVAP canister purge volume control valve harness connector.
- 4) Remove EVAP canister purge volume control valve from intake manifold collector and disconnect hoses from the valve.
(Plug the purge hoses. The EVAP canister purge volume control valve harness connector should remain connected.)
- 5) Turn ignition switch "ON" and "OFF". Check that EVAP canister purge volume control valve shaft moves smoothly forward and backward according to the ignition switch position.
If NG, replace the EVAP canister purge volume control valve.



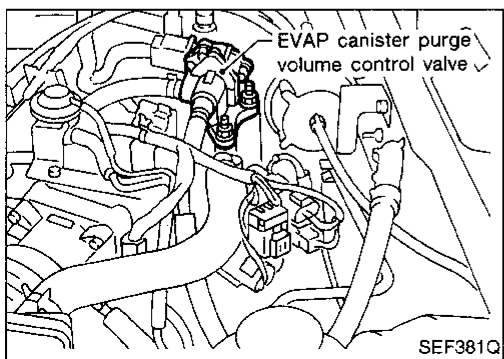
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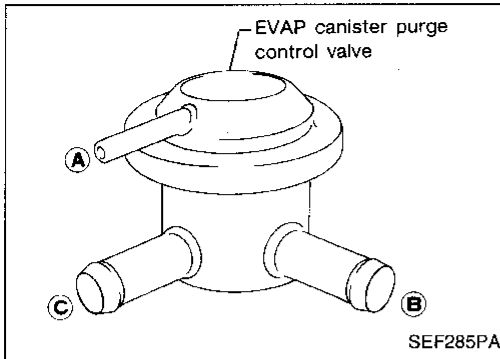
TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)

EVAP canister purge control valve

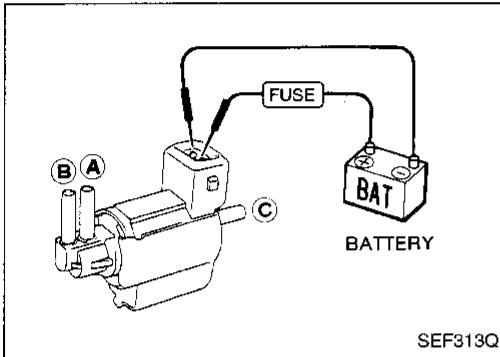
Check EVAP canister purge control valve as follows:

1. Blow air in port (A), (B) and (C), and check that there is no leakage.
2. Apply vacuum to port (A) with pump. [Approximately -13.3 to -20.0 kPa (-100 to -150 mmHg, -3.94 to -5.91 inHg)]
Blow air in port (C) and check that it flows freely out of port (B).



EVAP canister purge control solenoid valve

Check air passage continuity.

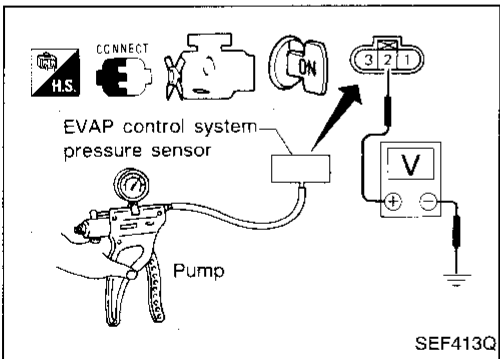


Condition	Air passage continuity between (A) and (B)	Air passage continuity between (A) and (C)
12V direct current supply between terminals	Yes	No
No supply	No	Yes

If NG, replace solenoid valve.

EVAP control system pressure sensor

1. Remove EVAP control system pressure sensor with its harness connector connected.
2. Remove hose from EVAP control system pressure sensor.
3. Use pump to apply vacuum and pressure to EVAP control system pressure sensor as shown in figure.
4. Check output voltage between terminal ② and engine ground.



Pressure (Relative to atmospheric pressure)	Voltage (V)
0 kPa (0 mmHg, 0 inHg, 0 psi)	3.0 - 3.6
-9.3 kPa (-70 mmHg, -2.76 inHg, -1.35 psi)	0.4 - 0.6

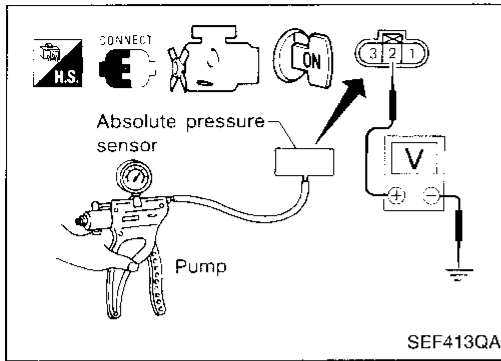
CAUTION:

Always calibrate the vacuum pump gauge when using it.

5. If NG, replace EVAP control system pressure sensor.

TROUBLE DIAGNOSIS FOR DTC P1447

Evaporative Emission (EVAP) Control System Purge Flow Monitoring (DTC: 0111) (Cont'd)



Absolute pressure sensor

1. Remove absolute pressure sensor with its harness connector connected.
2. Remove hose from absolute pressure sensor.
3. Turn ignition switch "ON" and check output voltage between terminal ② and engine ground.

The voltage should be 3.2 to 4.8 V.

4. Use pump to apply vacuum of -26.7 kPa (-200 mmHg, -7.87 inHg, -3.87 psi) to absolute pressure sensor as shown in figure and check the output voltage.

The voltage should be 1.0 to 1.4 V lower than the value measured in step 3.

CAUTION:

Always calibrate the vacuum pump gauge when using it.

5. If NG, replace absolute pressure sensor.

MAP/BARO switch solenoid valve

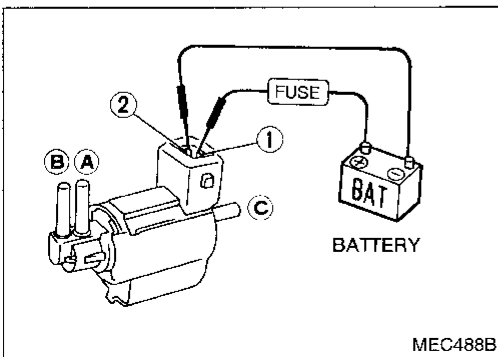
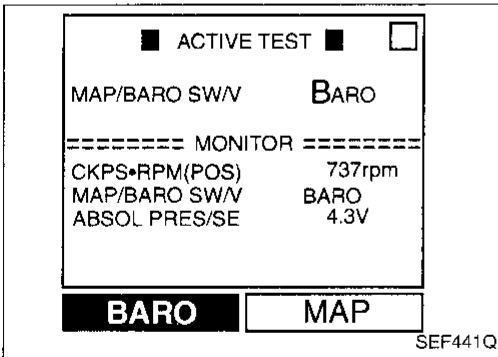
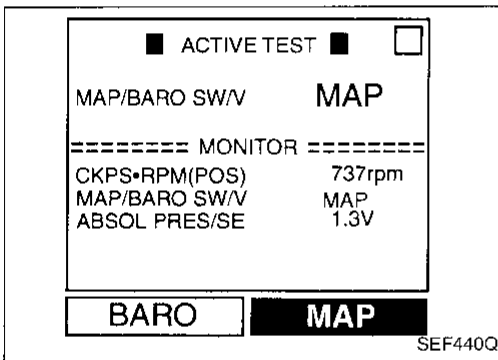
1. Start engine and warm it up sufficiently.
2. Perform "MAP/BARO SW/V" in "ACTIVE TEST" mode with CONSULT.
3. Check the following.
 - When "MAP" is selected, "ABSOL PRES/SE" indicates approximately 1.3V.
 - When "BARO" is selected, "ABSOL PRES/SE" indicates approximately 4.3V.
4. If NG, replace solenoid valve.

OR

1. Remove MAP/BARO switch solenoid valve.
2. Check air passage continuity.

Condition	Air passage continuity between ① and ②	Air passage continuity between ① and ③
12V direct current supply between terminals ① and ②	Yes	No
No supply	No	Yes

3. If NG, replace solenoid valve.



TROUBLE DIAGNOSIS FOR DTC P1605

A/T Diagnosis Communication Line (DTC: 0804)

The malfunction information related to A/T (Automatic Transaxle) is transferred through the line (circuit) from A/T control unit to ECM. Therefore, be sure to erase the malfunction information such as DTC not only in A/T control unit but also ECM after the A/T related repair.

Diagnostic Trouble Code No.	Malfunction is detected when ...	Check Items (Possible Cause)
P1605 0804	<ul style="list-style-type: none">• Signal from A/T control units is not sent to ECM.	<ul style="list-style-type: none">• Harness or connectors (The communication line circuit between ECM and A/T control unit is open or shorted.)• A/T control unit• Dead (Weak) battery

DIAGNOSTIC TROUBLE CODE CONFIRMATION PROCEDURE

Before performing the following procedure, confirm that battery voltage is more than 10.5V.



- 1) Turn ignition switch "ON".
- 2) Select "DATA MONITOR" mode with CONSULT.
- 3) Wait at least 40 seconds.

OR



- 1) Turn ignition switch "ON".
- 2) Wait at least 40 seconds.
- 3) Select "MODE 3" with GST.

OR

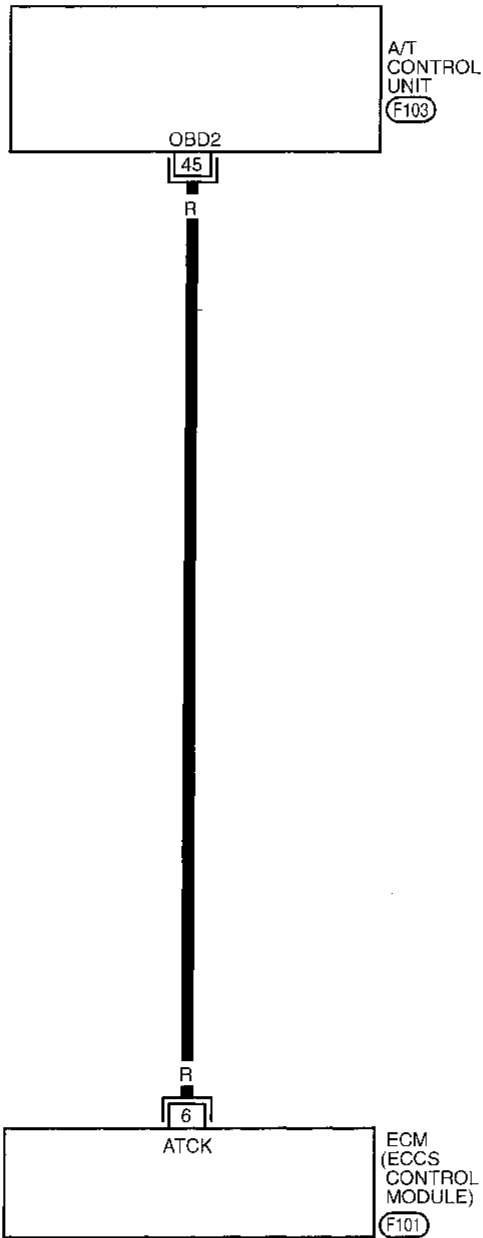


- 1) Turn ignition switch "ON".
- 2) Wait at least 40 seconds.
- 3) Turn ignition switch "OFF", wait at least 5 seconds and then turn "ON".
- 4) Perform diagnostic test mode II (self-diagnostic results) with ECM.

TROUBLE DIAGNOSIS FOR DTC P1605

A/T Diagnosis Communication Line (DTC: 0804) (Cont'd)

EC-ATDIAG-01



: Detectable line for DTC
 : Non-detectable line for DTC

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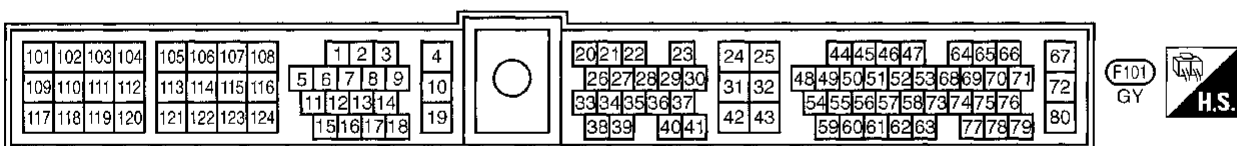
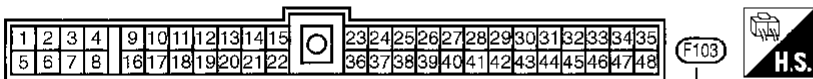
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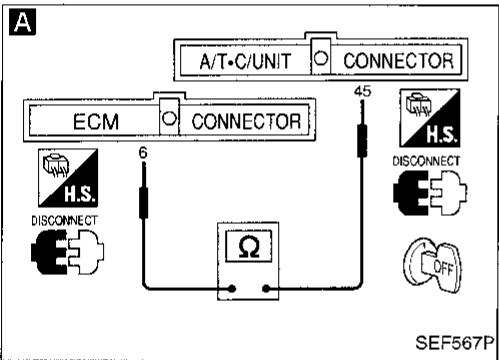
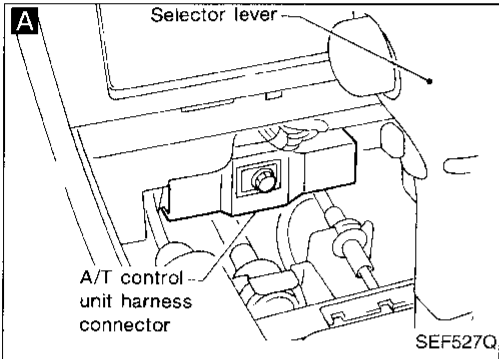
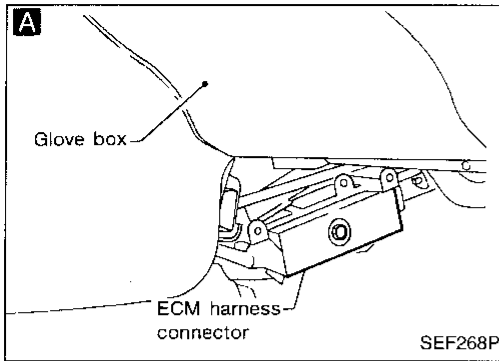
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TROUBLE DIAGNOSIS FOR DTC P1605

A/T Diagnosis Communication Line (DTC: 0804) (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A
CHECK INPUT SIGNAL CIRCUIT.
 1. Turn ignition switch "OFF".
 2. Disconnect ECM harness connector and A/T control unit harness connector.
 3. Check harness continuity between ECM terminal ⑥ and terminal ④⑤.
Continuity should exist.
 If OK, check harness for short.

NG → Repair harness or connectors.

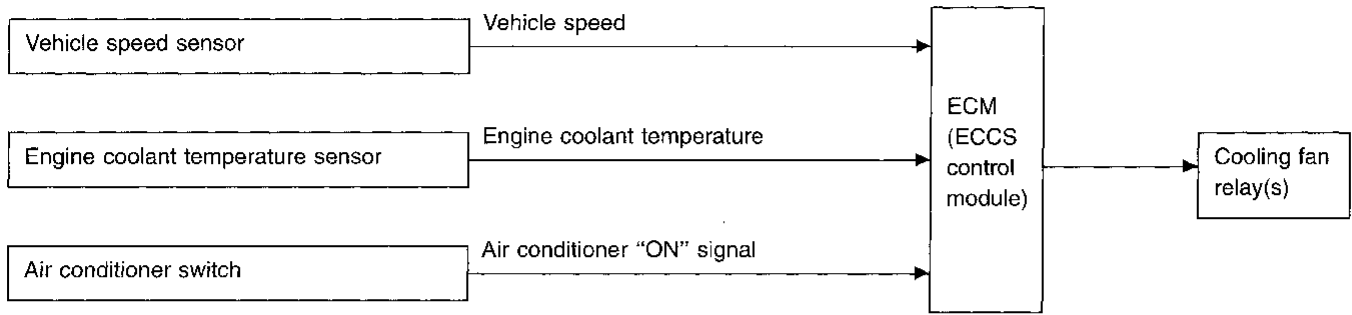
OK
 Disconnect and reconnect harness connectors in the circuit. Then retest.

Trouble is not fixed.
 Check ECM and A/T control unit pin terminals for damage and check the connection of ECM and A/T control unit harness connectors. Reconnect ECM and A/T control unit harness connectors and retest.

INSPECTION END

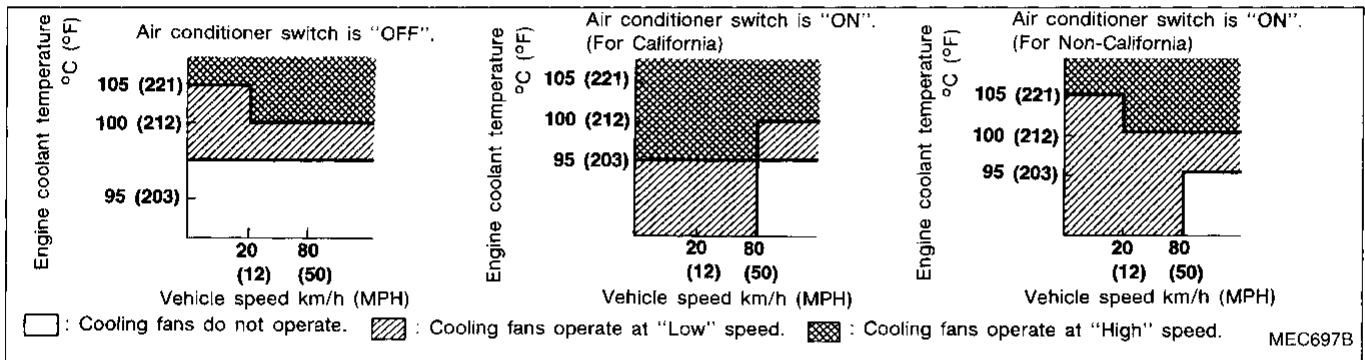
Cooling Fan (DTC: 1308)

SYSTEM DESCRIPTION



The ECM controls the cooling fan corresponding to the vehicle speed, engine coolant temperature and air conditioner ON signal. The control system has 3-step control [HIGH/LOW/OFF].

Operation



ON-BOARD DIAGNOSIS LOGIC

This diagnosis continuously monitors the engine coolant temperature.

If the cooling fan or another component in the cooling system malfunctions, the 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)
P1900 1308	<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-331).</p>

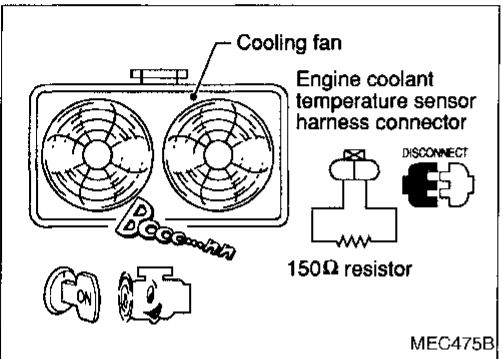
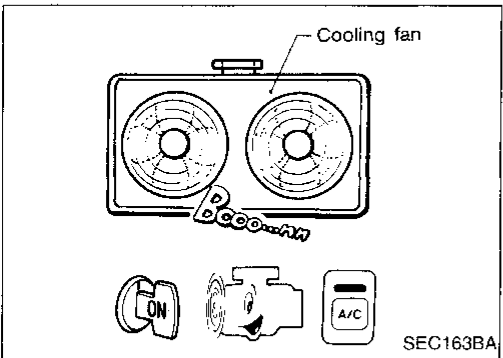
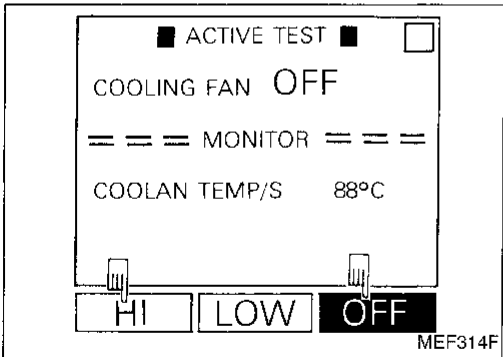
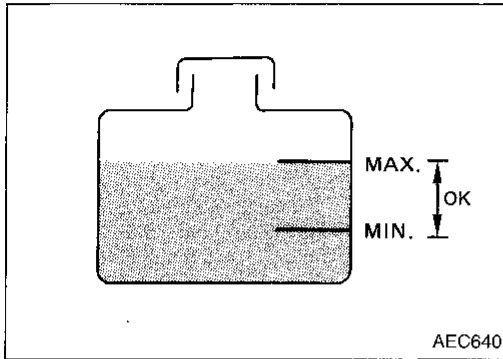
CAUTION:

When a malfunction is indicated, be sure to replace the coolant following the procedure in the MA section ("Changing Engine Coolant", "ENGINE MAINTENANCE"). Also, replace the engine oil.

