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< HOW TO USE THIS MANUAL > HOW TO USE THIS MANUAL DESCRIPTION

Description



This vehicle has two types of CAN communication systems; CAN and HEV SYSTEM CAN. For starting the trouble diagnosis, refer to the following list.

NOTE:

- If the DTCs related to CAN and related to HEV SYSTEM CAN are displayed at the same time, diagnose CAN first.
- After the diagnosis of HEV SYSTEM CAN or CAN, erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.

DESCRIPTION

< HOW TO USE THIS MANUAL >

[CAN FUNDAMENTAL]

Unit	DTC (INF code [*]) displayed on CONSULT-III	CAN communication system	Inspection	1
ECM	P0607, U1000, U1001, U1002, U1010	CAN	LAN-16, "Trouble Diagnosis Procedure"	
	P0607, U0129, U0293, U1011, U1020, U1022	HEV SYSTEM CAN		
EPS control unit	C1608, U0129, U0293	HEV SYSTEM CAN		
Brake ECU	C1300, U0073, U0123, U0124, U0126, U0293	HEV SYSTEM CAN	LAN-53, "Trouble Diagnosis	(
Hybrid vehicle con- trol ECU	P0A1D (924), P0A1D (925), U0100, U0100 (211), U0100 (212), U0100 (530), U0129, U0129 (220), U0129 (222), U0129 (528), U0131, U0131 (433), U0131 (434)	HEV SYSTEM CAN	Procedure"	[
	U1001, U1001 (146), U1001 (435), U1001 (594), U1001 (827), U1001 (919), U1001 (920)	CAN		
AV control unit				
BCM			LAN-16, "Trouble Diagnosis	
Controller (auto amp.)	P0607, U1000, U1002, U1010	CAN	Procedure"	I
Combination meter				
IPDM E/R				(

*: For the details, refer to <u>HBC-73, "Diagnosis Description"</u>.

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PRECAUTIONS

Precautions for Trouble Diagnosis

CAUTION:

- Never apply 7.0 V or more to the measurement terminal.
- Use a tester with open terminal voltage of 7.0 V or less.
- Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.

Precautions for Harness Repair

• Solder the repaired area and wrap tape around the soldered area. **NOTE:**

A fray of twisted lines must be within 110 mm (4.33 in).



• Bypass connection is never allowed at the repaired area. **NOTE:**

Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



• Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

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FUNCTION DIAGNOSIS CAN COMMUNICATION SYSTEM

System Description

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- CAN communication is a multiplex communication system. This enables the system to transmit and receive large quantities of data at high speed by connecting control units with two communication lines (CAN-H and CAN-L).
- Control units on the CAN network transmit signals using the CAN communication control circuit. They receive only necessary signals from other control units to operate various functions.
- CAN communication lines adopt twisted-pair line style (two lines twisted) for noise immunity.

System Diagram



signal. The termination circuits produce an electrical potential difference between CAN-H and CAN-L. CAN communication system transmits and receives CAN communication signals by the potential difference.

Component	Description	
Main line	CAN communication line between splices	
Branch line	CAN communication line between splice and a control unit	
Splice	A point connecting a branch line with a main line	
Termination circuit	Refer to LAN-8. "CAN Communication Control Circuit".	

CAN COMMUNICATION SYSTEM

< FUNCTION DIAGNOSIS >

[CAN FUNDAMENTAL]

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CAN Communication Control Circuit



Component	System description
CAN controller	It controls CAN communication signal transmission and reception, error detection, etc.
Transceiver IC	It converts digital signal into CAN communication signal, and CAN communication signal into digital signal.
Noise filter	It eliminates noise of CAN communication signal.
Termination circuit [*] (Resistance of approx. 120 Ω)	It produces potential difference.

*: These are the only control units wired with both ends of CAN communication system.

< FUNCTION DIAGNOSIS >

DIAG ON CAN

Description

"Diag on CAN" is a diagnosis using CAN communication instead of previous DDL1 and DDL2 communication В lines, between control units and diagnosis unit.

System Diagram



Name	Harness	Description	
DDL1	Tx Rx	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)	N
DDL2	K-LINE	It is used for trouble diagnosis. (CAN-H and CAN-L are used for controlling)	0
Diag on CAN	CAN-H CAN-L	It is used for trouble diagnosis and control.	0

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[CAN FUNDAMENTAL]

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TROUBLE DIAGNOSIS

Condition of Error Detection

"U1000" or "U1001" is indicated on SELF-DIAG RESULTS on CONSULT-III if CAN communication signal is not transmitted or received between units for 2 seconds or more.

CAN COMMUNICATION SYSTEM ERROR

- CAN communication line open (CAN-H, CAN-L, or both)
- CAN communication line short (ground, between CAN communication lines, other harnesses)
- Error of CAN communication control circuit of the unit connected to CAN communication line

WHEN "U1000" OR "U1001" IS INDICATED EVEN THOUGH CAN COMMUNICATION SYSTEM IS NORMAL

- Removal/installation of parts: Error may be detected when removing and installing CAN communication unit and related parts while turning the ignition switch ON. (A DTC except for CAN communication may be detected.)
- Fuse blown out (removed): CAN communication of the unit may cease.
- Voltage drop: Error may be detected if voltage drops due to discharged battery when turning the ignition switch ON (Depending on the control unit which carries out CAN communication).
- Error may be detected if the power supply circuit of the control unit, which carries out CAN communication, malfunctions (Depending on the control unit which carries out CAN communication).
- Error may be detected if reprogramming is not completed normally.

NOTE:

CAN communication system is normal if "U1000" or "U1001" is indicated on SELF-DIAG RESULTS of CON-SULT-III under the above conditions. Erase the memory of the self-diagnosis of each unit.

Symptom When Error Occurs in CAN Communication System

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In CAN communication system, multiple units mutually transmit and receive signals. Each unit cannot transmit and receive signals if any error occurs on CAN communication line. Under this condition, multiple control units related to the root cause malfunction or go into fail-safe mode.

ERROR EXAMPLE

NOTE:

- Each vehicle differs in symptom of each unit under fail-safe mode and CAN communication line wiring.
- Refer to LAN-23, "Abbreviation List" for the unit abbreviation.

Example: TCM branch line open circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	Reverse warning chime does not sound.

< FUNCTION DIAGNOSIS >

[CAN FUNDAMENTAL]

Unit name	Symptom	0
EPS control unit	Normal operation.	A
Combination meter	Shift position indicator and OD OFF indicator turn OFF.Warning lamps turn ON.	B
ABS actuator and electric unit (control unit)	Normal operation.	
ТСМ	No impact on operation.	
IPDM E/R	Normal operation.	С

Example: Data link connector branch line open circuit



Unit name	Symptom
ECM	
BCM	
EPS control unit	
Combination meter	Normal operation.
ABS actuator and electric unit (control unit)	· · · · · · · · · · · · · · · · · · ·
ТСМ	
IPDM E/R	L

NOTE:

• When data link connector branch line is open, transmission and reception of CAN communication signals are not affected. Therefore, no symptoms occur. However, be sure to repair malfunctioning circuit.

 The model (all units on CAN communication system are Diag on CAN) cannot perform CAN diagnosis with CONSULT-III if the following error occurs. The error is judged by the symptom.

		N
Error	Difference of symptom	
Data link connector branch line open circuit	Normal operation.	
CAN-H, CAN-L harness short-circuit	Most of the units which are connected to the CAN communication system enter fail-safe mode or are deactivated.	0

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< FUNCTION DIAGNOSIS >

Example: Main Line Between Data Link Connector and ABS Actuator and Electric Unit (Control Unit) Open Circuit



Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	 Reverse warning chime does not sound. The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position.
EPS control unit	The steering effort increases.
Combination meter	 The shift position indicator and OD OFF indicator turn OFF. The speedometer is inoperative. The odo/trip meter stops.
ABS actuator and electric unit (control unit)	Normal operation.
ТСМ	No impact on operation.
IPDM E/R	When the ignition switch is ON,The headlamps (Lo) turn ON.The cooling fan continues to rotate.

Example: CAN-H, CAN-L Harness Short Circuit



< FUNCTION DIAGNOSIS >

[CAN FUNDAMENTAL]

Unit name	Symptom
ECM	Engine torque limiting is affected, and shift harshness increases.Engine speed drops.
ВСМ	 Reverse warning chime does not sound. The front wiper moves under continuous operation mode even though the front wiper switch being in the intermittent position. The room lamp does not turn ON. The engine does not start (if an error or malfunction occurs while turning the ignition switch OFF.) The steering lock does not release (if an error or malfunction occurs while turning the ignition switch OFF.)
EPS control unit	The steering effort increases.
Combination meter	The tachometer and the speedometer do not move.Warning lamps turn ON.Indicator lamps do not turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
ТСМ	No impact on operation.
IPDM E/R	When the ignition switch is ON,The headlamps (Lo) turn ON.The cooling fan continues to rotate.

CAN Diagnosis with CONSULT-III

CAN diagnosis on CONSULT-III extracts the root cause by receiving the following information.

- Response to the system call
- Control unit diagnosis information
- Self-diagnosis
- CAN diagnostic support monitor

Self-Diagnosis

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DTC	Self-diagnosis item (CONSULT-III indication)	DTC detection condition	Inspection/Action	K
111000		When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.		
01000		When a control unit (except for ECM) is not transmitting or receiving CAN communication signal for 2 seconds or more.		L
114004*		When ECM is not transmitting or receiving CAN communication signal other than OBD (emis- sion-related diagnosis) for 2 seconds or more.		LA
01001		When hybrid vehicle control ECU is not transmit- ting or receiving CAN communication signal for 2 seconds or more.		Ν
U1002	SYSTEM COMM	When a control unit is not transmitting or receiv- ing CAN communication signal for 2 seconds or less.		0
U1010	CONTROL UNIT [CAN]	When an error is detected during the initial diag-	Replace the control unit	D
P0607	ECM	nosis for CAN controller of each control unit.	indicating "U1010" or "P0607".	Р

*: Hybrid vehicle control ECU may display one or more DTCs listed as follows; U1001 (146), U1001 (435), U1001 (594), U1001 (827), U1001 (919), U1001 (920).

CAN Diagnostic Support Monitor

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MONITOR ITEM (CONSULT-III)

< FUNCTION DIAGNOSIS >

Example: CAN DIAG SUPPORT MNTR indication

Withou	t PAST		With	PAST	
ECM			EC	M	
	PRSNT	PAST		PRSNT	PAST
INITIAL DIAG	OK		TRANSMIT DIAG	¦OK	OK
TRANSMIT DIAG	OK		VDC/TCS/ABS	 [-]-
ТСМ	OK		METER/M&A	¦OK	OK
VDC/TCS/ABS	UNKWN		BCM/SEC	OK	OK
METER/M&A	OK	1	ICC	¦-	
ICC	UNKWN		HVAC		
BCM/SEC	OK		ТСМ	lок	l ok
IPDM E/R	OK		EPS		
			IPDM E/R	ĹΟK	lок
			e4WD	-	-
			AWD/4WD	OK	OK

Without PAST

Item	PRSNT	Description	
OK		Normal at present	
initial diagnosis	NG	Control unit error (Except for some control units)	
ОК		Normal at present	
Transmission diagnosis	UNKWN	Unable to transmit signals for 2 seconds or more.	
		Diagnosis not performed	
ОК		Normal at present	
Control unit name (Reception diagnosis)		Unable to receive signals for 2 seconds or more.	
	UNKWN	Diagnosis not performed	
		No control unit for receiving signals. (No applicable optional parts)	

With PAST

Item	PRSNT	PAST	Description
Transmission diagnosis	ОК	OK	Normal at present and in the past
		1 – 39	Normal at present, but unable to transmit signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to transmit signals for 2 seconds or more at present.
Control unit name (Reception diagnosis)		OK	Normal at present and in the past
	ОК	1 – 39	Normal at present, but unable to receive signals for 2 seconds or more in the past. (The number indicates the number of ignition switch cycles from OFF to ON.)
	UNKWN	0	Unable to receive signals for 2 seconds or more at present.
		Diagnosis not performed.	
	-	_	No control unit for receiving signals. (No applicable optional parts)

MONITOR ITEM (ON-BOARD DIAGNOSIS)

NOTE:

For some models, CAN communication diagnosis result is received from the vehicle monitor.