- Fill radiator with coolant up to specified level with a filling speed of 2 liters per minute like pouring coolant by kettle. Be sure to use coolant with the proper mixture ratio. Refer to MA section ("Anti-freeze Coolant Mixture Ratio", "RECOMMENDED FLUIDS AND LUBRICANTS").
- After refilling coolant, run engine to ensure that no water-flow noise is emitted.

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)



OVERALL FUNCTION CHECK

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.

- 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-325.
- 2) Confirm whether customer filled the coolant or not. If customer filled the coolant, skip the following steps and go to "DIAGNOSTIC PROCEDURE", EC-325.
- 3) Turn ignition switch "ON".
- 4) Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT (LOW speed and HI speed).

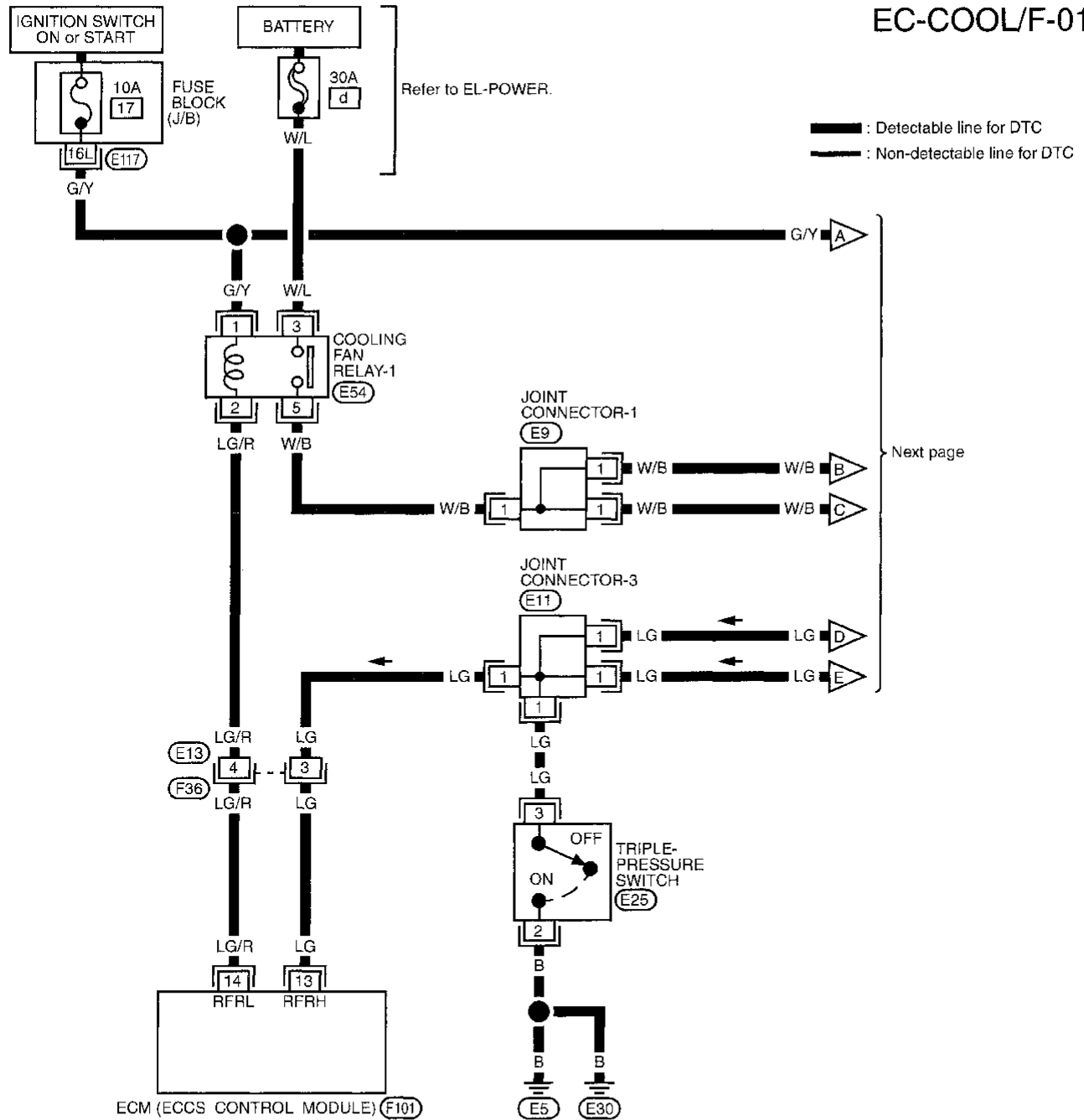
 OR

 - 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.
 - 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.**

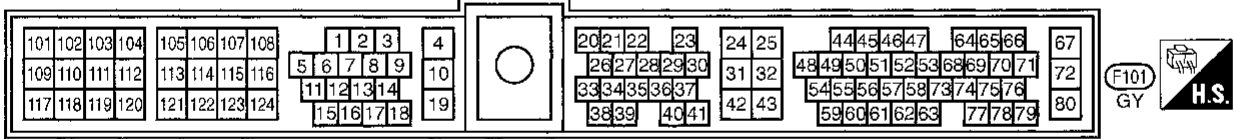
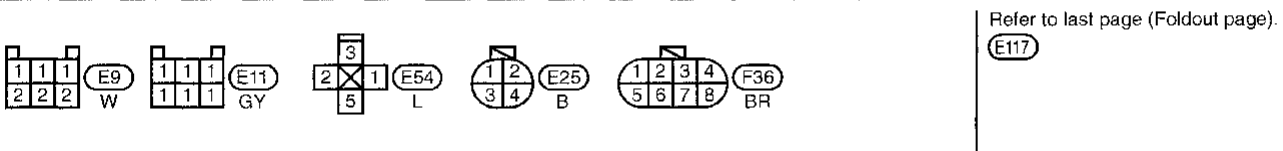
TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)

EC-COOL/F-01



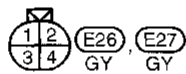
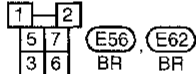
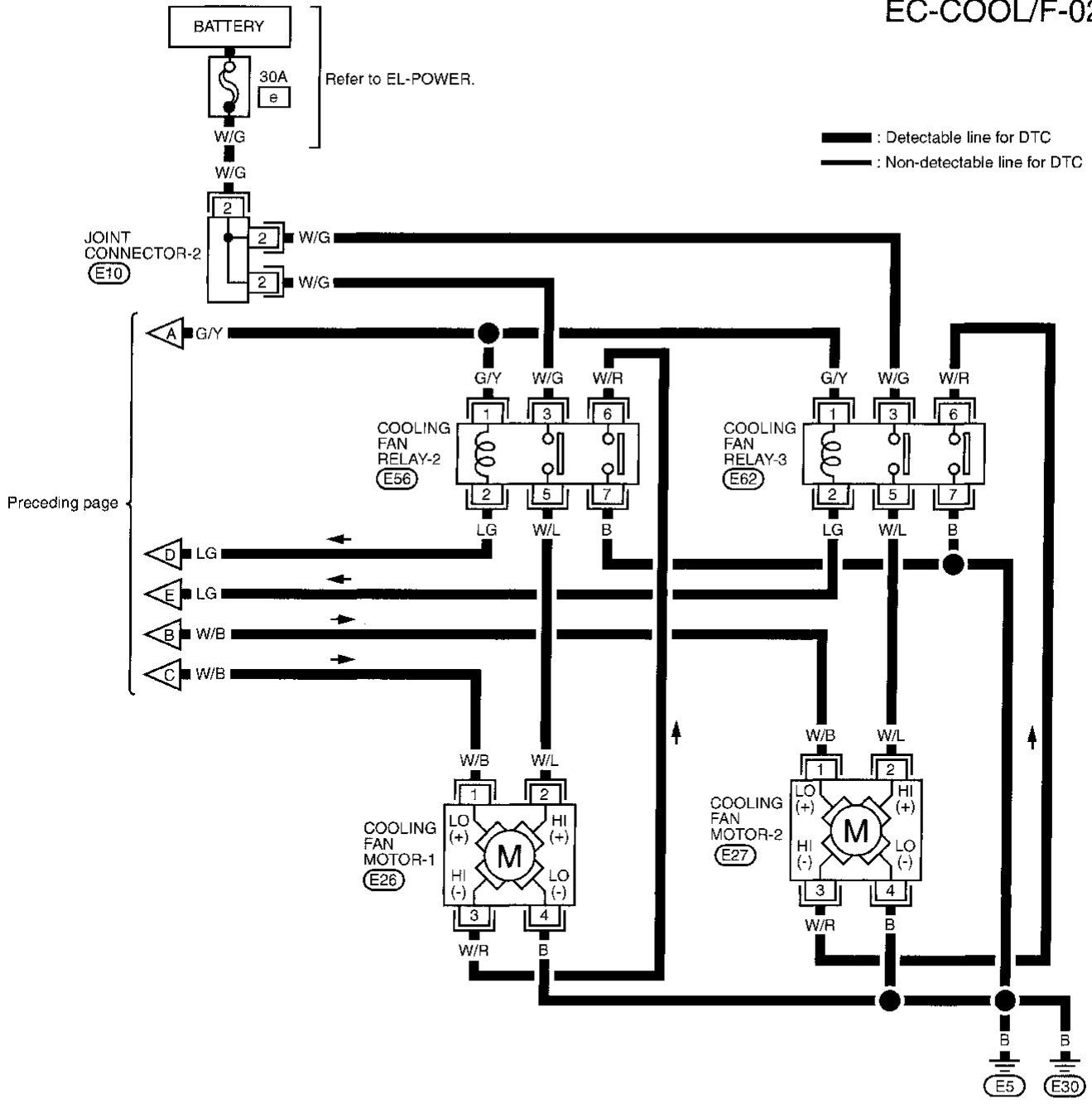
- GI
- MA
- EM
- LC
- EC**
- FE
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- HA
- EL
- IDX



TROUBLE DIAGNOSIS FOR DTC P1900

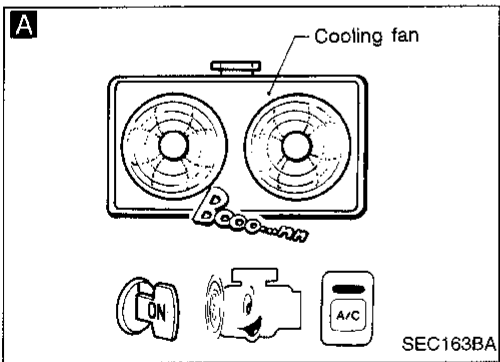
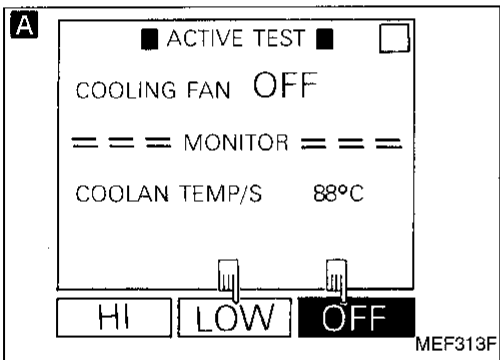
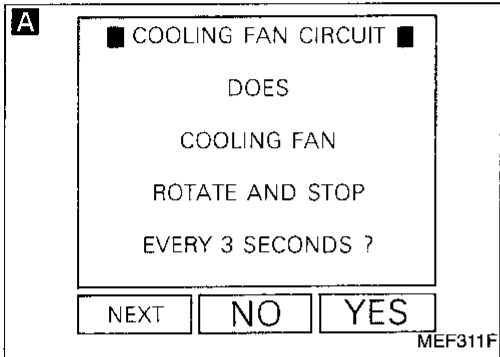
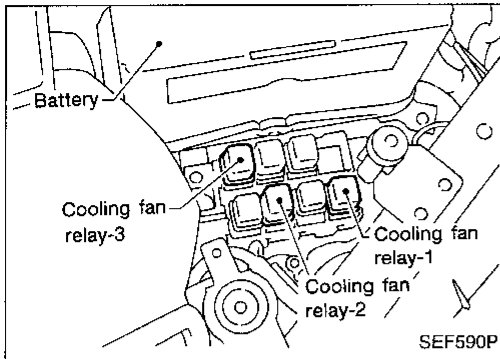
Cooling Fan (DTC: 1308) (Cont'd)

EC-COOL/F-02



TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd) DIAGNOSTIC PROCEDURE



INSPECTION START

A

CHECK COOLING FAN LOW SPEED OPERATION.

1. Disconnect cooling fan relay-2 and cooling fan relay-3.

2. Turn ignition switch "ON".

3. Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

2. Turn ignition switch "ON".

3. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

2. Start engine.

3. Set temperature lever at full cold position.

4. Turn air conditioner switch "ON".

5. Turn blower fan switch "ON".

6. Run engine at idle for a few minutes with air conditioner operating.

7. Make sure that cooling fan operates at low speed.

NG → Check cooling fan low speed control circuit.
(Go to PROCEDURE A.)

OK

A

GI

MA

EM

LC

EC

FE

CL

MT

AT

FA

RA

BR

ST

RS

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EL

IDX

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)

B

■ COOLING FAN CIRCUIT ■

DOES
COOLING FAN
ROTATE AND STOP
EVERY 3 SECONDS ?

NEXT NO YES

MEF311F

B

■ ACTIVE TEST ■

COOLING FAN OFF

== == MONITOR == ==

COOLAN TEMP/S 88°C

HI LOW OFF

MEF314F

B

Cooling fan

Engine coolant temperature sensor harness connector

DISCONNECT

150Ω resistor

MEC475B

C

Cooling fan relay-2

Cooling fan relay-3

DISCONNECT

1 2 3

6 3 7 5 2 1

6 3 7 5 2 1

Ω

Ω

OFF

SEF652Q

B

Ⓐ

CHECK COOLING FAN HIGH SPEED OPERATION.

1. Turn ignition switch "OFF".
2. Reconnect cooling fan relay-2 and cooling fan relay-3.
3. Disconnect cooling fan relay-1.
4. Turn ignition switch "ON".
5. Perform "COOLING FAN CIRCUIT" in "FUNCTION TEST" mode with CONSULT.

OR

4. Turn ignition switch "ON".
5. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.

OR

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 fan operates at higher speed than low speed.

NG → Check cooling fan high speed control circuit. (Go to PROCEDURE B.)

C

OK

CHECK HARNESS CONTINUITY BETWEEN COOLING FAN RELAYS-2, 3 AND GROUND.

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relays-2, 3.
3. Disconnect triple-pressure switch harness connector.
4. Check harness continuity between terminal ② and terminal ③, terminal ② and body ground.

Continuity should exist.
If OK, check harness for short.

NG → Check the following.

- Joint connector-3 (E11)
- Harness for open or short between cooling fan relays-2, 3 and triple-pressure switch
- Harness for open or short between triple-pressure switch and body ground

If NG, repair harness or connectors.

OK

CHECK COMPONENT (Triple-pressure switch).
Refer to HA section ("Electrical Components Inspection", "TROUBLE DIAGNOSES").

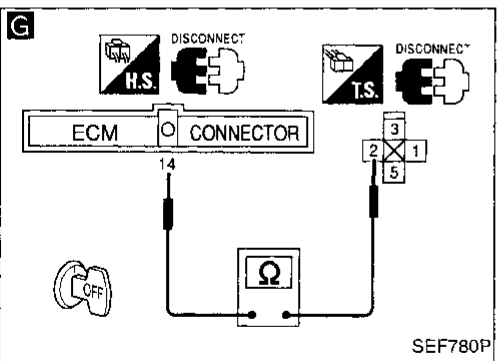
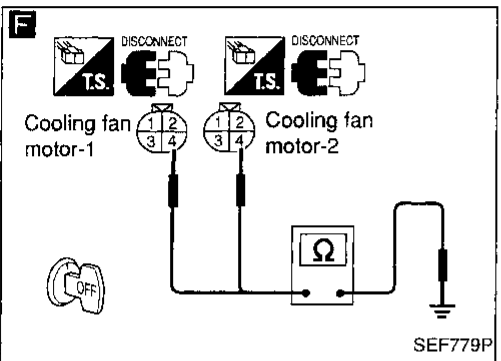
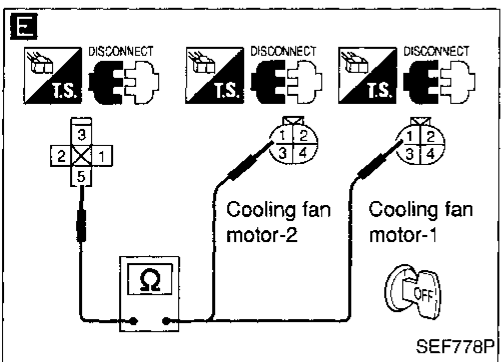
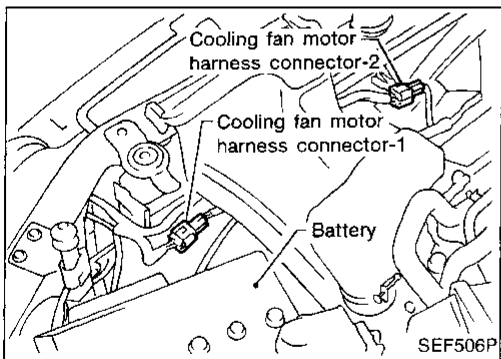
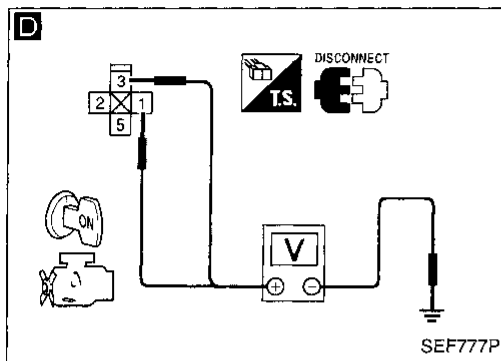
NG → Replace triple-pressure switch.

Ⓑ
(Go to EC-330.)

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)

GI
MA
EM
LC
EC
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IDX



PROCEDURE A

INSPECTION START

D

CHECK POWER SUPPLY.

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-1.
3. Turn ignition switch "ON".
4. Check voltage between terminals ①, ③ and ground with CONSULT or tester.

Voltage: Battery voltage

NG → Check the following.

- 10A fuse
- 30A fusible links
- Harness continuity between cooling fan relay-1 and fuse
- Harness continuity between cooling fan relay-1 and battery

If NG, repair harness or connectors.

OK ↓

CHECK GROUND CIRCUIT.

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 terminal ⑤ and terminal ①, terminal ⑤ and terminal ①.
4. Check harness continuity between terminal ④ and body ground.

Continuity should exist.

If OK, check harness for short.

NG → Check the following.

- Joint connector-1 (E9)
- Harness for open or short between cooling fan relay-1 and cooling fan motors

If NG, repair harness or connectors.

E

F

OK ↓

G

CHECK OUTPUT SIGNAL CIRCUIT.

1. Disconnect ECM harness connector.
2. Check harness continuity between ECM terminal ⑭ and terminal ②.

Continuity should exist.

If OK, check harness for short.

NG → Check the following.

- Harness connectors (F36, E13)
- Harness for open or short between cooling fan relay-1 and ECM

If NG, repair harness or connectors.

OK ↓

CHECK COMPONENT (Cooling fan relay-1).

Refer to "COMPONENT INSPECTION", EC-332.