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< FUNCTION DIAGNOSIS >

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Item	Result indi- cated	Error counter	Description
	ОК	0	Normal at present
CAN_COMM (Initial diagnosis)	NG	1 – 50	Control unit error (The number indicates how many times diagnosis has been run.)
	OK	0	Normal at present
CAN_CIRC_1 (Transmission diagnosis)	UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
	OK	0	Normal at present
CAN_CIRC_2 – 9 (Reception diagnosis of each unit)	CAN_CIRC_2 – 9 on diagnosis of each unit) UNKWN	1 – 50	Unable to transmit for 2 seconds or more at present. (The number indicates how many times diagnosis has been run.)
			Diagnosis not performed.
			No control unit for receiving signals. (No applicable optional parts)

How to Use CAN Communication Signal Chart

The CAN communication signal chart lists the signals needed for trouble diagnosis. It is useful for detecting the root cause by finding a signal related to the symptom, and by checking transmission and reception unit.



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BASIC INSPECTION DIAGNOSIS AND REPAIR WORKFLOW

Trouble Diagnosis Flow Chart



Trouble Diagnosis Procedure

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INTERVIEW WITH CUSTOMER

Interview with the customer is important to detect the root cause of CAN communication system errors and to understand vehicle condition and symptoms for proper trouble diagnosis.

Points in interview

- What: Parts name, system name
- When: Date, Frequency
- Where: Road condition, Place
- In what condition: Driving condition/environment
- Result: Symptom

NOTE:

- Check normal units as well as error symptoms.
- Example: Circuit between ECM and the combination meter is judged normal if the customer indicates tachometer functions normally.
- When a CAN communication system error is present, multiple control units may malfunction or go into failsafe mode.

LAN-16

< BASIC INSPECTION >

[CAN FUNDAMENTAL]

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• Indication of the combination meter is important to detect the root cause because it is the most obvious to the customer, and it performs CAN communication with many units.



INSPECTION OF VEHICLE CONDITION

Check whether the symptom is reproduced or not.

NOTE:

Do not turn the ignition switch OFF or disconnect the battery cable while reproducing the error. The error may temporarily correct itself, making it difficult to determine the root cause.

CHECK OF CAN SYSTEM TYPE (HOW TO USE CAN SYSTEM TYPE SPECIFICATION CHART) Determine CAN system type based on vehicle equipment.

NOTE:

- This chart is used if CONSULT-III does not automatically recognize CAN system type.
- There are two styles for CAN system type specification charts. Depending on the number of available system types, either style A or style B may be used.

CAN System Type Specification Chart (Style A) **NOTE:**

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< BASIC INSPECTION >

CAN system type is easily checked with the vehicle equipment identification information shown in the chart.

Example:

Vehicle is equipped as follows: Wagon, AWD, VQ35DE, CVT, VDC, and Intelligent Key system. (system type.)

CAN System Specification Chart

Determine CAN system type from the following specification chart.



CAN System Type Specification Chart (Style B) NOTE:

< BASIC INSPECTION >

[CAN FUNDAMENTAL]



CREATE INTERVIEW SHEET

Fill out the symptom described by the customer, vehicle condition, and CAN system type on the interview sheet.

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< BASIC INSPECTION >

[CAN FUNDAMENTAL]

Interview Sheet (Example)

CAN Communication Sys	tem Diagnosis Interview Sheet
	Date received: 3, Feb. 2006
Type: DBA-KG11	VIN No.: KG11-005040
Model: BDRARGZ397EDA-E-J	J
First registration: 10, Jan. 2001	Mileage: 62,140
CAN system type: Type 19	
Symptom (Results from interview with o	customer)
Headlamps suddenly turn ON while The engine does not restart after st switch OFF.	eriving the vehicle.
The cooling fan continues rotating v	while turning the ignition switch ON.
Condition at inspection	
Error Symptom: Present / Past	
The engine does not start. While turning the ignition switch ON, • The headlamps (Lo) turn ON, and t • The interior lamp does not turn ON	, the cooling fan continues rotating.
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DETECT THE ROOT CAUSE

CAN diagnosis function of CONSULT-III detects the root cause.

DESCRIPTION

< HOW TO USE THIS MANUAL > HOW TO USE THIS MANUAL DESCRIPTION

Description



This vehicle has two types of CAN communication systems; CAN and HEV SYSTEM CAN. For starting the trouble diagnosis, refer to the following list.

- NOTE:
- If the DTCs related to CAN and related to HEV SYSTEM CAN are displayed at the same time, diagnose CAN first.
- After the diagnosis of HEV SYSTEM CAN or CAN, erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.

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DESCRIPTION

< HOW TO USE THIS MANUAL >

Unit	DTC (INF code [*]) displayed on CONSULT-III	CAN communication system	Inspection
ECM	P0607, U1000, U1001	CAN	LAN-16. "Trouble Diagnosis Flow Chart"
	P0607, U0129, U0293, U1020, U1022	HEV SYSTEM CAN	
EPS control unit	C1608, U0129, U0293	HEV SYSTEM CAN	
Brake ECU	C1300, U0073, U0123, U0124, U0126, U0293	HEV SYSTEM CAN	LAN-53, "Trouble Diagnosis
Hybrid vehicle con- trol ECU	P0A1D (924), P0A1D (925), U0100, U0100 (211), U0100 (212), U0100 (530), U0129, U0129 (220), U0129 (222), U0129 (528), U0131, U0131 (433), U0131 (434)	HEV SYSTEM CAN	Flow Chart"
	U1001, U1001 (146), U1001 (435), U1001 (594), U1001 (827), U1001 (919), U1001 (920)	CAN	
AV control unit			*
BCM			LAN-16. "Trouble Diagnosis
Controller (auto amp.)	P0607, U1000, U1010	CAN	Flow Chart"
Combination meter			
IPDM E/R			

*: For the details, refer to <u>HBC-73, "Diagnosis Description"</u>.

HOW TO USE THIS SECTION

< HOW TO USE THIS MANUAL >

HOW TO USE THIS SECTION

Caution

• This section describes information peculiar to a vehicle and inspection procedures.

• For trouble diagnosis procedure, refer to LAN-16. "Trouble Diagnosis Procedure".

Abbreviation List

Unit name abbreviations in CONSULT-III CAN diagnosis and in the description of CAN diagnosis in this section are as per the following list.

Unit name	Abbreviation
Air bag diagnosis sensor unit	A-BAG
AV control unit	AV
BCM	BCM
Data link connector	DLC
ECM	ECM
Controller (auto amp.)	HVAC
Hybrid vehicle control ECU	HV ECU
IPDM E/R	IPDM-E
Combination meter	M&A
	Unit name Air bag diagnosis sensor unit AV control unit BCM Data link connector ECM Controller (auto amp.) Hybrid vehicle control ECU IPDM E/R Combination meter

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< PRECAUTION > PRECAUTION

PRECAUTIONS

Precautions For High-Voltage System

Refer to GI-24, "Precautions For High-Voltage System".