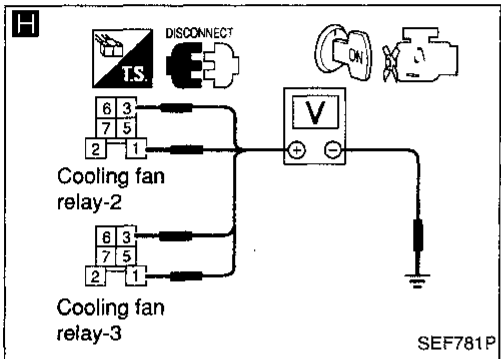
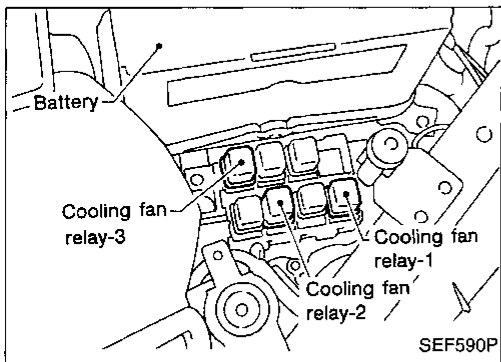
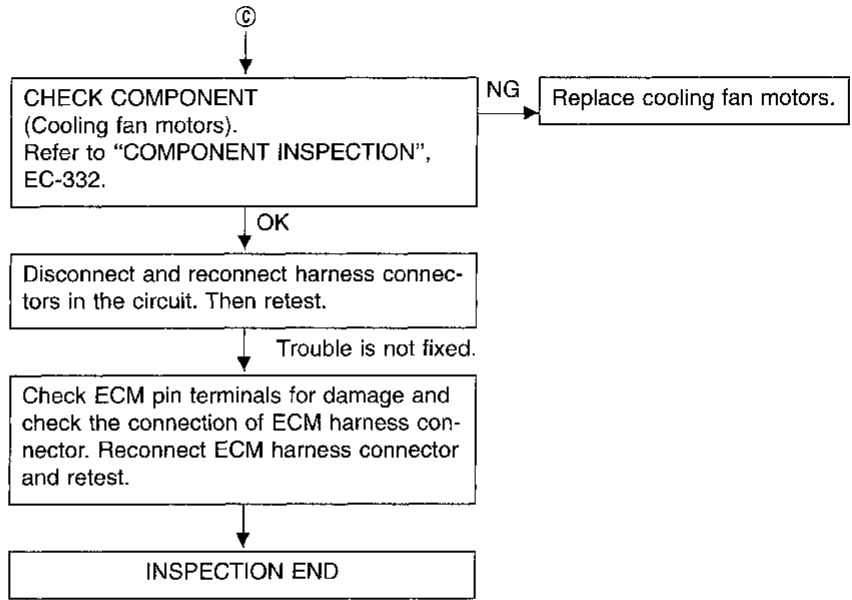
NG → Replace cooling fan relay.

OK ↓

③

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)



PROCEDURE B

INSPECTION START

H

CHECK POWER SUPPLY.

1. Turn ignition switch "OFF".
2. Disconnect cooling fan relay-2 and cooling fan relay-3.
3. Turn ignition switch "ON".
4. Check voltage between cooling fan relay-3 terminals ①, ③ and ground, and between cooling fan relay-2 terminals ①, ③ and ground with CONSULT or tester.

Voltage: Battery voltage

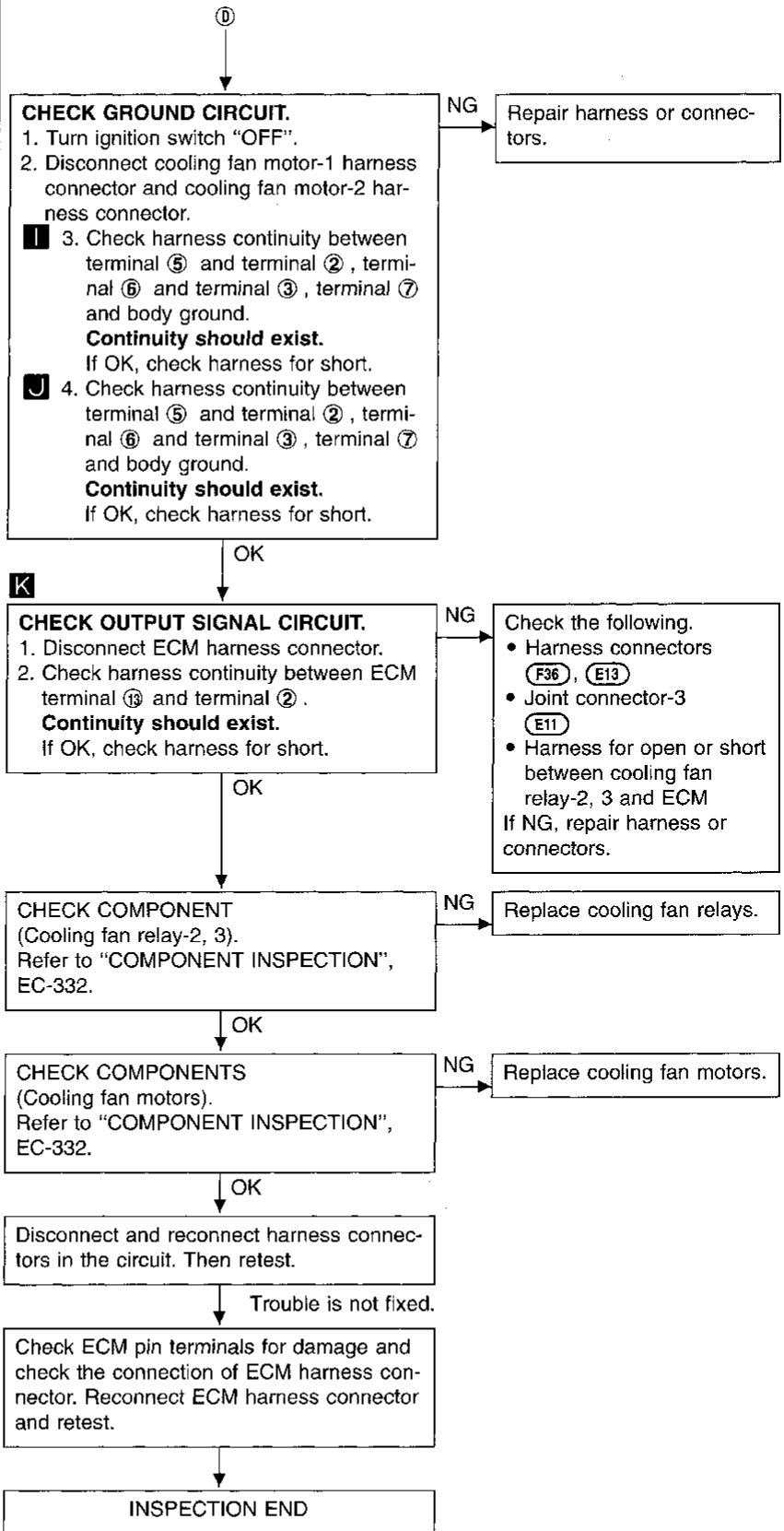
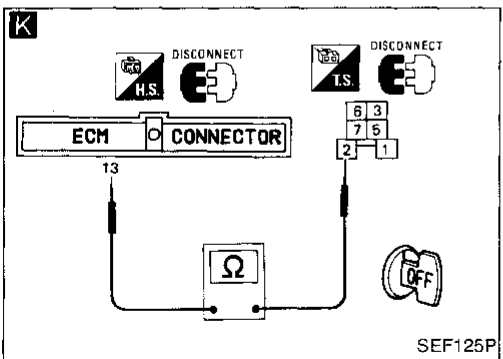
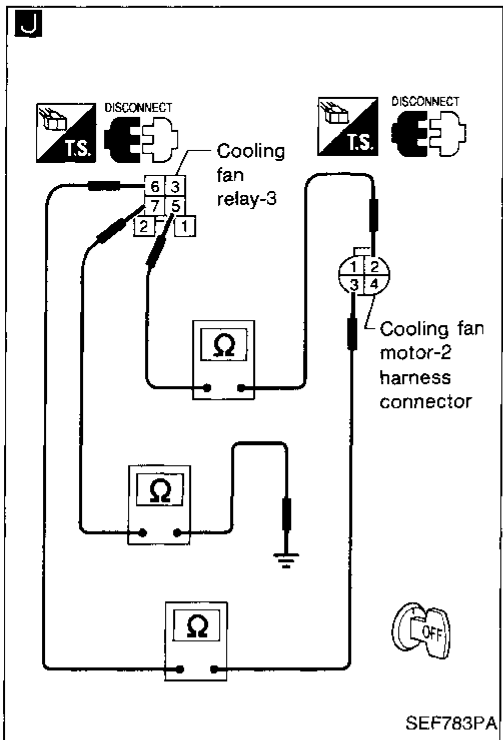
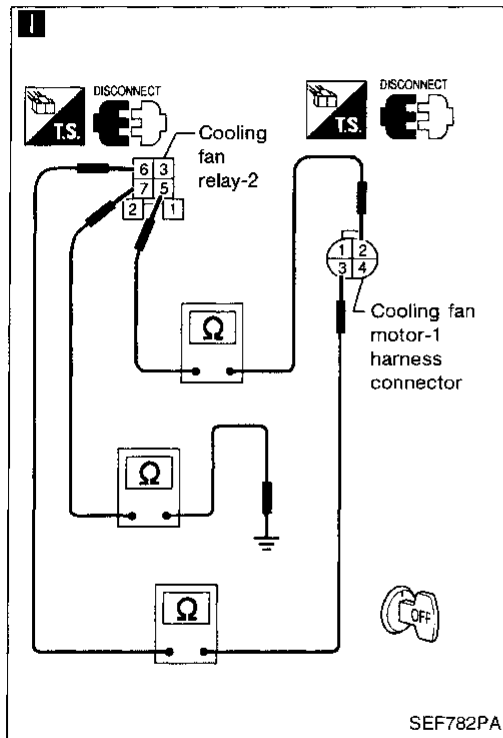
OK

④

- NG
- Check the following.
- Joint connector-2 **(E10)**
 - 30A fusible links
 - Harness continuity between cooling fan relay-2, 3 and fuse
 - Harness continuity between cooling fan relay-2, 3 and battery
- If NG, repair harness or connectors.

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)



GI

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LC

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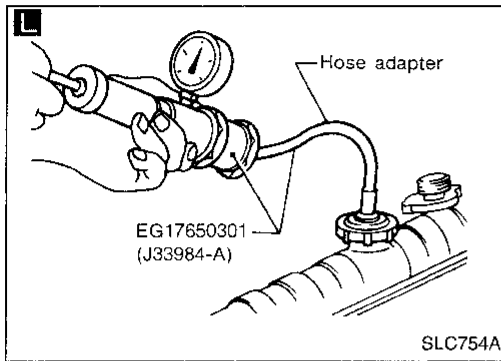
HA

EL

IDX

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)



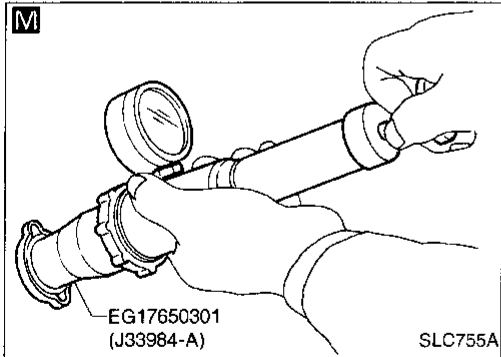
L

CHECK COOLING SYSTEM FOR LEAK.
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)
Pressure should not drop.
CAUTION:
Higher than the specified pressure may cause radiator damage.

NG → Check the following for leaks.

- Hose
- Radiator
- Water pump

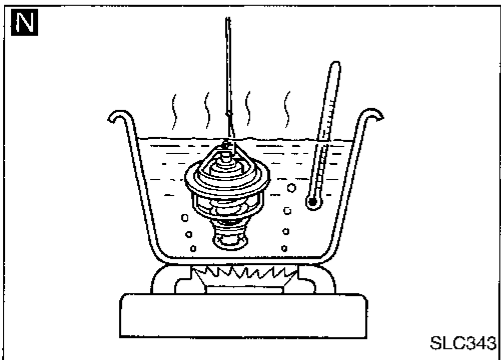
Refer to LC section ("Water Pump").



M

CHECK RADIATOR CAP.
Apply pressure to cap with a tester.
Radiator cap relief pressure:
59 - 98 kPa (0.6 - 1.0 kg/cm², 9 - 14 psi)

NG → Replace radiator cap.



N

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:
82°C (180°F) [standard]
Valve lift:
More than 8.6 mm/95°C (0.339 in/203°F)
3. Check if valve is closed at 5°C (9°F) below valve opening temperature. For details, refer to LC section ("Thermostat").

NG → Replace thermostat

OK → Check engine coolant temperature sensor. Refer to "COMPONENT INSPECTION", EC-128.

NG → Replace engine coolant temperature sensor.

If the cause can not be isolated, go to "MAIN 12 CAUSES OF OVERHEATING" on next page.

INSPECTION END

Perform FINAL CHECK by the following procedure after repair is completed.

1. Warm up engine. Run the vehicle for at least 20 minutes. Pay attention to engine coolant temperature gauge on the instrument panel. If the reading shows an abnormally high temperature, another part may be malfunctioning.
2. Stop vehicle and let engine idle. Check the intake and exhaust systems for leaks by listening for noise or visually inspecting the components.
3. Allow engine to cool and visually check for oil and coolant leaks. Then, perform "OVERALL FUNCTION CHECK".

TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)

MAIN 12 CAUSES OF OVERHEATING

Engine	Step	Inspection item	Equipment	Condition	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 "RECOMMENDED FLUIDS AND LUBRICANTS" in MA section
	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 "Changing Engine Coolant", "ENGINE MAINTENANCE" in MA section
	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)	See "System Check" "ENGINE COOLING SYSTEM" in LC section
ON*2	5	<ul style="list-style-type: none"> Coolant leaks 	<ul style="list-style-type: none"> Visual 	No leaks	See "System Check" "ENGINE COOLING SYSTEM" in LC section
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 "Thermostat" and "Radiator", "ENGINE COOLING SYSTEM" in LC section
ON*1	7	<ul style="list-style-type: none"> Cooling fan 	<ul style="list-style-type: none"> CONSULT 	Operating	See "TROUBLE DIAGNOSIS FOR DTC P1900" (EC-321)
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 "Changing Engine Coolant", "ENGINE MAINTENANCE" in MA section
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 "ENGINE MAINTENANCE" in MA section
OFF	11	<ul style="list-style-type: none"> Cylinder head 	<ul style="list-style-type: none"> Straight gauge feeler gauge 	0.1mm (0.004 in) Maximum distortion (warping)	See "Inspection", "CYLINDER HEAD" in EM section
	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 "Inspection", "CYLINDER BLOCK" in EM section

*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 "OVERHEATING CAUSE ANALYSIS" in LC section.

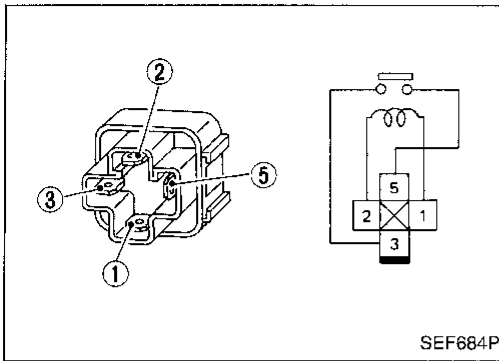
TROUBLE DIAGNOSIS FOR DTC P1900

Cooling Fan (DTC: 1308) (Cont'd)

COMPONENT INSPECTION

Cooling fan relay-1

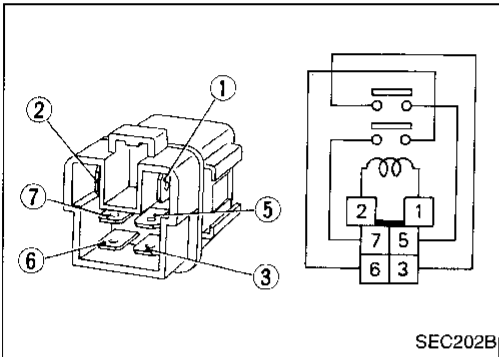
Check continuity between terminals ③ and ⑤ .



Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

Cooling fan relays-2 and -3

Check continuity between terminals ③ and ⑤ , ⑥ and ⑦ .

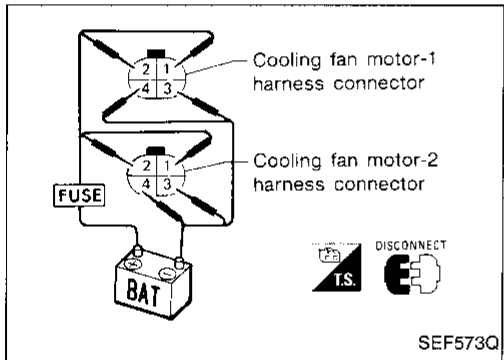


Conditions	Continuity
12V direct current supply between terminals ① and ②	Yes
No current supply	No

If NG, replace relay.

Cooling fan motors-1 and -2

1. Disconnect cooling fan motor harness connectors.
2. Supply cooling fan motor terminals with battery voltage and check operation.



	Speed	Terminals	
		(⊕)	(⊖)
Cooling fan motor-1	Low	①	④
	High	① , ②	③ , ④
Cooling fan motor-2	Low	①	④
	High	① , ②	③ , ④

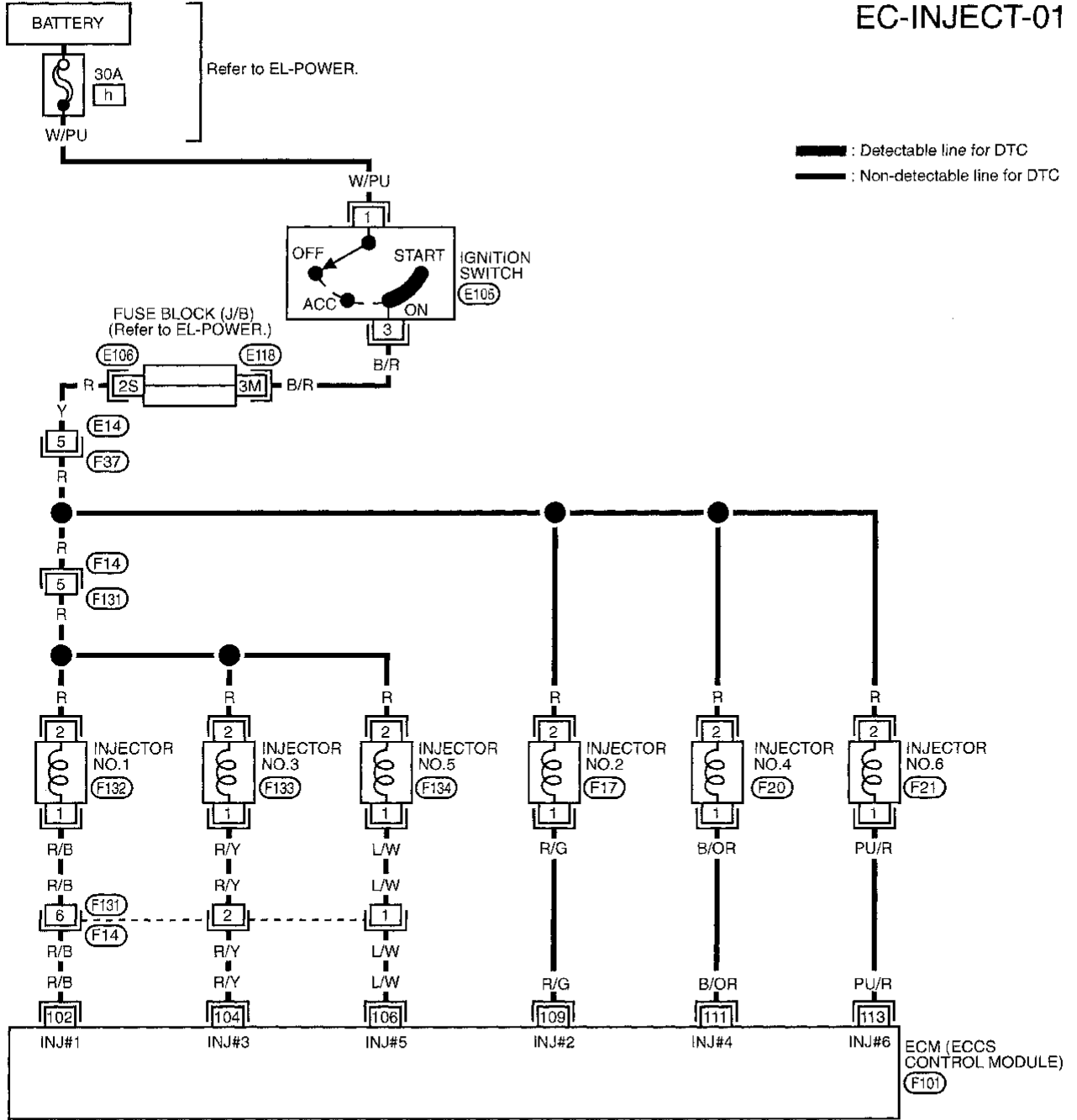
Cooling fan motor should operate.

If NG, replace cooling fan motor.

TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

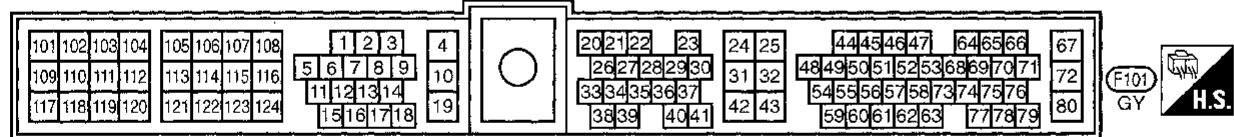
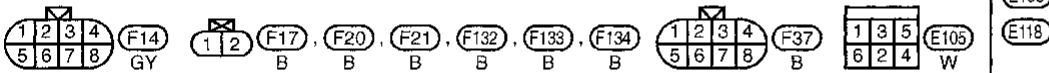
Injector

EC-INJECT-01



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Refer to last page (Foldout page).



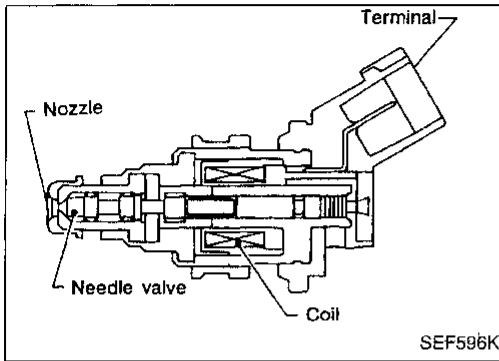
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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

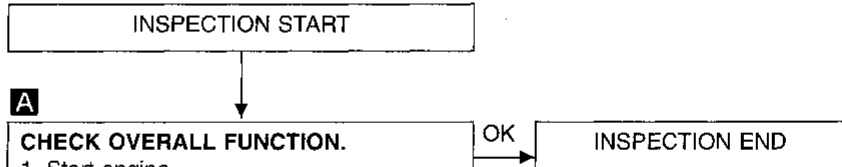
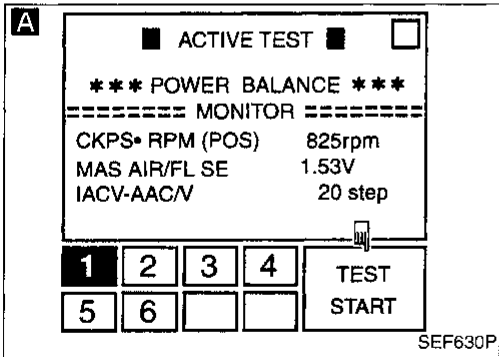
Injector (Cont'd)

COMPONENT DESCRIPTION

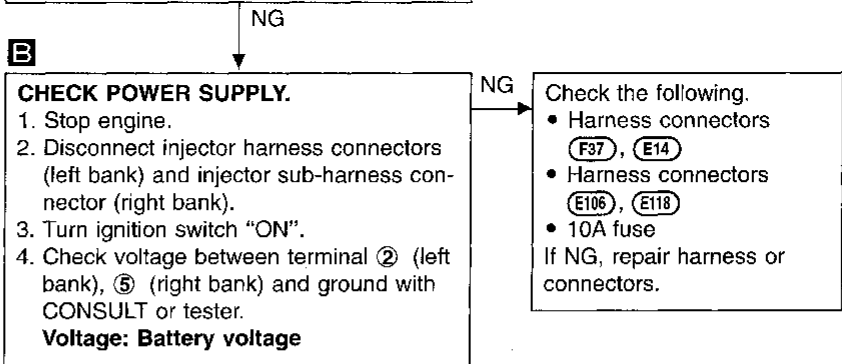
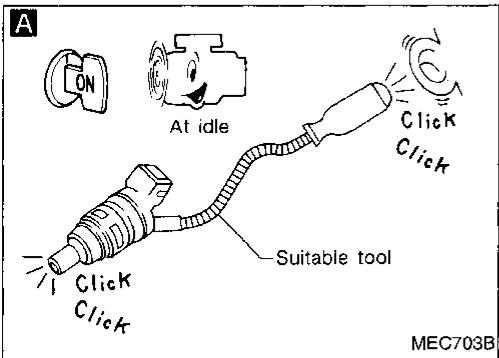
The fuel injector is a small, precise solenoid valve. When the ECM supplies a ground to the injector circuit, the coil in the injector is energized. The energized coil pulls the needle valve back and allows fuel to flow through the injector into the intake manifold. The amount of fuel injected depends 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.



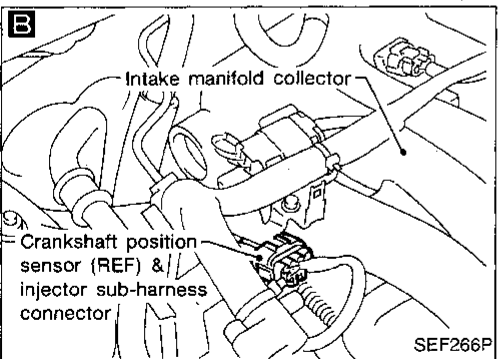
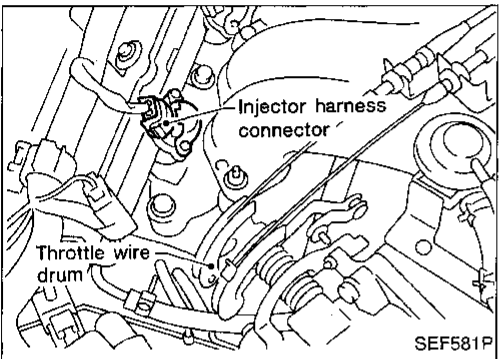
DIAGNOSTIC PROCEDURE



- A**
- CHECK OVERALL FUNCTION.**
1. Start engine.
 2. Perform "POWER BALANCE" in "ACTIVE TEST" mode with CONSULT.
 3. Make sure that each circuit produces a momentary engine speed drop.
- OR
2. Listen to each injector operating sound.
Clicking noise should be heard.

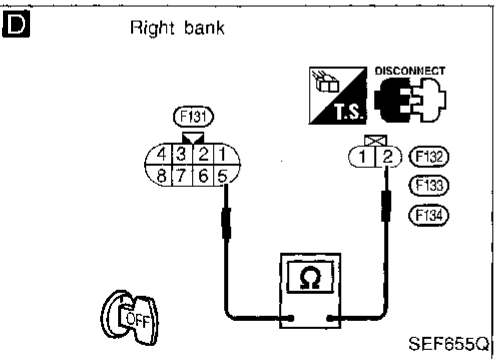
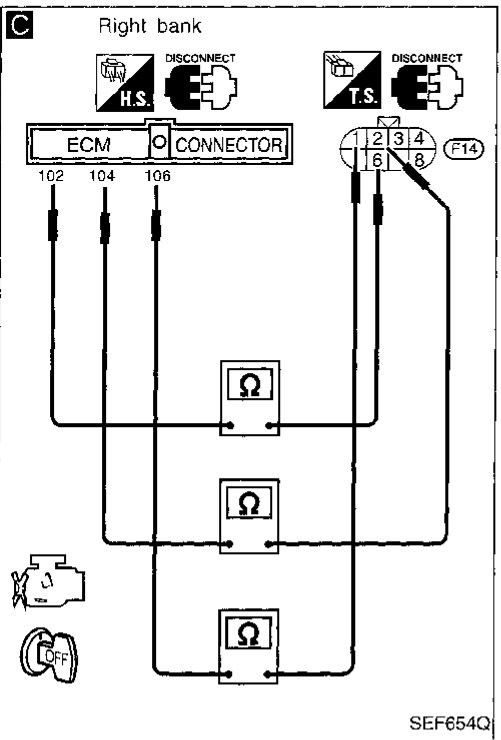
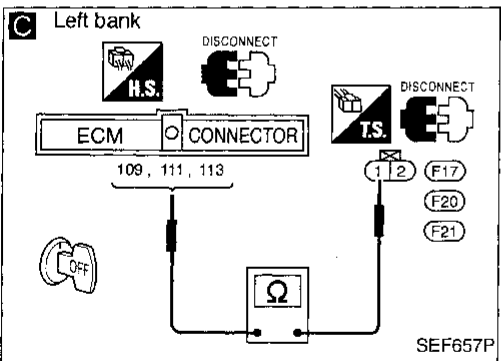
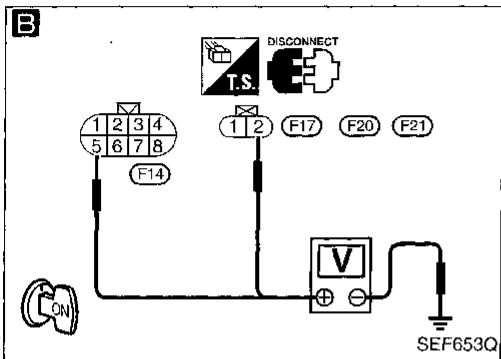


- B**
- CHECK POWER SUPPLY.**
1. Stop engine.
 2. Disconnect injector harness connectors (left bank) and injector sub-harness connector (right bank).
 3. Turn ignition switch "ON".
 4. Check voltage between terminal ② (left bank), ⑤ (right bank) and ground with CONSULT or tester.
Voltage: Battery voltage



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Injector (Cont'd)



C

CHECK OUTPUT SIGNAL CIRCUIT.

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Check harness continuity between the following terminals and ECM terminals.

Left bank:
 ① and ⑩⑨, ⑪①, ⑫③

Right bank:
 ⑥ and ⑩②,
 ② and ⑩④,
 ① and ⑩⑥

Continuity should exist.
 If OK, check harness for short.

NG → Repair harness or connectors.

D

CHECK POWER SUPPLY CIRCUIT AND OUTPUT SIGNAL CIRCUIT (FOR RIGHT BANK).

1. Remove intake manifold collector.
2. Disconnect injector sub-harness connector.
3. Check harness continuity between terminal ⑤ and terminal ②.
Continuity should exist.
 If OK, check harness for short.
4. Check harness continuity between terminal ① and terminals ①, ②, ⑥.
Continuity should exist.
 If OK, check harness for short.

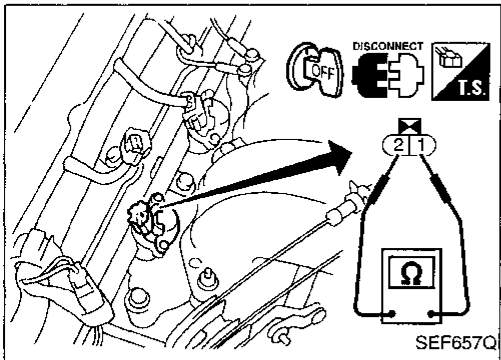
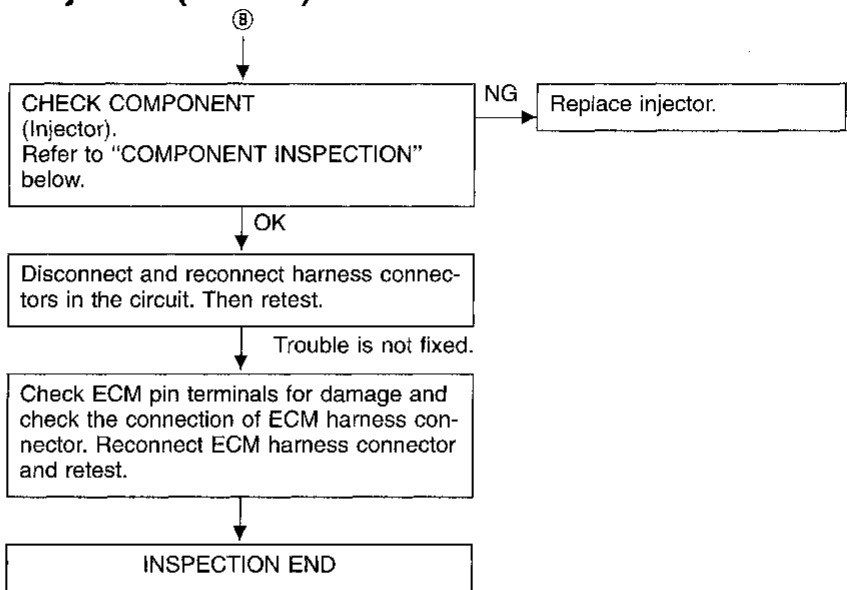
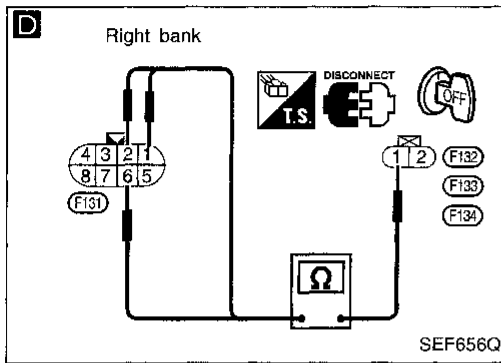
NG → Repair harness or connectors.

OK
 ↓
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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Injector (Cont'd)



COMPONENT INSPECTION

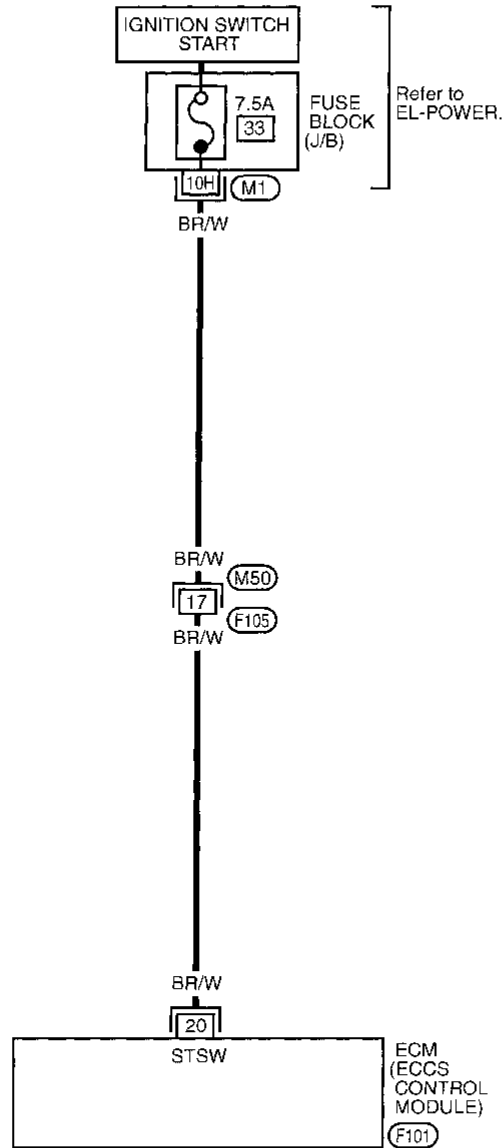
Injector

1. Disconnect injector harness connector.
2. Check resistance between terminals as shown in the figure.
Resistance: 10 - 14Ω at 25°C (77°F)
If NG, replace injector.

TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Start Signal

EC-S/SIG-01



: Detectable line for DTC
 : Non-detectable line for DTC

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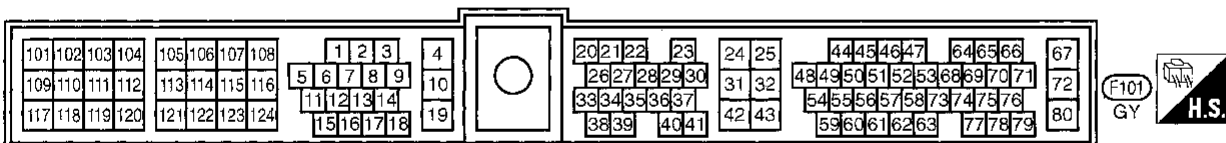
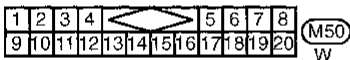
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Refer to last page (Foldout page).

(M1)



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Start Signal (Cont'd) DIAGNOSTIC PROCEDURE

A

■ START SIGNAL CKT ■

1. CLOSE THROTTLE, SHIFT TO P OR N RANGE.
2. TOUCH START AND START ENGINE IMMEDIATELY.

NEXT START

SEF191L

A

☆ MONITOR ☆ NO FAIL

START SIGNAL	OFF
CLSD TH/P SW	ON
AIR COND SIG	OFF
P/N POSI SW	ON

RECORD

SEF111P

A

ECM CONNECTOR H.S. CONNECT

20

V

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SEF109P

B

DISCONNECT DISCONNECT

H.S. H.S.