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIRBAG" and "SEAT BELT" 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/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIRBAG".
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

Precautions for Trouble Diagnosis

CAUTION:

- Never apply 7.0 V or more to the measurement terminal.
- Use a tester with open terminal voltage of 7.0 V or less.
- Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness.

Precautions for Harness Repair

• Solder the repaired area and wrap tape around the soldered area. **NOTE:**

A fray of twisted lines must be within 110 mm (4.33 in).



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PRECAUTIONS

< PRECAUTION >

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Bypass connection is never allowed at the repaired area.
 NOTE:
 Bypass connection may cause CAN communication or

Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



• Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

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< BASIC INSPECTION >

[CAN]

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Interview Sheet

	INF0/D:00000000
CAN Communication System [Diagnosis Interview Sheet
	Date received:
Туре:	VIN No.:
Model:	
First registration:	Mileage:
CAN system type:	
Symptom (Results from interview with custor	mer)
Condition at inspection	
Error symptom : Present / Past	
	SKIB8898E

FUNCTION DIAGNOSIS

< FUNCTION DIAGNOSIS >

CAN COMMUNICATION SYSTEM

CAN System Specification Chart

Determine CAN system type from the following specification chart.

NOTE: Refer to LAN-16, "Trouble Diagnosis Procedure" for how to use CAN system specification chart.

Body type	Se	edan				
Axle	2WD					
Engine	QR:	25DE	<u> </u>			
Transmission	e-(CVT	F			
Brake control	VDC					
Navigation system		×				
CAN system type	13	14	F			
Start CAN Diagnosis (CONSULT-III)	13	14				
			(-			

Display

X: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

Check CAN system type from the vehicle shape and equipment.

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CAN Communication Signal Chart

With navigation system

Refer to LAN-15, "How to Use CAN Communication Signal Chart" for how to use CAN communication signal chart. NOTE:

Refer to LAN-23. "Abbreviation List" for the abbreviations of the connecting units.

					-	T: Transmit	R: Receive
Signal name/Connecting unit	ECM	AV	BCM	HVAC	M&A	HV ECU	IPDM-E
A/C cut request signal	Т			R	R		
Cooling fan speed request signal	Т						R
Engine coolant temperature signal	Т			R	R		

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CAN COMMUNICATION SYSTEM

< FUNCTION DIAGNOSIS >

[CAN]

Signal name/Connecting unit	ECM	AV	BCM	HVAC	M&A	HV ECU	IPDM-E
Engine speed signal	Т			R	R		
Engine status signal	Т	R	R		R		
Fuel consumption monitor signal	Т	R			R		
Malfunctioning indicator lamp signal	Т				R		
Buzzer output signal			Т		R		
Day time running light request signal			Т				R
Door switch signal		R	Т		R	R	R
Front fog light request signal			Т		R		R
Front wiper request signal			Т				R
High beam request signal			Т		R		R
Horn reminder signal			Т				R
Ignition switch ON signal			Т				R
Ignition switch ON signal			R				Т
Interlock/PNP switch signal			Т				R
interiouverive switch signal			R				Т
Key warning signal			Т		R		
Low beam request signal			Т				R
Meter display signal			Т		R		
	R		R		R	R	Т
Oil pressure switch signal					R	Т	
			Т		R		
Position light request signal			Т		R		R
Rear window defogger switch signal			Т				R
Sleep wake up signal			Т		R		R
Steering lock relay signal			R				Т
			Т				R
Steering lock unit status signal			R				Т
Theft warning horn request signal			Т				R
Tire pressure data signal			Т		R		
Trunk switch signal		R	Т		R		
Turn indicator signal			Т		R		
A/C evaporator temperature signal	R			Т			
A/C switch signal	R			Т			
Blower fan motor switch signal	R			Т			
Target A/C evaporator temperature signal	R			Т			
Distance to empty signal		R			Т		
Fuel level low warning signal		R			Т		
Fuel level sensor signal	R				Т		
Market information signal		R			Т		
Parking brake switch signal			R		Т		
Seat belt buckle switch signal			R		Т		
Vehicle speed signal	R	R	R		Т		R
venior speed signal	R		R		R	Т	



CAN COMMUNICATION SYSTEM

< FUNCTION DIAGNOSIS >

[CAN]

Signal name/Connecting unit		AV	BCM	HVAC	M&A	HV ECU	IPDM-E	А
ABS warning lamp signal					R	Т		D
ASCD status signal					R	Т		D
Brake warning lamp signal					R	Т		
CHARGE lamp signal					R	Т		С
Energy flow status signal		R				Т		
Engine off indicator signal					R	Т		
EPS warning lamp signal					R	Т		D
HV battery warning lamp signal					R	Т		
HV system warning lamp signal					R	Т		E
Master warning lamp signal					R	Т		
NDB warning lamp signal					R	Т		•
P range signal	R		R		R	Т		F
READY lamp signal					R	Т		
Regenerated power signal		R				Т		G
Shift position signal			R			Т		
SLIP indicator lamp signal					R	Т		
SOC signal		R			R	Т		Н
Tire rotating direction signal		R				Т		
Total power signal					R	Т		
VDC warning indicator lamp signal					R	Т		
AT device (detent switch) signal			R				Т	
Front wiper stop position signal			R				Т	J
Hood switch signal			R				Т	
Push-button ignition switch status signal			R				Т	17
Rear window defogger control signal	R						Т	K

NOTE:

CAN data of the air bag diagnosis sensor unit is not used by usual service work, thus it is omitted.

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COMPONENT DIAGNOSIS CAN COMMUNICATION SYSTEM

Component Parts Location

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- 1. Hybrid vehicle control ECU E66
- 4. BCM M19
- 7. Data link connector M22
- 2. ECM E10
- 5. Combination meter M24
- 8. Controller (auto amp.) M37
- 3. IPDM E/R E17
- 6. Air bag diagnosis sensor unit M35
- 9. AV control unit M46

CAN COMMUNICATION SYSTEM

< COMPONENT DIAGNOSIS >

Wiring Diagram - CAN SYSTEM -

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Signal Name	CAN-H	CAN-L	
Color of Wire	Γ	Р	
Terminal No.	15	35	





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< COMPONENT DIAGNOSIS >

Connector No.