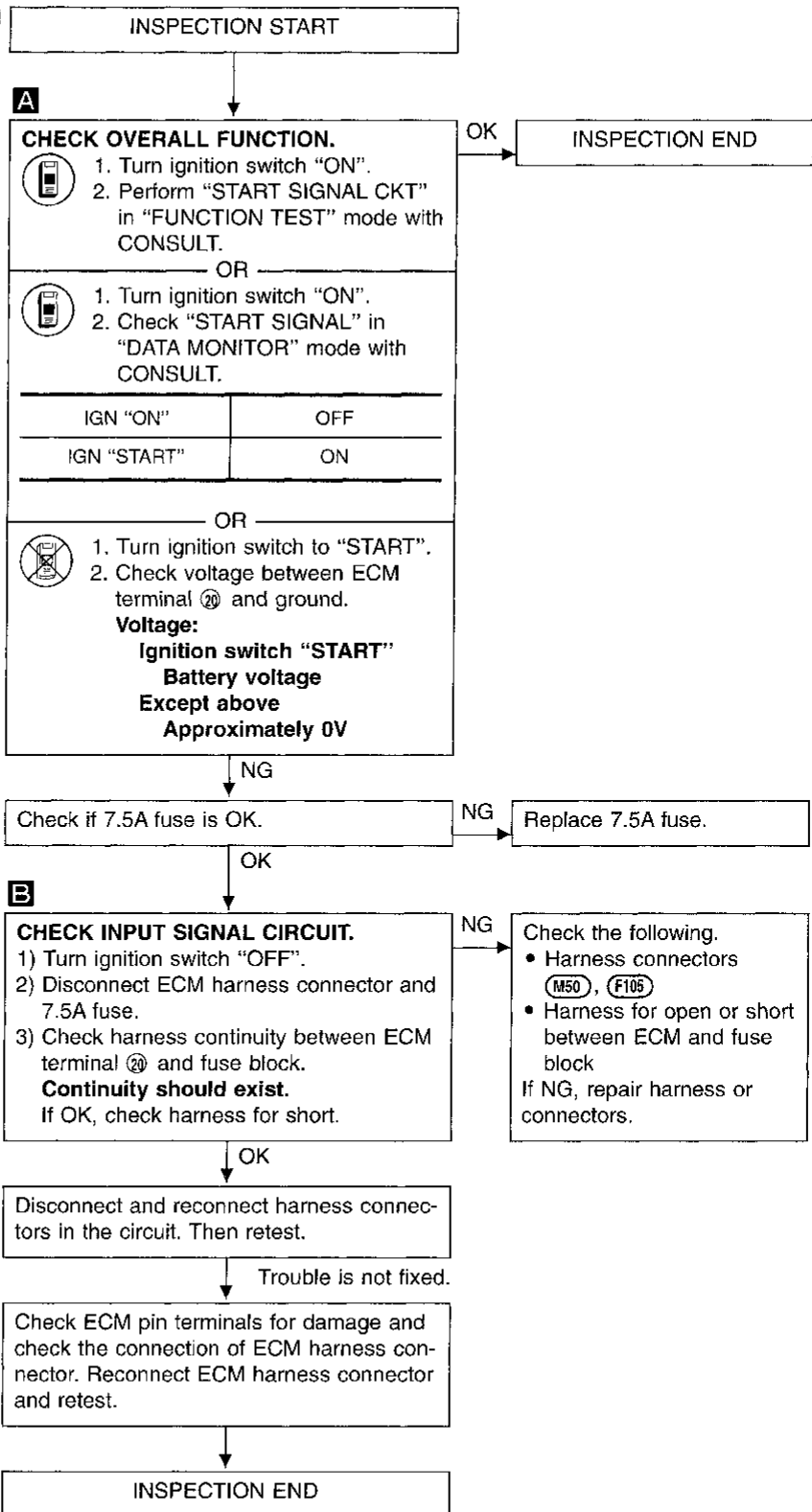
ECM CONNECTOR Fuse block

20 33

OFF

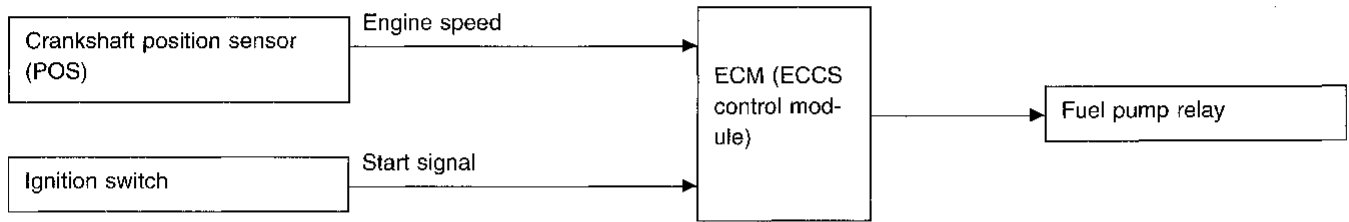
Ω

SEF574Q



Fuel Pump Control

SYSTEM DESCRIPTION



Fuel pump ON-OFF control

The ECM activates the fuel pump for several seconds after the ignition switch is turned ON to improve engine start-up. If the ECM receives a 1° signal from the crankshaft position sensor (POS), it knows that the engine is rotating, and causes the pump to activate. If the 1° signal is not received when the ignition switch is ON, the engine stalls. The ECM stops pump operation and prevents the battery from 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 1 second
Engine running and cranking	Operates
Except as shown above	Stops

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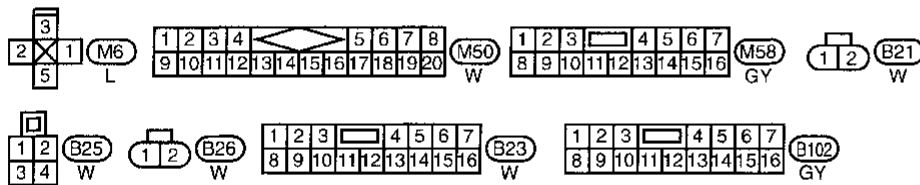
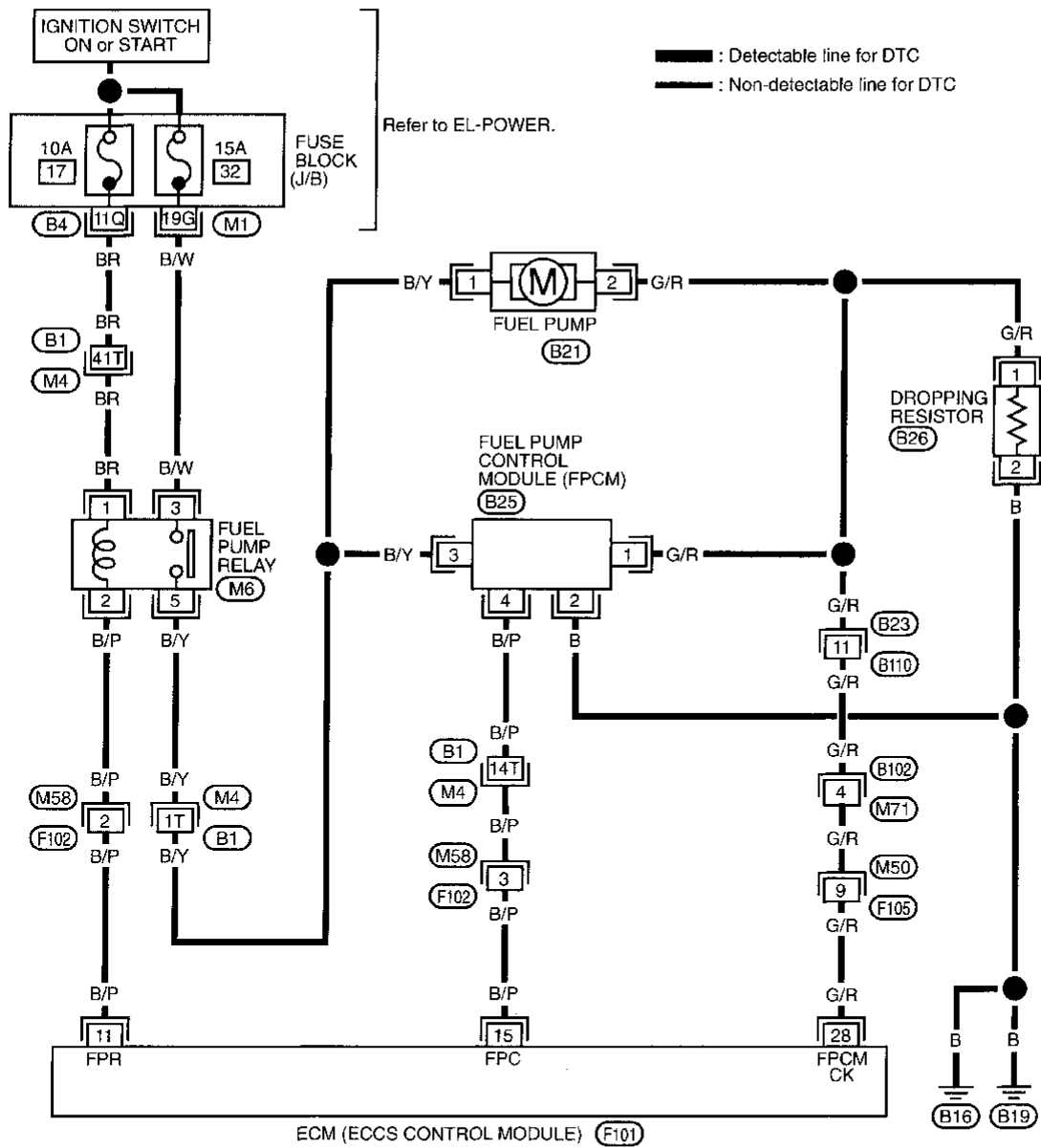
EL

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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

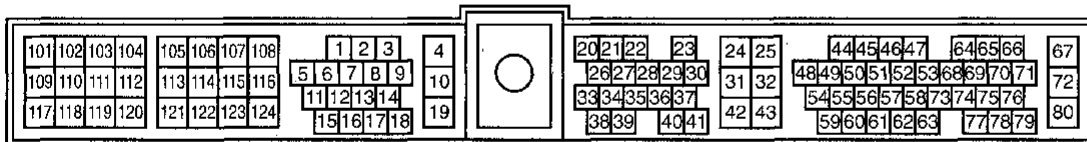
Fuel Pump Control (Cont'd)

EC-F/PUMP-01



Refer to last page (Foldout page).

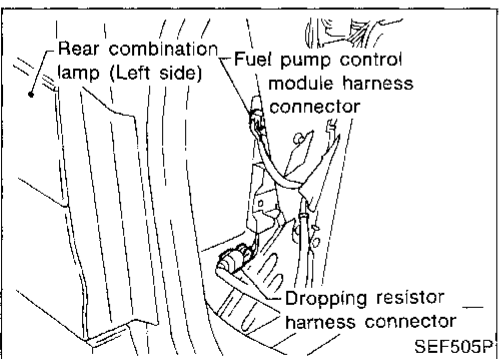
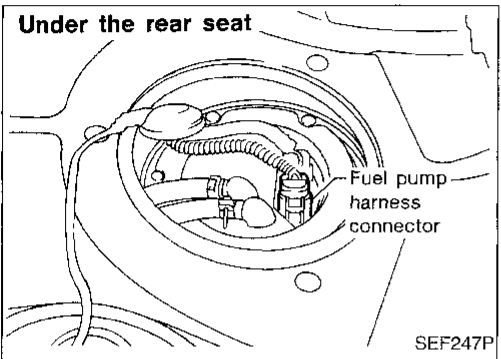
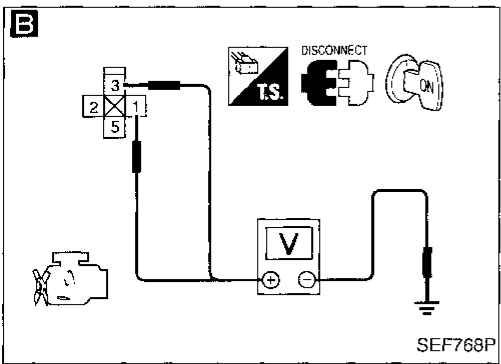
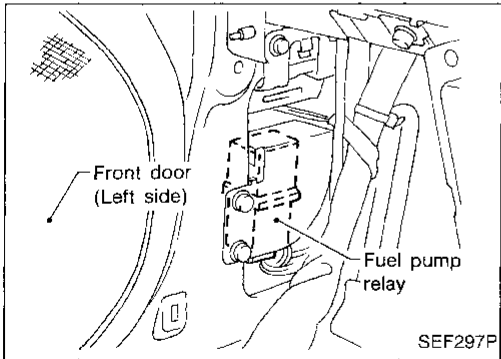
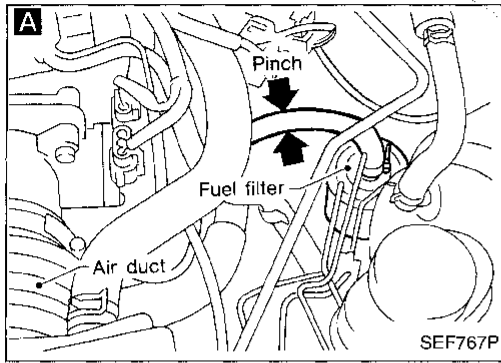
- (B1), (M4)
- (M1)
- (B4)



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Fuel Pump Control (Cont'd)

DIAGNOSTIC PROCEDURE



INSPECTION START

A
CHECK OVERALL FUNCTION.
 1) Turn ignition switch "ON".
 2) Pinch fuel feed hose with fingers.
Fuel pressure pulsation should be felt on the fuel feed hose for 1 second after ignition switch is turned "ON".

OK → INSPECTION END

B
CHECK POWER SUPPLY.
 1) Turn ignition switch "OFF".
 2) Disconnect fuel pump relay.
 3) Turn ignition switch "ON".
 4) Check voltage between terminals ①, ③ and ground with CONSULT or tester.
Voltage: Battery voltage

NG → Check the following.
 • Harness connectors (M4, B1)
 • 15A fuse
 • 10A fuse
 • Harness continuity between fuse and fuel pump relay
 If NG, repair harness or connectors.

C
CHECK GROUND CIRCUIT.
 1) Turn ignition switch "OFF".
 2) Disconnect fuel pump harness connector and dropping resistor harness connector.
 3) Check harness continuity between terminal ⑤ and terminal ①, terminal ② and terminal ①.
Continuity should exist.
 If OK, check harness for short.

NG → Check the following.
 • Harness connectors (M4, B1)
 • Harness for open or short between fuel pump relay and fuel pump
 • Harness for open or short between fuel pump and dropping resistor
 If NG, repair harness or connectors.

D
CHECK OUTPUT SIGNAL CIRCUIT.
 1) Disconnect ECM harness connector.
 2) Check harness continuity between ECM terminal ① and terminal ②.
Continuity should exist.
 If OK, check harness for short.

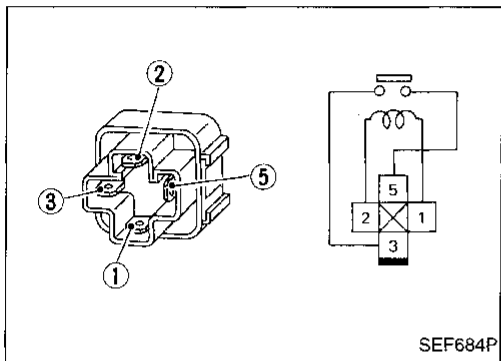
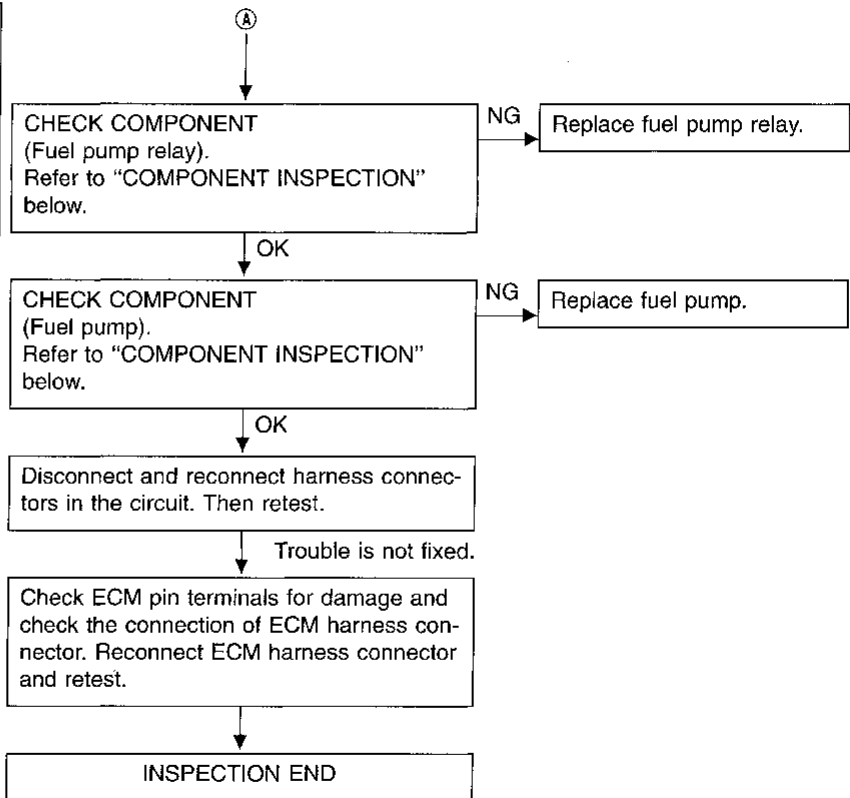
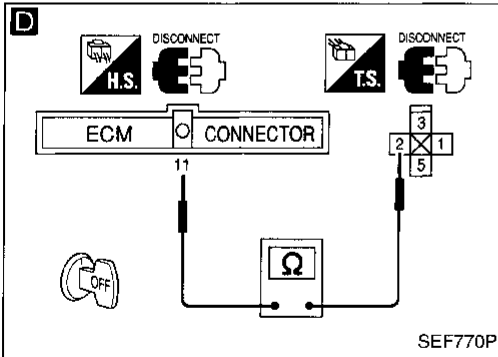
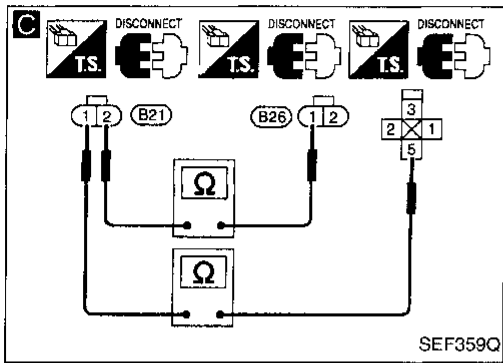
NG → Check the following.
 • Harness connectors (F102, M58)
 • Harness for open or short between fuel pump relay and ECM
 If NG, repair harness or connector.

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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Fuel Pump Control (Cont'd)



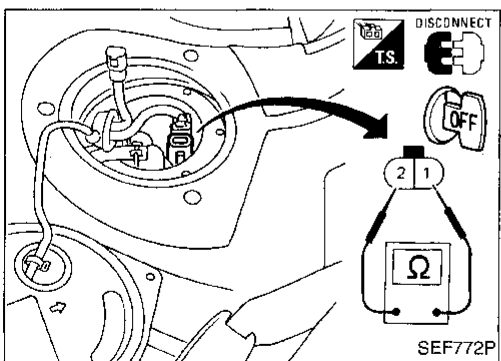
COMPONENT INSPECTION

Fuel pump relay

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.

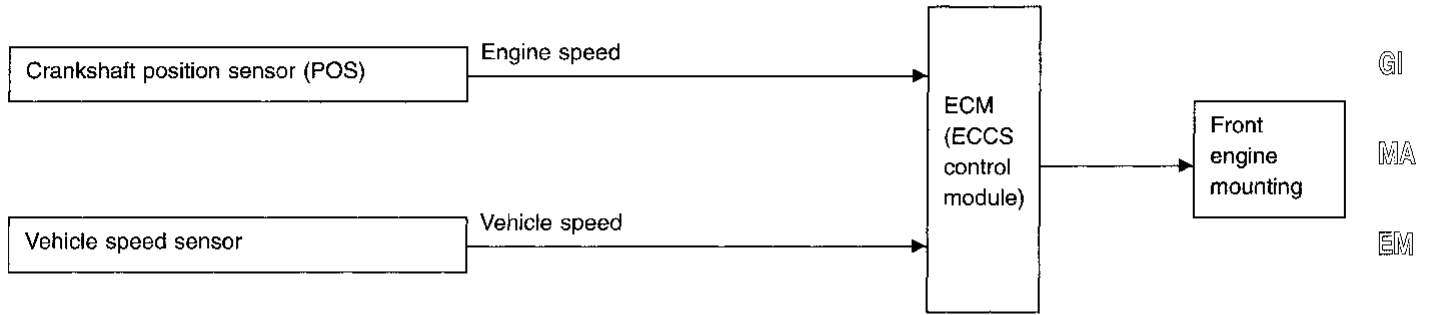


Fuel pump

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.

Front Engine Mounting Control

SYSTEM DESCRIPTION



The ECM controls the front engine mounting operation corresponding to the engine speed and the vehicle speed. The control system has 2-step control [soft/hard].