H.S.

E

Terminal No. 51G 52G Connector Color

H.S.

E

Connector No.

				А
				В
2010 1011	Signal Name CAN-L CAN-H		Signal Name	С
E 10 E C M BLACK 88 99 39 71 71 91 95 99 11 71 91 95 99 11 71 91 95 99 11		E48 JUNCTION WHITE		D
ector No. ector Name estar Color Bal 6 82 16 84 16	al No. Colo 97 F 38 I	ector No. ector Color	20 Colo	Е
Conne Conne H.S.		Conne Conne H.S.		F
	0 E		e l	G
10 WIRE	Signal Nar	FION BLOCK	Signal Nar CAN-H CAN-L	Н
or WHTE	Color of Wire P	or WHITE	Color of Mire	I
Connector No. Connector Col H.S.	Terminal No. 7 8	Connector No. Connector Nat Connector Col	Terminal No. 43 44	J
8 8 33 59 60				K
UNIT 134 33 37 3 134 55 55 57 5	al Name <u>IN H</u> AN L	ELLIGENT RIBUTION LINE ROOM)	ial Name ZAN-L ZAN-H	L
6 CONTROL HITE	Sign CO CO	7 DM E/R (IN1 0WER DIST 0DULE ENG 111E		LAN
No. M4 Name AV Color WH 45 46 47 48	Do Color o Wire P	No. E1 Name IPT PC Color WH	L Color o Vire L P	Ν
Connector Connector H.S.	Terminal N 24 44	Connector Connector Connector	Terminal A 39 40	0
			ALMIA0069GB	

CAN COMMUNICATION SYSTEM

< COMPONENT DIAGNOSIS >

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[CAN]

Connector No	. E64	
Connector Na	me WIRI	e to wire
Connector Co	lor WHI	TE
同时 H.S.	1 2 3 6 7 8	9 10 11 12
Terminal No.	Color of Wire	Signal Name

	T CONNECTOR-E07			7 6 5 4 3 2 1	Signal Name		I	I	1	I	
E59		or BLUE		1 10 9 8	Color of Wire	_	-	_	Ч	Ч	
Connector No.	Connector Nam	Connector Cold	Ē	H.S.	Terminal No.	-	2	e	2	8	

_		_	
	4 3 2 1		
$ \Pi$	ŝ		i
$ \rangle\rangle$	9		
IN /	~		
ILV	~		f
	0		Dr.
	읙		0
	Ξ		
	12		
	U	5	
E			
I WIL			

Signal Name	I	Ι	I	I	I	ļ
Color of Wire	L	L	L	Ь	Ь	٩.
erminal No.	-	N	ო	7	8	6

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Connector No.	E66
Connector Name	HYBRID VEHICLE CONTROL ECU
Connector Color	BLACK



[5	1		 _				_
	Ř	95	112	000	D J	146	
62	79	96	113	001	20	147	
8	80	97	114	101	2	148	l
64	81	98	115	1 2 2	30	149	l
65	82	66	116	100	2	150	l
66	83	100	117	124	5	151	l
67	84	101	118	105	3	152	
68	85	102	119	100	200	153	l
69	86	103	120	1 0 7	ò	154	
70	87	104	121	100	8	155	l
71	88	105	122	001	200	156	
72	89	106	123	1 40	2 2	157	
73	96	107	124	1 4 4	ŧ	158	
74	91	108	125	071	44	159	l
75	92	109	126	07 1	2	160	
76	93	110	127	4 4 4	ŧ	161	
17	94	111	128	145	10	162	l
163		169	175			181	
164		170	176			182	
165		171	177			183	
166		172	178			184	
167		173	179		185		
68		174	180			186	

Signal Name	CAN-L	CAN-H	
Color of Wire	Ч	L	
Terminal No.	172	173	

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MALFUNCTION AREA CHART

< COMPONENT DIAGNOSIS >

MALFUNCTION AREA CHART

Main Line

Malfunction Area	Reference
Main line between data link connector and hybrid vehicle control ECU	LAN-36, "Diagnosis Procedure"

Branch Line

D Malfunction Area Reference ECM branch line circuit LAN-37, "Diagnosis Procedure" Air bag diagnosis sensor unit branch line circuit LAN-38, "Diagnosis Procedure" Е AV control unit branch line circuit LAN-39, "Diagnosis Procedure" BCM branch line circuit LAN-40, "Diagnosis Procedure" Data link connector branch line circuit LAN-41, "Diagnosis Procedure" F Controller (auto amp.) branch line circuit LAN-42, "Diagnosis Procedure" Combination meter branch line circuit LAN-43, "Diagnosis Procedure" Hybrid vehicle control ECU branch line circuit LAN-44, "Diagnosis Procedure" IPDM E/R branch line circuit LAN-45, "Diagnosis Procedure" Н

Short Circuit

Malfunction Area	Reference		
CAN communication circuit	LAN-46, "Diagnosis Procedure"		

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MAIN LINE BETWEEN DLC AND HV ECU CIRCUIT

< COMPONENT DIAGNOSIS >

MAIN LINE BETWEEN DLC AND HV ECU CIRCUIT

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).
- Harness connector M89
- Harness connector E64

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M89 and E64.

2. Check the continuity between the data link connector and the harness connector.

Data link connector		Harness	Continuity	
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
M22	6	M80	7	Existed
	14	10189	8	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the main line between the data link connector and the harness connector M89.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of hybrid vehicle control ECU.

Check the continuity between the harness connector and the hybrid vehicle control ECU harness connector.

Harness connector		Hybrid vehicle control I	Continuity	
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
E64	7	E66	173	Existed
	8		172	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.

YES (Past error)>>Error was detected in the main line between the data link connector and the hybrid vehicle control ECU.

NO >> Repair the main line between the harness connector E64 and the hybrid vehicle control ECU.