Front engine mounting control

Vehicle condition	Front engine mounting control
Idle (with vehicle stopped)	Soft
Driving	Hard

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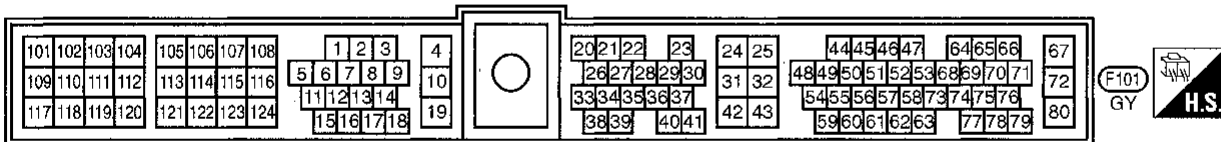
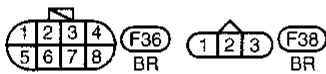
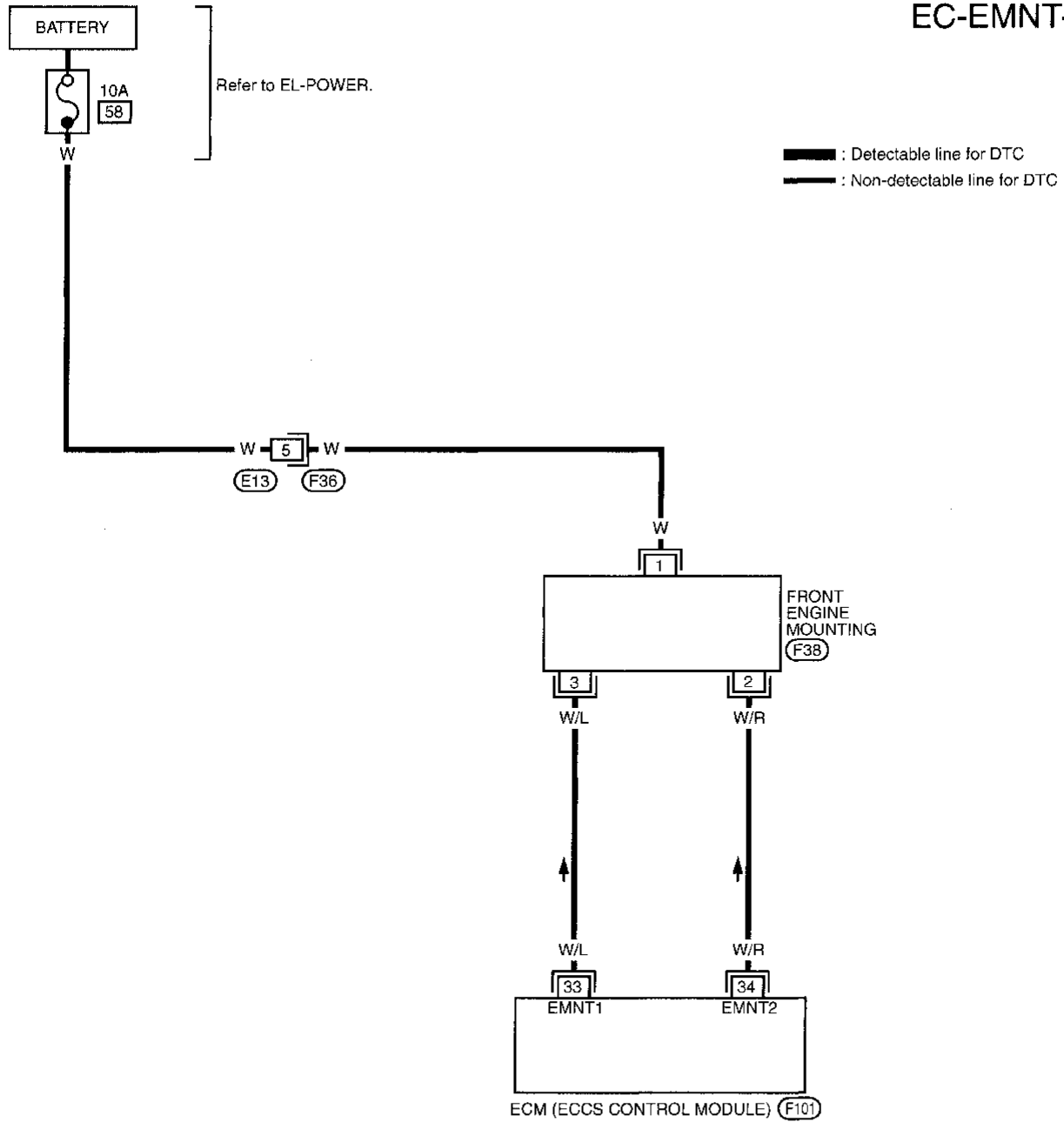
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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

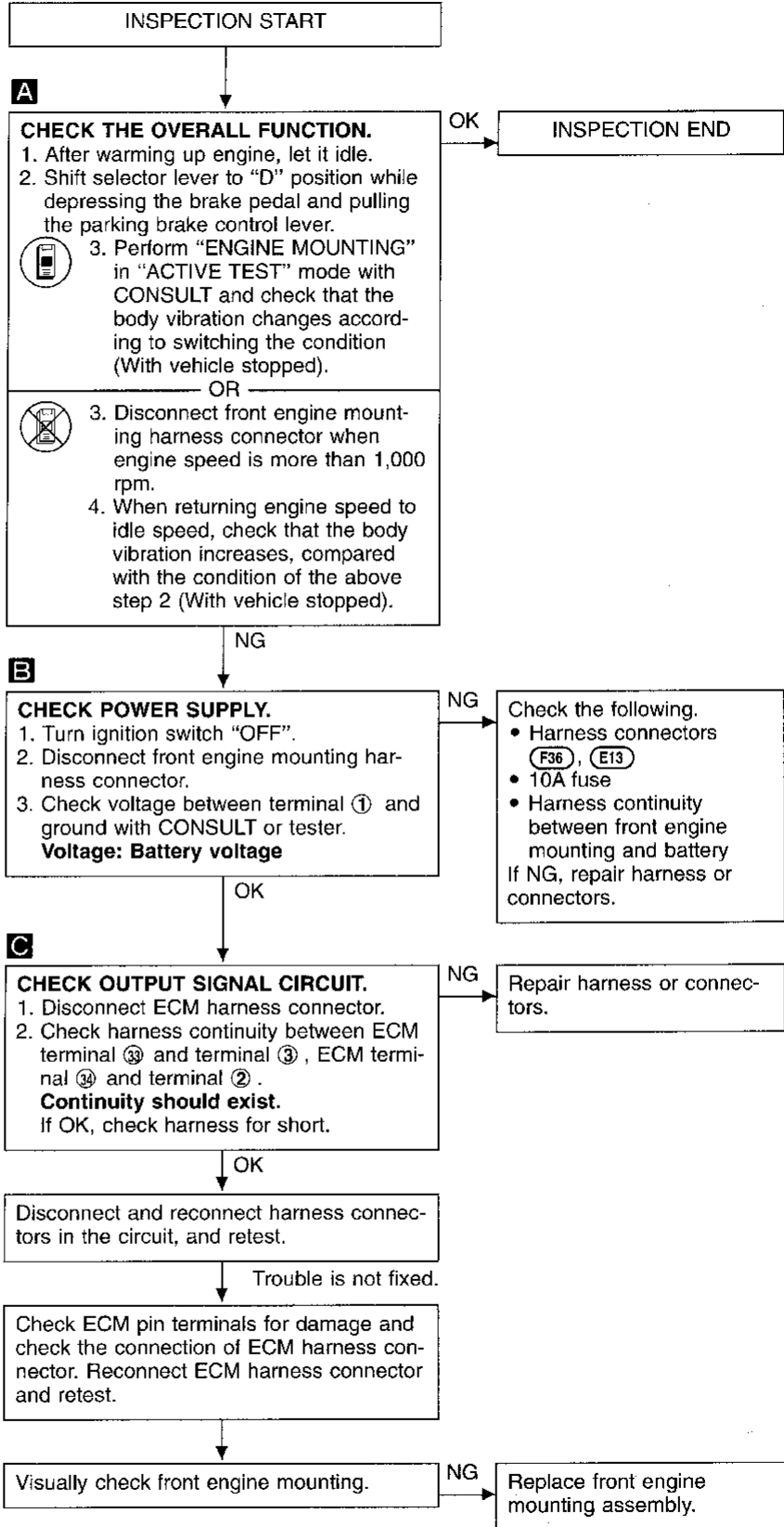
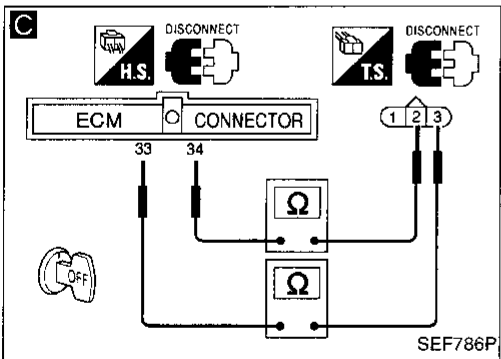
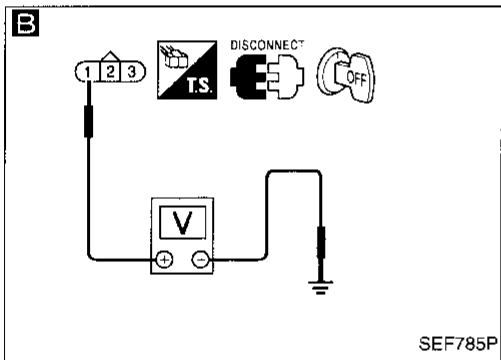
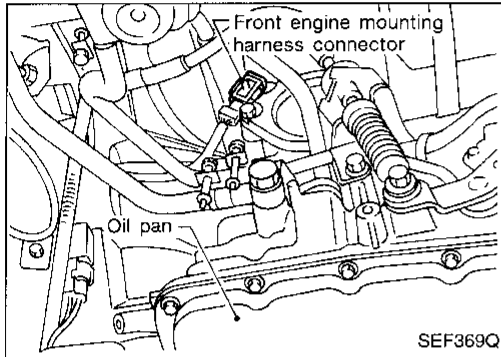
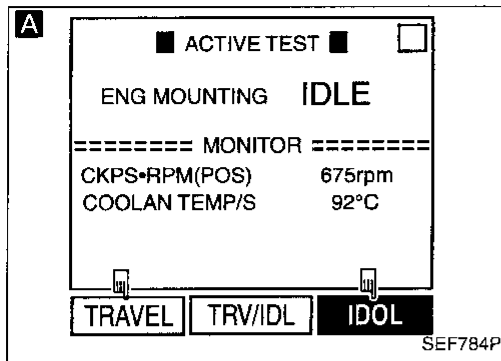
Front Engine Mounting Control (Cont'd)

EC-EMNT-01



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Front Engine Mounting Control (Cont'd) DIAGNOSTIC PROCEDURE



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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Power Steering Oil Pressure Switch (Cont'd)

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.

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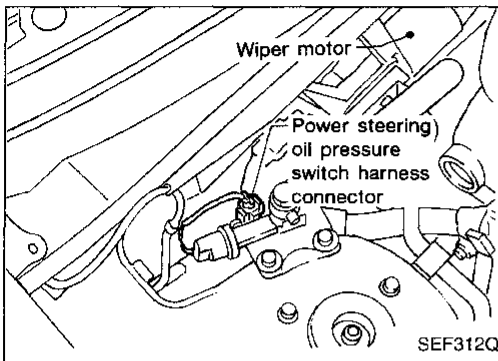
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A

■ PW/ST SIGNAL CIRCUIT ■

HOLD STEERING WHEEL
IN A FULL
LOCKED POSITION
THEN
TOUCH START

NEXT START

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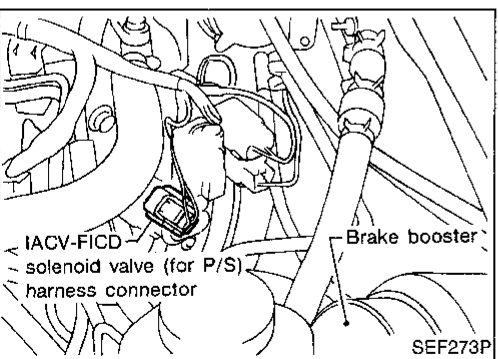
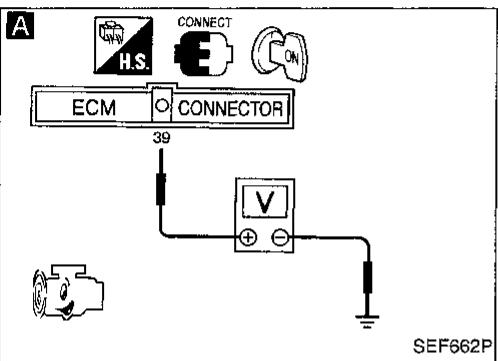
A

☆ MONITOR ☆ NO FAIL

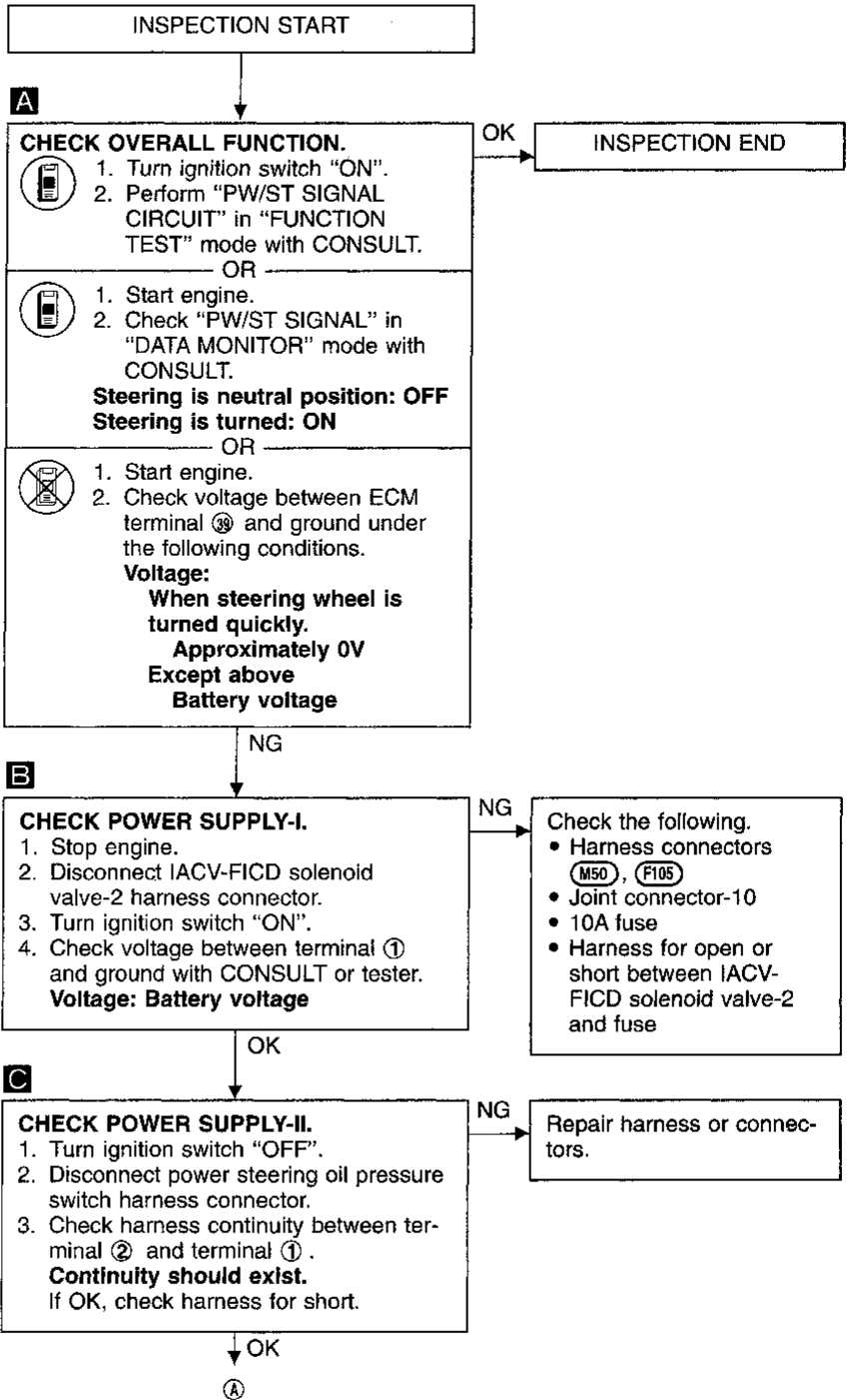
PW/ST SIGNAL OFF

RECORD

SEF591I

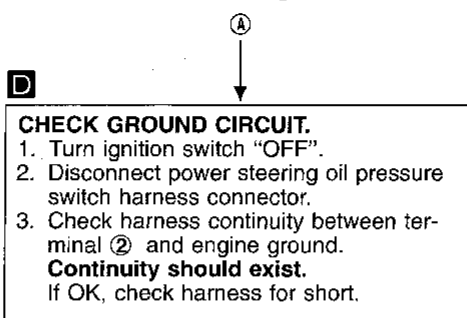
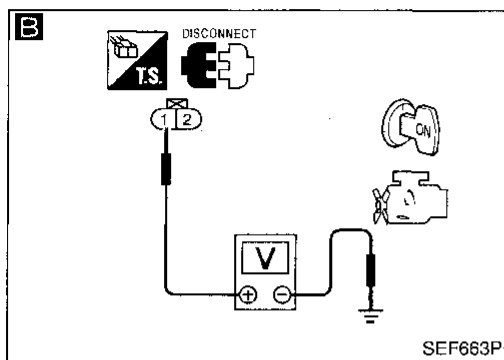


DIAGNOSTIC PROCEDURE

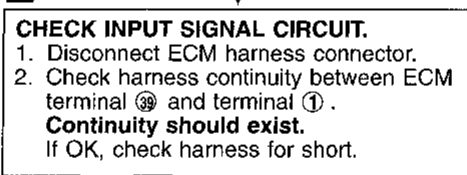
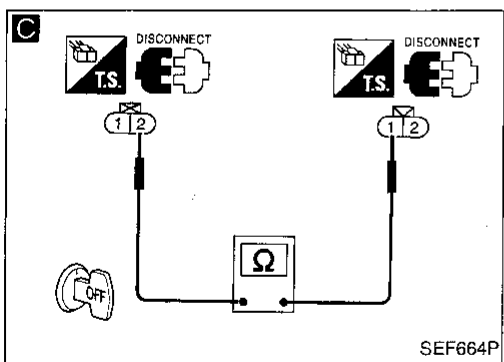


TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

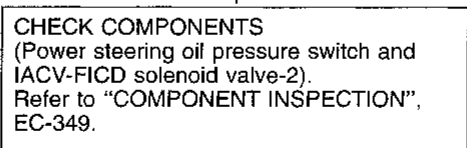
Power Steering Oil Pressure Switch (Cont'd)



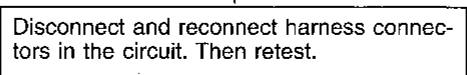
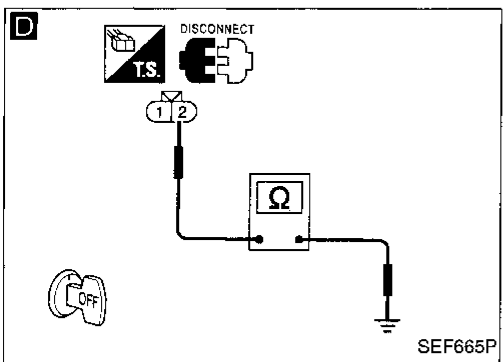
NG → Repair harness or connectors.



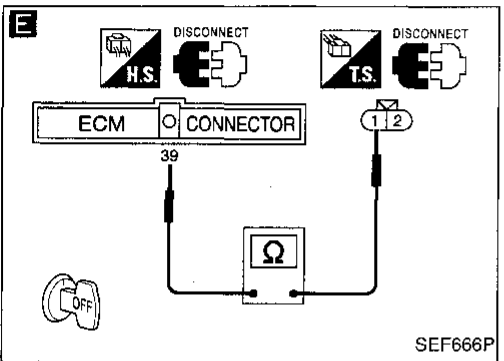
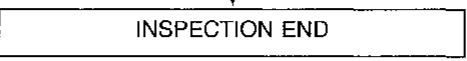
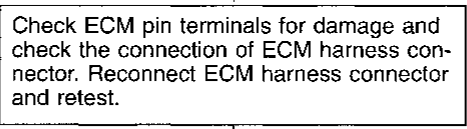
NG → Repair harness or connectors.



NG → Replace power steering oil pressure switch or IACV-FICD solenoid valve-2.



↓ Trouble is not fixed.



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Power Steering Oil Pressure Switch (Cont'd) COMPONENT INSPECTION

Power steering oil pressure switch

1. Disconnect power steering oil pressure switch harness connector then start engine.
2. Check continuity between terminals ① and ② .