INFOID:000000003071885
ECM BRANCH LINE CIRCUIT

< COMPONENT DIAGNO	SIS >		[CAN]
ECM BRANCH LIN	E CIRCUIT		0
Diagnosis Procedure			A
1.CHECK CONNECTOR			В
 Turn the ignition switch Disconnect the battery of Check the following terr nector side). ECM Harpess connector E47 	OFF. cable from the negative terr ninals and connectors for d	ninal. amage, bend and loose col	nnection (unit side and con- C
 Harness connector E47 Harness connector E48 Junction block 			D
 Harness connector E30 Harness connector M1 Is the inspection result permission 	2012		E
$\begin{array}{rll} \hline result in the solution result from \\ \end{tabular} YES >> GO TO 2. \\ \end{tabular} NO >> Repair the term \\ \hline \textbf{2.CHECK HARNESS FOR} \end{array}$	inal and connector. OPEN CIRCUIT		F
 Disconnect the connect Check the resistance be 	or of ECM. etween the ECM harness c	onnector terminals.	G
	ECM harness connector		Desistance (0)
Connector No.	Termir	nal No.	
E10	98	97	Approx. 108 – 132
Is the measurement value wYES>> GO TO 3.NO>> Repair the ECM 3. CHECK POWER SUPPL	<u>ithin the specification?</u> I branch line. Y AND GROUND CIRCUI?	T	l J
Check the power supply and	the ground circuit of the E	CM. Refer to EC-118, "Diag	nosis Procedure".
Is the inspection result norm	al?		K
YES (Present error)>>Rep <u>CONTROL UNI</u> YES (Past error)>>Error w NO >> Repair the powe	lace the ECM. Refer to \underline{F} <u>T : Special Repair Requirer</u> as detected in the ECM bra er supply and the ground ci	<u>C-14, "ADDITIONAL SER</u> <u>nent"</u> . Inch line. rcuit.	VICE WHEN REPLACING
			LA

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< COMPONENT DIAGNOSIS >

A-BAG BRANCH LINE CIRCUIT

Diagnosis Procedure

1. CHECK AIR BAG DIAGNOSIS SENSOR UNIT

Check the air bag diagnosis sensor unit. Refer to SRC-3, "Work Flow".

Is the inspection result normal?

YES >> Replace the main harness.

NO >> Replace parts whose air bag system has a malfunction.

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AV BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >			[CAN]
AV BRANCH LINE CIRCU	ЛТ		٨
Diagnosis Procedure			INFOID:000000003071888
1. CHECK CONNECTOR			В
 Turn the ignition switch OFF. Disconnect the battery cable from Check the terminals and connect side and connector side). 	n the negative termin tors of the AV contro	al. I unit for damage, bend	and loose connection (unit
Is the inspection result normal?YES>> GO TO 2.NO>> Repair the terminal and comparison of terminal and comparison	connector.		D
Disconnect the connector of AV of 2. Check the resistance between the AV exterior of AV of the control of	control unit. e AV control unit har	ness connector terminals	S.
Connector No.	Terminal	No.	Resistance (Ω)
M46	24	44	Approx. 54 – 66
Is the measurement value within the YES >> GO TO 3. NO >> Repair the AV control unit 3. CHECK POWER SUPPLY AND G	specification? it branch line. ROUND CIRCUIT		H
Check the power supply and the group Diagnosis Procedure".	und circuit of the AV	control unit. Refer to <u>AV-</u>	201, "AV CONTROL UNIT :
Is the inspection result normal? YES (Present error)>>Replace the A YES (Past error)>>Error was detect	AV control unit. Refered in the AV control of th	to <u>AV-272, "Removal ar</u> unit branch line.	u <mark>d Installation"</mark> . J

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>> Repair the power supply and the ground circuit. NO

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the BCM for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of BCM.

2. Check the resistance between the BCM harness connector terminals.

BCM harness connector			Posistanco (O)
Connector No.	Terminal No.		
M19	79	78	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the BCM branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the BCM. Refer to <u>BCS-41, "Diagnosis Procedure"</u>. Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to <u>BCS-85. "Removal and Installation"</u>.

YES (Past error)>>Error was detected in the BCM branch line.

NO >> Repair the power supply and the ground circuit.

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DLC BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >	[CAN]	
DLC BRANCH LINE CIRCUIT		Δ
Diagnosis Procedure	NFOID:000000003071890	A
1.CHECK CONNECTOR		В
 Turn the ignition switch OFF. Disconnect the battery cable from the negative terminal. Check the terminals and connectors of the data link connector for damage, bend and loos (connector side and harness side). 	e connection	С
Is the inspection result normal? YES >> GO TO 2. NO >> Repair the terminal and connector.		D
2.CHECK HARNESS FOR OPEN CIRCUIT		E
Check the resistance between the data link connector terminals.		_

	Data link connector			-
Connector No.	Terminal No.		Resistance (22)	F
M22	6	14	Approx. 54 – 66	_

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.

YES (Past error)>>Error was detected in the data link connector branch line circuit.

NO >> Repair the data link connector branch line.

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HVAC BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

HVAC BRANCH LINE CIRCUIT

Diagnosis Procedure

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the controller (auto amp.) for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

- 1. Disconnect the connector of controller (auto amp.).
- 2. Check the resistance between the controller (auto amp.) harness connector terminals.

Controller (auto amp.) harness connector			Posistanco (O)
Connector No.	Terminal No.		
M37	15	35	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the controller (auto amp.) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the controller (auto amp.). Refer to <u>HAC-86, "Diagnosis Pro-</u> cedure".

Is the inspection result normal?

YES (Present error)>>Replace the controller (auto amp.). Refer to HAC-14, "Component Part Location".

YES (Past error)>>Error was detected in the controller (auto amp.) branch line.

NO >> Repair the power supply and the ground circuit.

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M&A BRANCH LINE CIRCUIT

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M&A BRANCH LINE	E CIRCUIT		
Diagnosis Procedure			INFOID:000000003071892
1.CHECK CONNECTOR			
 Turn the ignition switch Disconnect the battery of Check the terminals an (unit side and connector) 	OFF. able from the negative termi d connectors of the combina side).	nal. ation meter for damage,	bend and loose connection
s the inspection result norm YES >> GO TO 2. NO >> Repair the term CHECK HARNESS FOR	al? nal and connector.		
 Disconnect the connect Check the resistance be 	or of combination meter.	r harness connector term	ninals.
Сс	mbination meter harness connecto	r	Basistanas (O)
Connector No.	Terminal	l No.	Resistance (12)
M24	21	22	Approx. 54 – 66
YES >> GO TO 3. NO >> Repair the comb CHECK POWER SUPPL	bination meter branch line. Y AND GROUND CIRCUIT	ombination meter. Refer t	o <u>MWI-40, "COMBINATION</u>
METER : Diagnosis Procedu	<u>ıre"</u> .		
s the inspection result norm YES (Present error)>>Rep YES (Past error)>>Error way NO >> Repair the powe	<u>al?</u> ace the combination meter. I as detected in the combinatic er supply and the ground circ	Refer to <u>MWI-135, "Remo</u> on meter branch line. uit.	oval and Installation".