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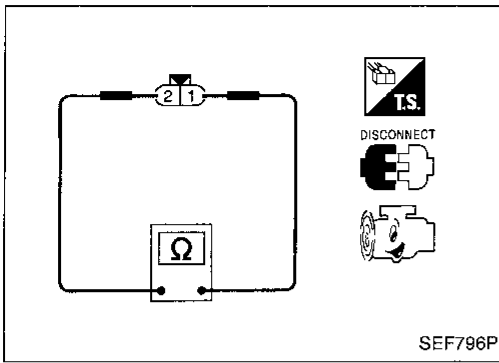
RS

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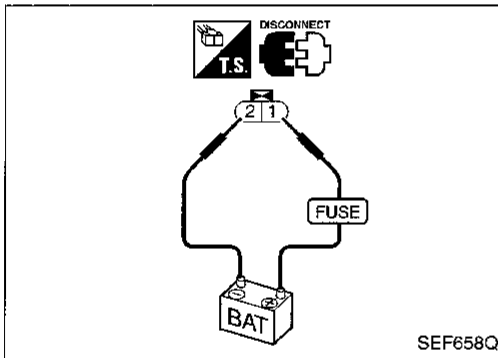
EL

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Conditions	Continuity
Steering wheel is being turned	Yes
Steering wheel is not being turned	No

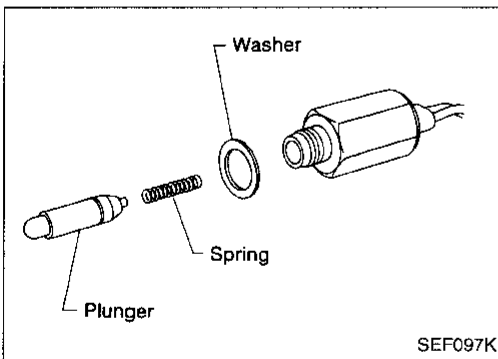
If NG, replace power steering oil pressure switch.



IACV-FICD solenoid valve-2

Disconnect IACV-FICD solenoid valve-2 harness connector.

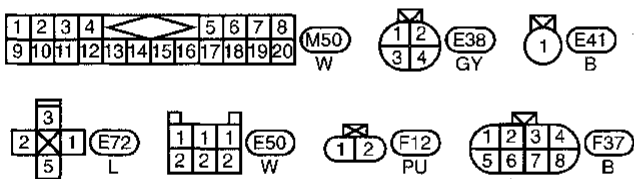
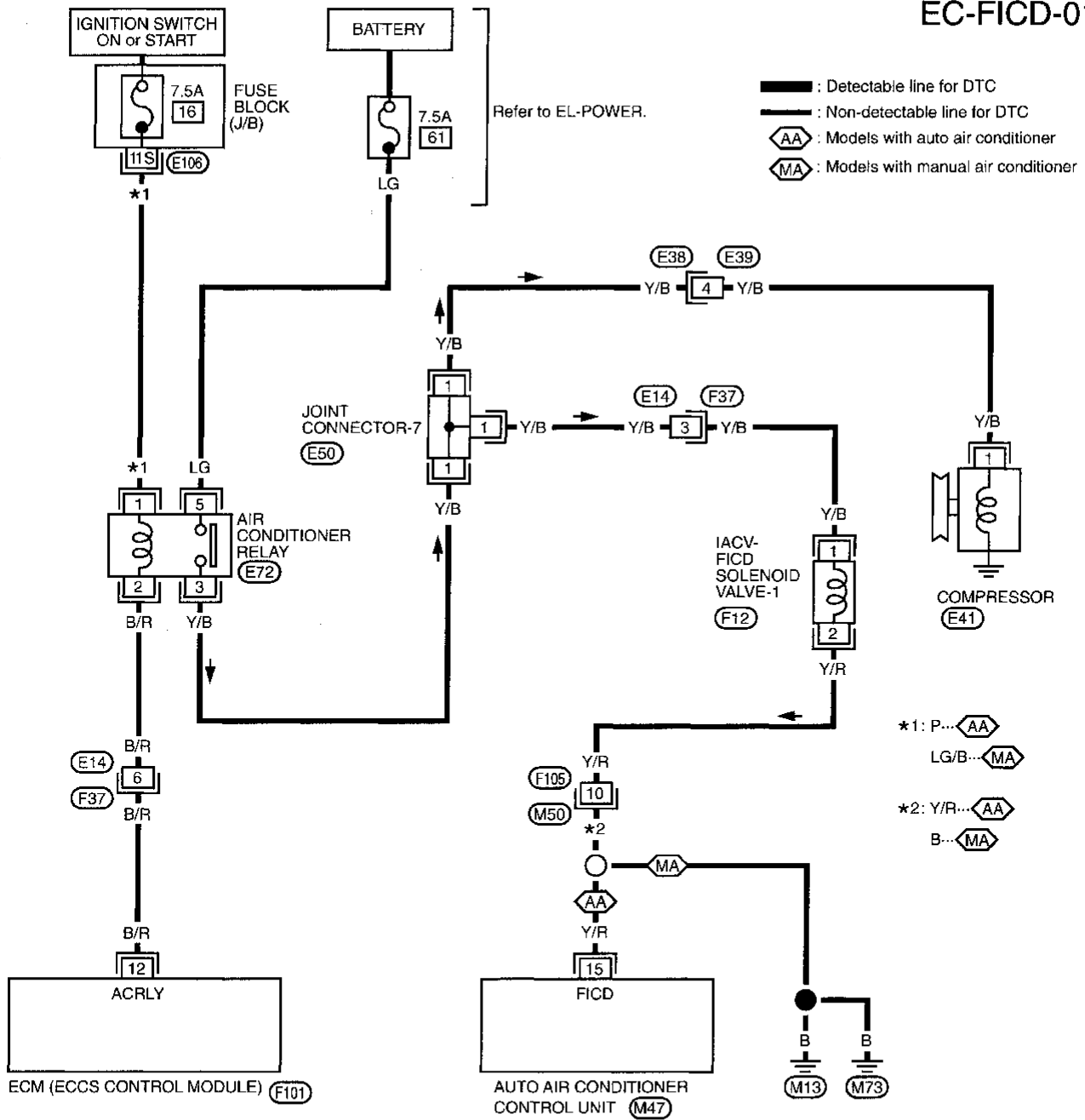
- Check for clicking sound when applying 12V direct current to terminals.



- Check plunger for seizing or sticking.
- Check for broken spring.

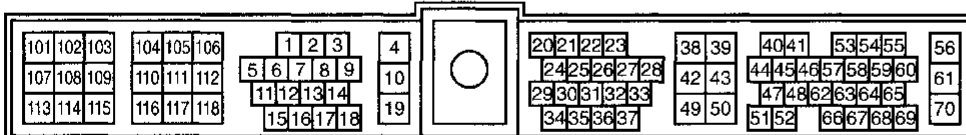
IACV-FICD Solenoid Valve

EC-FICD-01



Refer to last page (Foldout page).

M47
E106



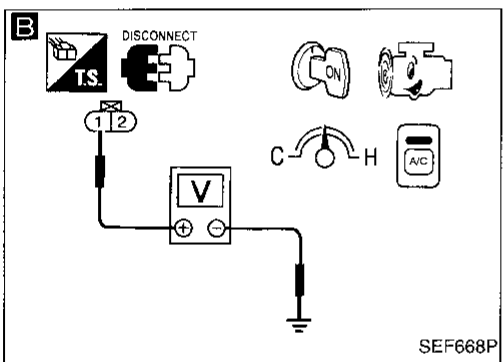
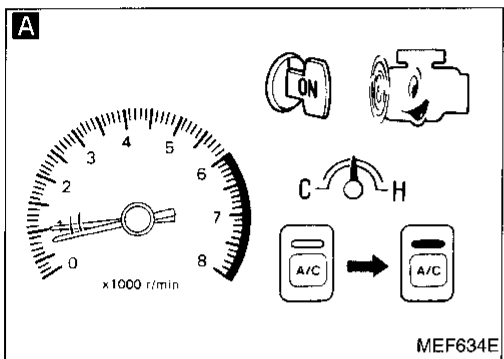
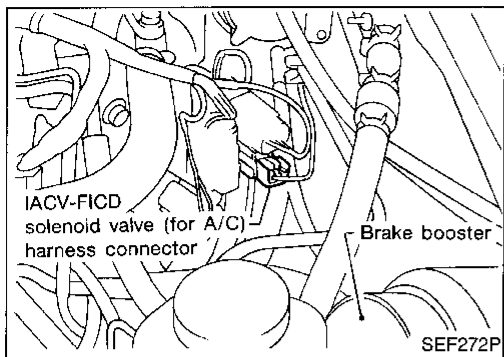
F101 GY

TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

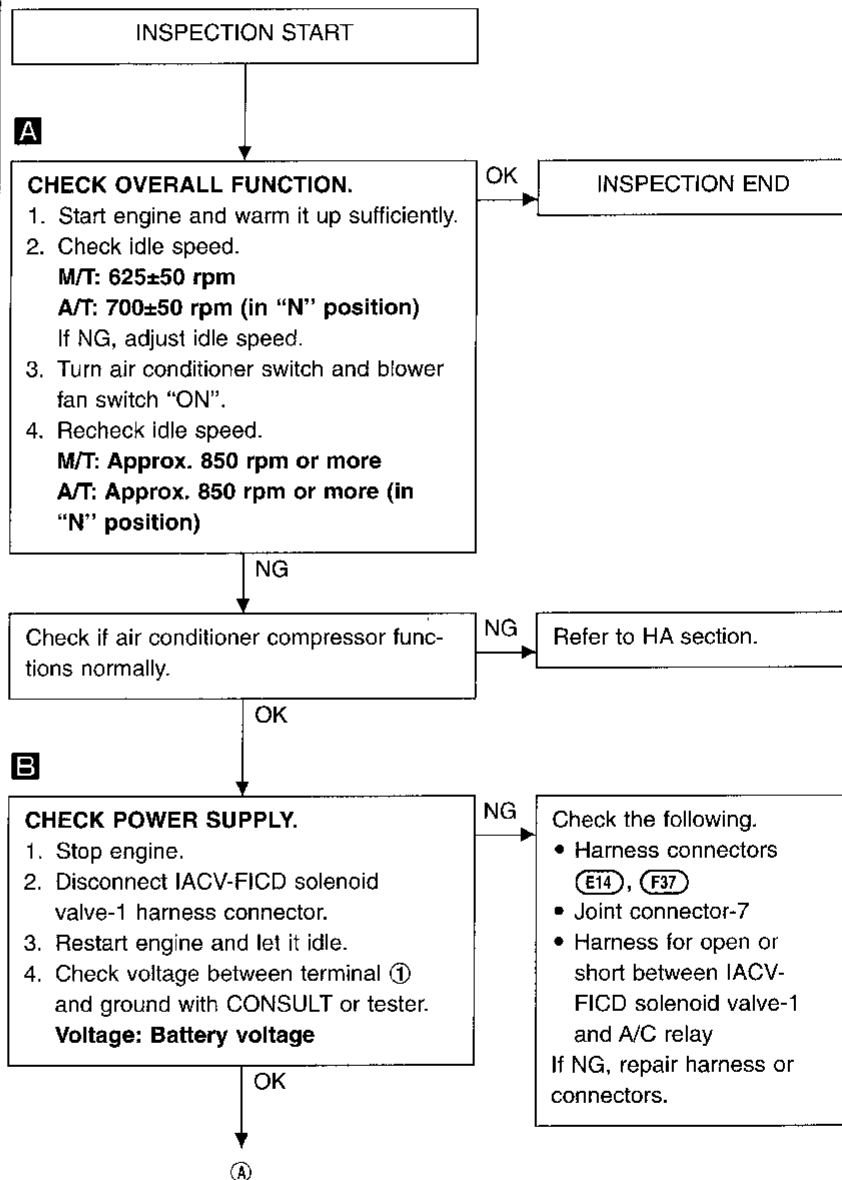
IACV-FICD Solenoid Valve (Cont'd)

COMPONENT DESCRIPTION

The idle air adjusting (IAA) unit is made up of the IACV-AAC valve, IACV-FICD solenoid valves and idle adjusting screw. It receives the signal from the ECM and controls the idle speed at the preset value.



DIAGNOSTIC PROCEDURE



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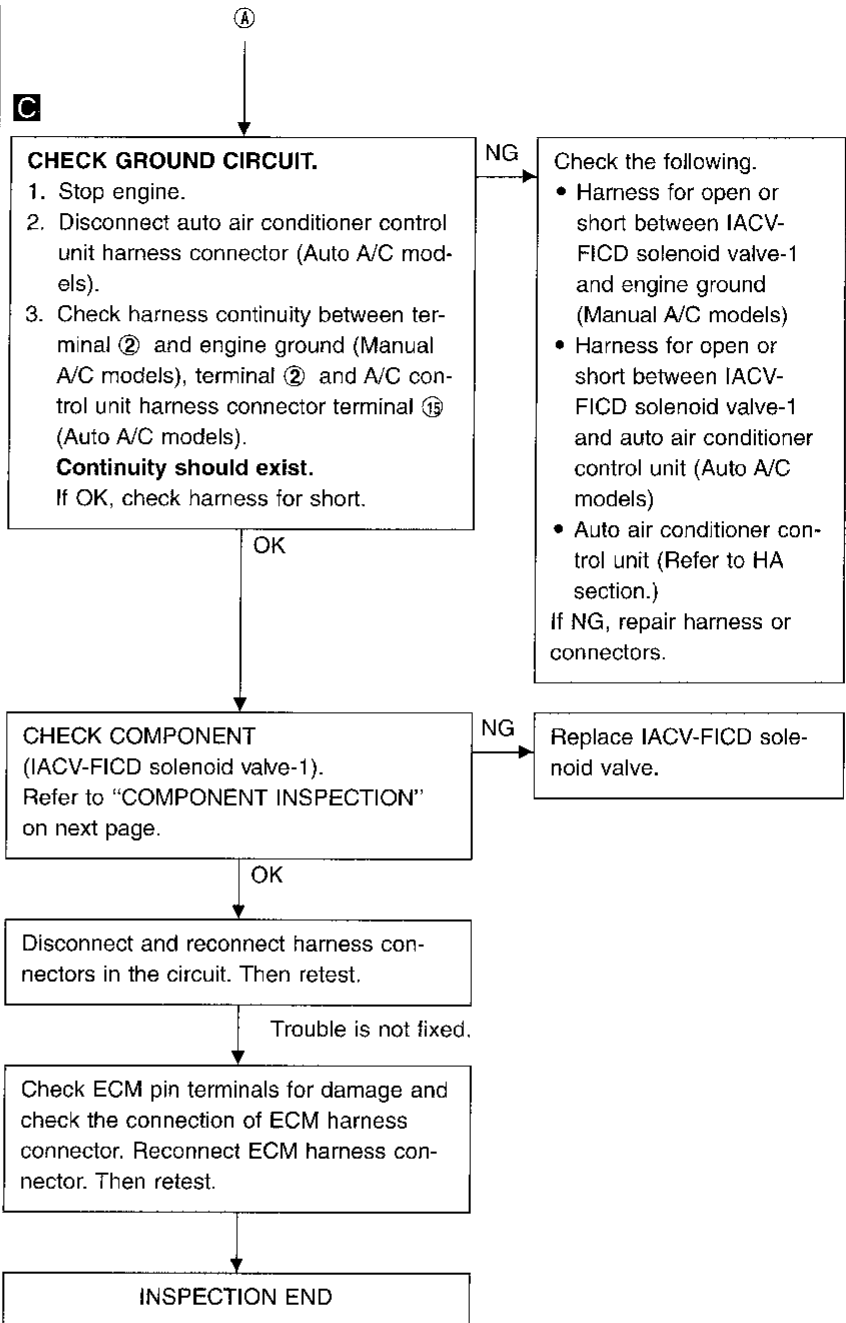
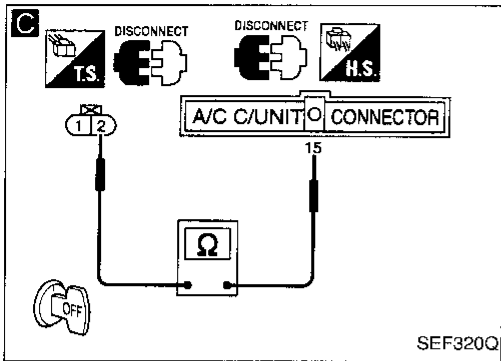
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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

IACV-FICD Solenoid Valve (Cont'd)



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

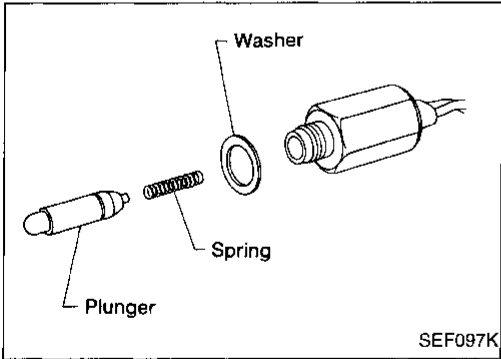
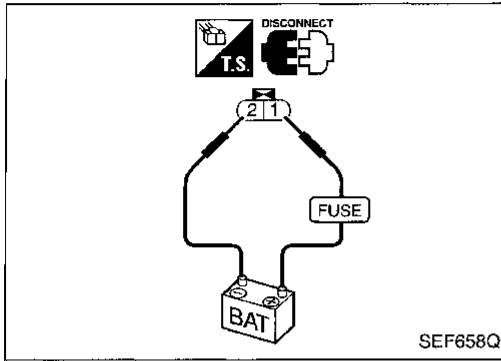
IACV-FICD Solenoid Valve (Cont'd)

COMPONENT INSPECTION

IACV-FICD solenoid valve-1

Disconnect IACV-FICD solenoid valve-1 harness connector.

- Check for clicking sound when applying 12V direct current to terminals.



- Check plunger for seizing or sticking.
- Check for broken spring.