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HV ECU BRANCH LINE CIRCUIT

Diagnosis Procedure

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[CAN]

1. СНЕСК DTC

Check whether or not the DTC related to HEV SYSTEM CAN indicated on All DTC Reading by CONSULT-III. **NOTE:**

For DTCs related to HEV SYSTEM CAN, refer to <u>LAN-59, "DTC Related to HEV SYSTEM CAN List"</u>. <u>Is the DTC related to HEV SYSTEM CAN displayed?</u>

YES >> Inspect HEV SYSTEM CAN. Refer to LAN-53, "Trouble Diagnosis Flow Chart".

NO >> GO TO 2.

2.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the hybrid vehicle control ECU for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the terminal and connector.

3.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of hybrid vehicle control ECU.

2. Check the resistance between the hybrid vehicle control ECU harness connector terminals.

Hybrid vehicle control ECU harness connector			Posistanco (O)
Connector No.	Terminal No.		
E66	173	172	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 4.

NO >> Repair the hybrid vehicle control ECU branch line.

4.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the hybrid vehicle control ECU. <u>HBC-592</u>, "Wiring Diagram". Is the inspection result normal?

YES (Present error)>>Replace the hybrid vehicle control ECU. Refer to <u>HBC-636</u>, "Exploded View".

YES (Past error)>>Error was detected in the hybrid vehicle control ECU branch line.

NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

< COMPONENT DIAGNOS	S >		[CAN]
IPDM-E BRANCH LI	NE CIRCUIT		
Diagnosis Procedure			INFOID:000000003071894
1.CHECK CONNECTOR			
 Turn the ignition switch C Disconnect the battery ca Check the terminals and and connector side). 	FF. able from the negative tern connectors of the IPDM E	ninal. E/R for damage, bend and	loose connection (unit side
Is the inspection result normal YES >> GO TO 2. NO >> Repair the termin 2.CHECK HARNESS FOR (<u>.l?</u> al and connector. DPEN CIRCUIT		
 Disconnect the connecto Check the resistance bet 	r of IPDM E/R. ween the IPDM E/R harne	ess connector terminals.	
	IPDM E/R harness connector		Resistance (Ω)
Connector No.	Termin	al No.	
E17	40	39	Approx. 108 – 132
Is the measurement value withYES>> GO TO 3.NO>> Repair the IPDMCHECK POWER SUPPLY	hin the specification? E/R branch line.		
O.CHECK POWER SUPPLY			
Check the power supply and	the ground circuit of the IP	DM E/R. Refer to PCS-18.	<u>, "Diagnosis Procedure"</u> .
YES (Present error)>>Repla YES (Past error)>>Error wa NO >> Repair the power	IP ice the IPDM E/R. Refer to s detected in the IPDM E/ supply and the ground cir	o <u>PCS-34. "Removal and Ir</u> R branch line. [.] cuit.	<u>stallation"</u> .

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CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

1.CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Disconnect all the unit connectors on CAN communication system.
- 4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

	Data link connector		
Connector No.	Terminal No.		Continuity
M22	6	14	Not existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector			Continuity
Connector No.	Terminal No.	Ground Not exist	Continuity
Moo	6		Not existed
17122	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Check the harness and repair the root cause.

CHECK ECM AND IPDM E/R TERMINATION CIRCUIT

1. Remove the ECM and the IPDM E/R.

2. Check the resistance between the ECM terminals.

ECM		Resistance (O)	
Terminal No.			
98	97	Approx. 108 – 132	

3. Check the resistance between the IPDM E/R terminals.

IPDN	Posistanco (O)	
Termi		
40	39	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.

NO >> Replace the ECM and/or the IPDM E/R.

5.CHECK SYMPTOM

Connect all the connectors. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced.



LAN-46

INFOID:000000003071895

CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

Inspection result					
Reproduced>>GO TO 6. Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected					
6. CHECK UNIT REPRODUCTION	В				
Perform the reproduction test as per the following procedure for each unit.					
 Turn the ignition switch OFF. Disconnect the battery cable from the negative terminal. 	С				
 Disconnect one of the unit connectors of CAN communication system. 					
 NOTE: ECM and IPDM E/R have a termination circuit. Check other units first. 4. Connect the battery cable to the negative terminal. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced. 	D				
NOTE: Although unit-related error symptoms occur, do not confuse them with other symptoms.	Е				
Inspection result					
Reproduced>>Connect the connector. Check other units as per the above procedure. Non-reproduced>>Replace the unit whose connector was disconnected.	F				
	G				

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Description



This vehicle has two types of CAN communication systems; CAN and HEV SYSTEM CAN. For starting the trouble diagnosis, refer to the following list.

NOTE:

- If the DTCs related to CAN and related to HEV SYSTEM CAN are displayed at the same time, diagnose CAN first.
- After the diagnosis of HEV SYSTEM CAN or CAN, erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.

DESCRIPTION

< HOW TO USE THIS MANUAL >

[HEV SYSTEM CAN]

Unit	DTC (INF code [*]) displayed on CONSULT-III	CAN communication system	Inspection	А
ECM	P0607, U1000, U1001	CAN	LAN-16. "Trouble Diagnosis Flow Chart"	
	P0607, U0129, U0293, U1020, U1022	HEV SYSTEM CAN		В
EPS control unit	C1608, U0129, U0293	HEV SYSTEM CAN		
Brake ECU	C1300, U0073, U0123, U0124, U0126, U0293	HEV SYSTEM CAN	LAN-53, "Trouble Diagnosis	C
Hybrid vehicle con- trol ECU	P0A1D (924), P0A1D (925), U0100, U0100 (211), U0100 (212), U0100 (530), U0129, U0129 (220), U0129 (222), U0129 (528), U0131, U0131 (433), U0131 (434)	HEV SYSTEM CAN	Flow Chart"	D
	U1001, U1001 (146), U1001 (435), U1001 (594), U1001 (827), U1001 (919), U1001 (920)	CAN		
AV control unit				E
BCM			LAN-16, "Trouble Diagnosis	
Controller (auto amp.)	P0607, U1000, U1010	CAN	Flow Chart"	
Combination meter				
IPDM E/R				G

*: For the details, refer to HBC-73, "Diagnosis Description".