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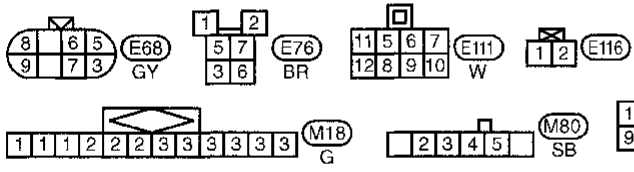
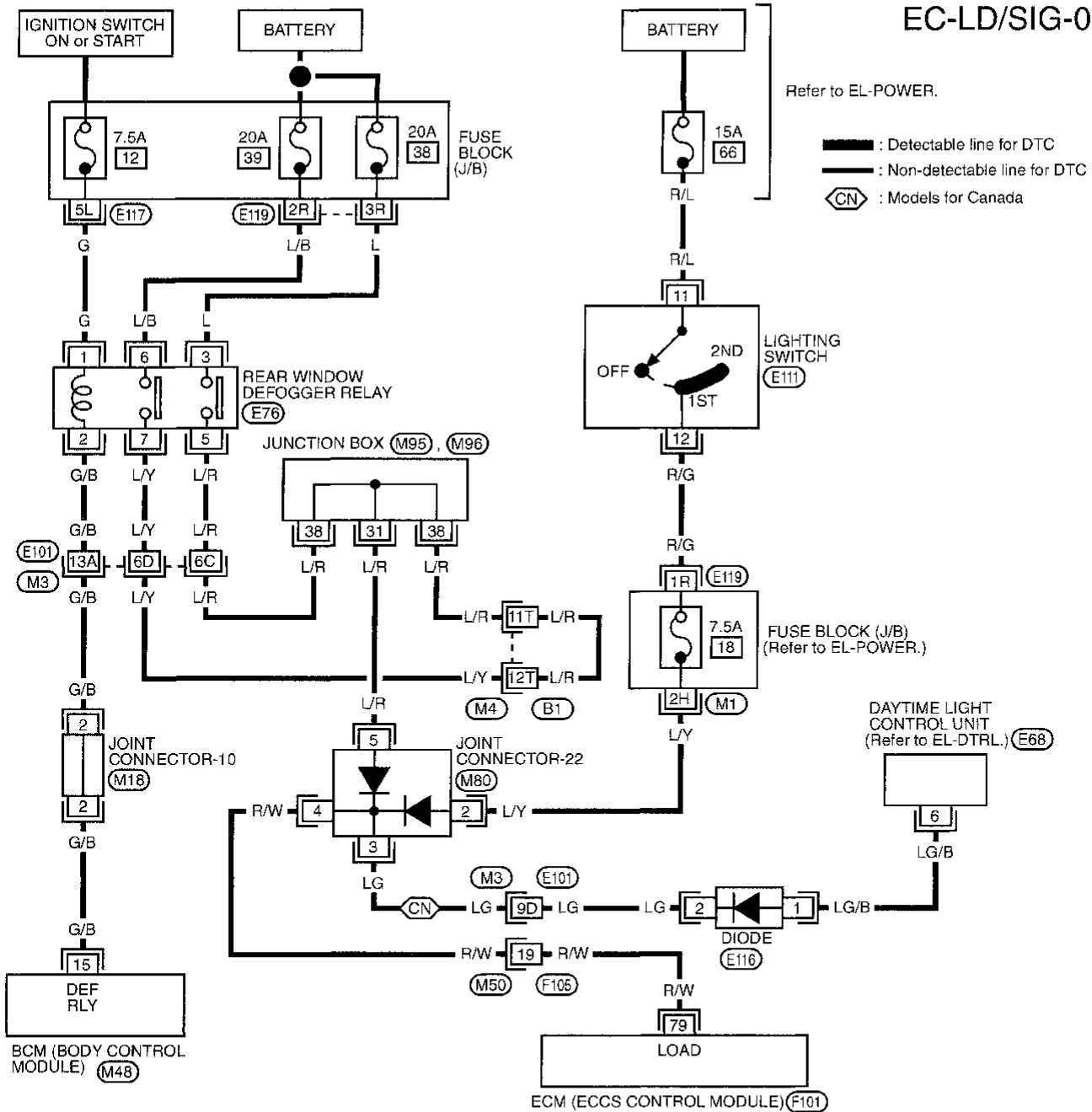
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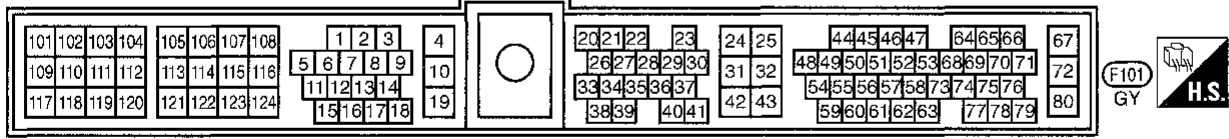
Electrical Load Signal

EC-LD/SIG-01



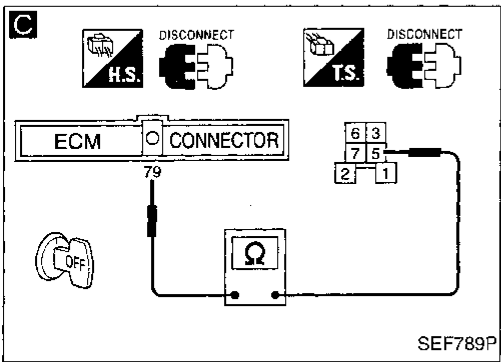
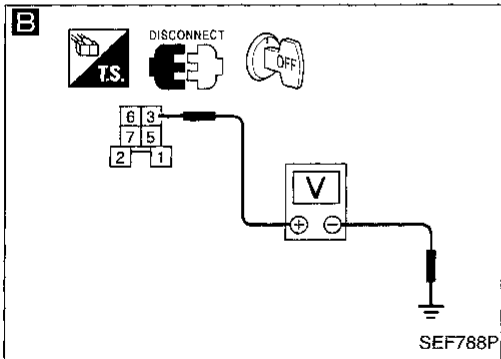
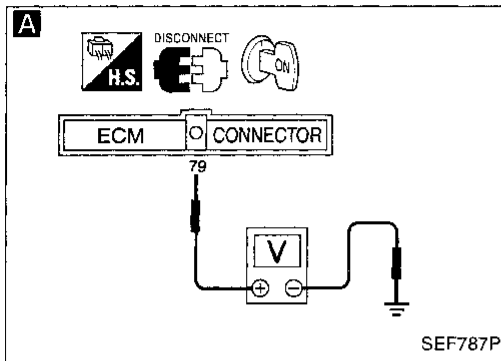
Refer to last page (Foldout page).

(B1), (M4), (E119)
 (E101), (M3), (M95), (M96)
 (M1)
 (M48)
 (E117)



TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Electrical Load Signal (Cont'd)



DIAGNOSTIC PROCEDURE

INSPECTION START

A

CHECK THE OVERALL FUNCTION.

1. Turn ignition switch "OFF".
2. Disconnect ECM harness connector.
3. Turn ignition switch "ON".
4. Check voltage between ECM terminal ⑦ and ground in the following conditions.

OK → INSPECTION END

Conditions	Voltage (V)
Rear window defogger	ON Battery voltage
Headlamp (1st or 2nd) (For non-California models)	
Headlamp (2nd) (For California models)	
Except the above	0

NG

B

CHECK POWER SUPPLY FOR RR/DEF SIGNAL CIRCUIT.

1. Turn ignition switch "OFF".
2. Disconnect rear window defogger relay.
3. Check voltage between terminal ③ and ground.

Voltage: Battery voltage

NG → Check the following.

- 20A fuse
- Harness for open or short between rear defogger relay and battery

If NG, repair harness or connectors.

OK

C

CHECK INPUT SIGNAL CIRCUIT FOR RR/DEF.

Check harness continuity between ECM terminal ⑦ and terminal ⑤. **Continuity should exist.** If OK, check harness for short.

NG → Check the following.

- Harness connectors (F105), (M50)
- Joint connector-22 (M80)
- Junction box
- Harness connectors (M3), (E101)

If NG, repair harness or connectors.

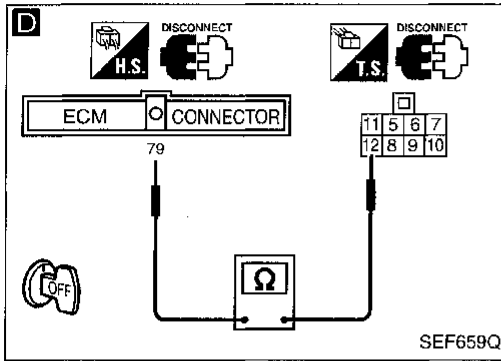
OK

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TROUBLE DIAGNOSIS FOR NON-DETECTABLE ITEMS

Electrical Load Signal (Cont'd)



D

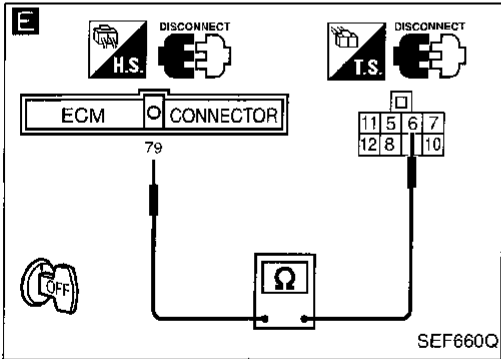
CHECK INPUT SIGNAL CIRCUIT FOR HEADLAMP (For California models).

1. Turn ignition switch "OFF".
2. Disconnect lighting switch harness connector.
3. Check harness continuity between ECM terminal 79 and terminal 12. **Continuity should exist.** If OK, check harness for short.

NG → Check the following.

- Harness connectors (F105, M50)
- Joint connector-22
- Harness connectors (M1, E119)
- 7.5A fuse

If NG, repair harness or connectors.



E

CHECK INPUT SIGNAL CIRCUIT FOR HEADLAMP (For Canada models).

1. Turn ignition switch "OFF".
2. Disconnect daytime light control unit harness connector.
3. Check harness continuity between ECM terminal 79 and terminal 6. **Continuity should exist.** If OK, check harness for short.

NG → Check the following.

- Harness connectors (F105, M50)
- Joint connector-22
- Harness connectors (M3, E101)
- Diode (E116)

If NG, repair harness or connectors.

INSPECTION END

Alphabetical & P No. Index for DTC

ALPHABETICAL INDEX FOR DTC

Items (CONSULT screen terms)	DTC		Reference page
	MIL*1	CONSULT GST*2	
*COOLANT TEMP SEN	0908	P0125	EC-134
ABSOL PRESS SEN- SOR	0803	P0105	EC-113
A/T 1ST SIGNAL	1103	P0731	AT section
A/T 2ND SIGNAL	1104	P0732	AT section
A/T 3RD SIGNAL	1105	P0733	AT section
A/T 4TH SIG OR TCC	1106	P0734	AT section
A/T COMM LINE	0504	P0600	EC-256
A/T DIAG COMM LINE	0804	P1605	EC-318
CAM POS SEN (PHASE)	0101	P0340	EC-197
CLOSED LOOP-B1	0307	P0130	EC-144
CLOSED LOOP-B2	0308	P0150*3	EC-144
CLOSED THRL POS SW	0203	P0510	EC-252
COOLANT TEMP SEN	0103	P0115	EC-125
COOLING FAN	1308	P1900	EC-321
CRANK POS SEN (REF)	0407	P1335	EC-283
CRANK P/S (POS) COG	0905	P1336	EC-287
CRANK POS SEN (POS)	0802	P0335	EC-192
CYL 1 MISFIRE	0608	P0301	EC-185
CYL 2 MISFIRE	0607	P0302	EC-185
CYL 3 MISFIRE	0606	P0303	EC-185
CYL 4 MISFIRE	0605	P0304	EC-185
CYL 5 MISFIRE	0604	P0305	EC-185
CYL 6 MISFIRE	0603	P0306	EC-185
ECM	0301	P0605	EC-259
EGR SYSTEM	0302	P0400	EC-201
EGR TEMP SENSOR	0305	P1401	EC-295
EGRC SOLENOID/V	1005	P1400	EC-292
EGRC-BPT VALVE	0306	P0402	EC-210
ENGINE SPEED SIG	1207	P0725	AT section
EVAP PURG FLOW/ MON	0111	P1447	EC-311
EVAP SYS PRES SEN	0704	P0450	EC-238
EVAP (SMALL LEAK)	0705	P0440	EC-215
FLUID TEMP SENSOR	1208	P0710	AT section
FPCM	1305	P1220	EC-271
FR O2 SE HEATER-B1	0901	P0135	EC-146

Items (CONSULT screen terms)	DTC		Reference page
	MIL*1	CONSULT GST*2	
FR O2 SE HEATER-B2	1001	P0155	EC-159
FRONT O2 SENSOR-B1	0503	P0130	EC-139
FRONT O2 SENSOR-B2	0303	P0150	EC-154
FUEL SYS LEAN/BK1	0115	P0171	EC-162
FUEL SYS LEAN/BK2	0210	P0174	EC-172
FUEL SYS RICH/BK1	0114	P0172	EC-167
FUEL SYS RICH/BK2	0209	P0175	EC-177
IACV-AAC VALVE	0205	P0505	EC-246
IGN SIGNAL-PRIMARY	0201	P1320	EC-277
INHIBITOR SWITCH	1101	P0705	AT section
INT AIR TEMP SEN	0401	P0110	EC-120
MAP/BARO SW SOL/V	1302	P1105	EC-265
KNOCK SENSOR	0304	P0325	EC-189
LINE PRESSURE S/V	1205	P0745	AT section
MASS AIR FLOW SEN	0102	P0100	EC-108
MULTI CYL MISFIRE	0701	P0300	EC-185
OVERRUN CLUTCH S/V	1203	P1760	AT section
PARK/NEUT POSI SW	1003	P0705	EC-261
PURG CONT/V & S/V	0807	P0443	EC-225
PURG VOLUME CONT/V	1008	P1445	EC-305
REAR O2 SENSOR	0707	P0136	EC-149
SHIFT SOLENOID/V A	1108	P0750	AT section
SHIFT SOLENOID/V B	1201	P0755	AT section
TANK FUEL TEMP SEN	0402	P0180	EC-182
THROTTLE POSI SEN	0403	P0120	EC-129
THRTL POSI SEN A/T	1206	P1705	AT section
TOR CONV CLUTCH SV	1204	P0740	AT section
TW CATALYST SYS-B1	0702	P0420	EC-212
TW CATALYST SYS-B2	0703	P0430	EC-212
VC/V BYPASS/V	0801	P1441	EC-300
VEHICLE SPEED SEN	0104	P0500	EC-242
VENT CONTROL VALVE	0903	P0446	EC-233
VHCL SPEED SEN A/T	1102	P0720	AT section

*1: These are controlled by NISSAN.

*2: These are prescribed by SAE J2012.

*3: Using CONSULT, "P0130" will be displayed in this case.

TROUBLE DIAGNOSIS — Index

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

P NO. INDEX FOR DTC

DTC		Items (CONSULT screen terms)	Reference page
CONSULT GST*2	MIL*1		
P0000	0505	NO SELF-DIAGNOSTIC FAILURE INDICATED	—
P0100	0102	MASS AIR FLOW SEN	EC-108
P0105	0803	ABSOL PRESS SEN- SOR	EC-113
P0110	0401	INT AIR TEMP SEN	EC-120
P0115	0103	COOLANT TEMP SEN	EC-125
P0120	0403	THROTTLE POSI SEN	EC-129
P0125	0908	*COOLANT TEMP SEN	EC-134
P0130	0307	CLOSED LOOP-B1	EC-144
P0130	0503	FRONT O2 SENSOR-B1	EC-139
P0135	0901	FR O2 SE HEATER-B1	EC-146
P0136	0707	REAR O2 SENSOR	EC-149
P0150*3	0308	CLOSED LOOP-B2	EC-144
P0150	0303	FRONT O2 SENSOR-B2	EC-154
P0155	1001	FR O2 SE HEATER-B2	EC-159
P0171	0115	FUEL SYS LEAN/BK1	EC-162
P0172	0114	FUEL SYS RICH/BK1	EC-167
P0174	0210	FUEL SYS LEAN/BK2	EC-172
P0175	0209	FUEL SYS RICH/BK2	EC-177
P0180	0402	TANK FUEL TEMP SEN	EC-182
P0300	0701	MULTI CYL MISFIRE	EC-185
P0301	0608	CYL 1 MISFIRE	EC-185
P0302	0607	CYL 2 MISFIRE	EC-185
P0303	0606	CYL 3 MISFIRE	EC-185
P0304	0605	CYL 4 MISFIRE	EC-185
P0305	0604	CYL 5 MISFIRE	EC-185
P0306	0603	CYL 6 MISFIRE	EC-185
P0325	0304	KNOCK SENSOR	EC-189
P0335	0802	CRANK POS SEN (POS)	EC-192
P0340	0101	CAM POS SEN (PHASE)	EC-197
P0400	0302	EGR SYSTEM	EC-201
P0402	0306	EGRC-BPT VALVE	EC-210
P0420	0702	TW CATALYST SYS-B1	EC-212
P0430	0703	TW CATALYST SYS-B2	EC-212
P0440	0705	EVAP (SMALL LEAK)	EC-215

DTC		Items (CONSULT screen terms)	Reference page
CONSULT GST*2	MIL*1		
P0443	0807	PURG CONT/V & S/V	EC-225
P0446	0903	VENT CONTROL VALVE	EC-233
P0450	0704	EVAP SYS PRES SEN	EC-238
P0500	0104	VEHICLE SPEED SEN	EC-242
P0505	0205	IACV-AAC VALVE	EC-246
P0510	0203	CLOSED THRL POS SW	EC-252
P0600	0504	A/T COMM LINE	EC-256
P0605	0301	ECM	EC-259
P0705	1003	PARK/NEUT POSI SW	EC-261
P0705	1101	INHIBITOR SWITCH	AT section
P0710	1208	FLUID TEMP SENSOR	AT section
P0720	1102	VHCL SPEED SEN A/T	AT section
P0725	1207	ENGINE SPEED SIG	AT section
P0731	1103	A/T 1ST SIGNAL	AT section
P0732	1104	A/T 2ND SIGNAL	AT section
P0733	1105	A/T 3RD SIGNAL	AT section
P0734	1106	A/T 4TH SIG OR TCC	AT section
P0740	1204	TOR CONV CLUTCH SV	AT section
P0745	1205	LINE PRESSURE S/V	AT section
P0750	1108	SHIFT SOLENOID/V A	AT section
P0755	1201	SHIFT SOLENOID/V B	AT section
P1105	1302	MAP/BARO SW SOL/V	EC-265
P1220	1305	FPCM	EC-271
P1320	0201	IGN SIGNAL-PRIMARY	EC-277
P1335	0407	CRANK POS SEN (REF)	EC-283
P1336	0905	CRANK P/S (POS) COG	EC-287
P1400	1005	EGRC SOLENOID/V	EC-292
P1401	0305	EGR TEMP SENSOR	EC-295
P1441	0801	VC/V BYPASS/V	EC-300
P1445	1008	PURG VOLUME CONT/V	EC-305
P1447	0111	EVAP PURG FLOW/ MON	EC-311
P1605	0804	A/T DIAG COMM LINE	EC-318
P1705	1206	THRTL POSI SEN A/T	AT section
P1760	1203	OVERRUN CLUTCH S/V	AT section
P1900	1308	COOLING FAN	EC-321

*1: These are controlled by NISSAN.

*2: These are prescribed by SAE J2012.

*3: Using CONSULT, "P0130" will be displayed in this case.

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SERVICE DATA AND SPECIFICATIONS (SDS)

General Specifications

PRESSURE REGULATOR

Fuel pressure	kPa (kg/cm ² , psi)	
At idle		Approximately 235 (2.4, 34)
A few seconds after ignition switch is turned from OFF to ON		Approximately 294 (3.0, 43)

Inspection and Adjustment

Idle speed*1	rpm	
No-load*2 (in "N" position)		M/T: 625±50 A/T: 700±50
Air conditioner: ON (in "N" position)		850 or more
Ignition timing		15°±2° BTDC

*1: Feedback controlled and needs no adjustments

*2: Under the following conditions:

- Air conditioner switch: OFF
- Electric load: OFF (Lights, heater, fan & rear defogger)

MASS AIR FLOW SENSOR

Supply voltage	V	Battery voltage (11 - 14)
Output voltage	V	1.0 - 1.7 at idle*
Mass air flow (Using CONSULT or GST)	g/cm/sec	2.0 - 6.0 at idle* 7.0 - 20.0 at 2,500 rpm*

*: Engine is warmed up sufficiently and idling under no-load.

ENGINE COOLANT TEMPERATURE SENSOR

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

EGR TEMPERATURE SENSOR

EGR temperature °C (°F)	Voltage (V)	Resistance (MΩ)
0 (32)	4.81	7.9 - 9.7
50 (122)	2.82	0.57 - 0.70
100 (212)	0.8	0.08 - 0.10
150 (302)	0.16	0.01 - 0.02

FRONT HEATED OXYGEN SENSOR HEATER

Resistance [at 25°C (77°F)]	Ω	2.3 - 4.3
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FUEL PUMP

Resistance [at 25°C (77°F)]	Ω	0.2 - 5.0
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IACV-AAC VALVE (Step motor type)

Resistance [at 25°C (77°F)]	Ω	Approximately 30
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INJECTOR

Resistance [at 25°C (77°F)]	Ω	10 - 14
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THROTTLE POSITION SENSOR

Accelerator pedal conditions	Resistance [at 25°C (77°F)]
Completely released	Approximately 0.5 kΩ
Partially released	0.5 - 4.0 kΩ
Completely depressed	Approximately 4.0 kΩ

SERVICE DATA AND SPECIFICATIONS (SDS)

Inspection and Adjustment (Cont'd)

CALCULATED LOAD VALUE

	Calculated load value % (Using CONSULT or GST)
At idle	14.0 - 33.0
At 2,500 rpm	12.0 - 25.0

INTAKE AIR TEMPERATURE SENSOR

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

EVAP CANISTER PURGE VOLUME CONTROL VALVE

Resistance [at 25°C (77°F)]	Ω	Approximately 30
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REAR HEATED OXYGEN SENSOR HEATER

Resistance [at 25°C (77°F)]	Ω	5.2 - 8.2
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CAMSHAFT POSITION SENSOR (PHASE)

Resistance	Ω	HITACHI make	1,440 - 1,760 [at 20°C (68°F)]
		MITSUBISHI make	2,090 - 2,550 [at 20°C (68°F)]

CRANKSHAFT POSITION SENSOR (REF)

Resistance [at 25°C (77°F)]	Ω	470 - 570
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DROPPING RESISTOR

Resistance [at 25°C (77°F)]	Ω	Approximately 0.9
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