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HOW TO USE THIS SECTION

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HOW TO USE THIS SECTION

Caution

For trouble diagnosis procedure, refer to LAN-53. "Trouble Diagnosis Procedure".

Abbreviation List

Unit name abbreviations in HEV SYSTEM CAN diagnosis are as per the following list.

Abbreviation	Unit name	All DTC Reading (CONSULT-III)
ABS	Brake ECU	ABS
DLC	Data link connector	
ECM	ECM	ENGINE
EPS	EPS control unit	EPS
HV ECU	Hybrid vehicle control ECU	HYBRID SYSTEM
STRG	Steering angle sensor	_
YAW	Yaw rate/side/decel G sensor	_

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PRECAUTIONS	
Precautions For High-Voltage System	В
Refer to GI-24, "Precautions For High-Voltage System".	
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"	С
The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain	D
system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIRBAG" and "SEAT BELT" of this Service Manual.	E
WARNING: • To avoid rendering the SPS inoperative, which could increase the risk of personal injury or death in	F
 It avoid rendening the SRS inoperative, which could increase the risk of personal injury of death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer. Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the "SRS AIRBAG". 	G
• Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.	Η
Precautions for Trouble Diagnosis	
 CAUTION: Never apply 7.0 V or more to the measurement terminal. Use a tester with open terminal voltage of 7.0 V or less. Turn the ignition switch OFF and disconnect the battery cable from the negative terminal when checking the harness. 	J
Precautions for Harness Repair	
Solder the repaired area and wrap tape around the soldered area.	I.

ıμ ٦ŀ NOTE:

A fray of twisted lines must be within 110 mm (4.33 in).

< PRECAUTION >

PRECAUTION



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PRECAUTIONS

< PRECAUTION >

Bypass connection is never allowed at the repaired area.
 NOTE:
 Bypass connection may cause CAN communication or

Bypass connection may cause CAN communication error. The spliced wire becomes separated and the characteristics of twisted line are lost.



• Replace the applicable harness as an assembly if error is detected on the shield lines of HEV SYSTEMCAN communication line.

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Information Needed for Trouble Diagnosis

HEV SYSTEM CAN performs trouble diagnosis with the following tools.

Tool	Usage
Diagnosis sheet	For detecting the root cause.
All DTC Reading (CONSULT-III)	For checking the condition of control units and the status of HEV SYSTEM CAN communication.
Abbreviation list	For checking abbreviations in diagnosis sheet.

Trouble Diagnosis Flow Chart



Trouble Diagnosis Procedure

INFOID:000000003071905

CHECK VEHICLE CONDITION

Check whether or not the DTC related to HEV SYSTEM CAN indicated on "All DTC Reading" by CONSULT-III. NOTE:

Root cause cannot be detected using the procedure in this section if the DTC related to HEV SYSTEM CAN is not indicated. Refer to LAN-59, "DTC Related to HEV SYSTEM CAN List".

OUTPUT OF DATA Print out or save "All DTC Reading".

CREATE DIAGNOSIS SHEET Print out diagnosis sheet. Refer to <u>LAN-59</u>, "Diagnosis Sheet". **NOTE:**

LAN-53

INFOID:000000003071903

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< BASIC INSPECTION >

[HEV SYSTEM CAN]

For abbreviations, refer to LAN-50, "Abbreviation List".



DETECT THE ROOT CAUSE

Description

To detect the root cause of HEV SYSTEM CAN, check for short circuit first. When there is no short circuit, check for open circuit.

Short Circuit

Check for short circuit, and DLC branch line open circuit.

When the symptoms listed below exist, a short circuit of the HEV SYSTEM CAN communication line or control unit is a possible cause.

Received data

Item (CONSULT-III)	Indication
The printed or saved All DTC Reading	 The items of EPS and ABS are not displayed. U0129, U0293, U1020 and U1022 are displayed as the ENGINE items. U0100^{*1}, U0129^{*2} and U0131^{*3} are displayed as the HYBRID SYSTEM items.

• *1: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0100 (211), U0100 (212), U0100 (530).

• *2: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0129 (220), U0129 (222), U0129 (528).

• *3: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0131 (433), U0131 (434).

Error symptom

• Most the units connected to the HEV SYSTEM CAN go into fail-safe mode or are deactivated.

Inspection procedure

LAN-54

< BASIC INSPECTION >

[HEV SYSTEM CAN]

• Refer to LAN-68, "Short Circuit".

DTC RESULTS	ТІМЕ	DTC RESULTS	TIME	DTC RESULTS	TIME	DTC RESULTS	TIME
IPDM E/R		,,		REARVIEW CAME	RA	,,	
lo DTC is detected. Futher testing may be		[EPS]		U1([HV]		IU1020: LOST COMM [HV ECU]	1t
required.		MULTI AV					
HYBRID SYSTEM				AIR BAG		[BRAKE]	1t
U0100: LOST COMM		No Support		No DTC is detected. Futher testing may be			
		BCM		required.			
UN120-LOST COMM		No DTC is detected.		METER/M&A			
[BRAKE]		Futher testing may be required.		B2205:SPEED METER	CRNT		
				ENGINE		-	
				U0293: LOST COMM [HV ECU]	о		
				U0129:LOST COMM [BRAKE]	о		
					!		

NOTE:

DLC branch line circuit can be open when the following conditions are satisfied as All DTC Reading result;

- The DTCs related to HEV SYSTEM CAN are not displayed as ENGINE or HYBRID SYSTEM item.
- The items of EPS and ABS are not displayed.

For the DLC branch line circuit inspection procedure, refer to LAN-68, "Branch Line".

Open Circuit

Draw a line on the diagnosis sheet to indicate the possible cause. Narrow the search. NOTE:

- Color-code when drawing lines.
- Do not draw a line onto a existing line.
- When the root cause appears to be a branch line, be sure to check the control unit as well as the communication line.
- 1. Check each item on the printed or saved All DTC Reading. Draw a line on the diagnosis sheet to indicate the error circuit. Refer to LAN-59, "DTC Related to HEV SYSTEM CAN List".
- a. Reception item of "HYBRID SYSTEM":
- LAN "U0100:LOST COMM [ECM]:211", "U0100:LOST COMM [ECM]:212" and "U0100:LOST COMM i. [ECM]:530" are indicated. This means HV ECU cannot receive the signal from ECM. Draw a line to indicate an error between HV ECU and ECM (line 1-a-i in the figure below).

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< BASIC INSPECTION >

[HEV SYSTEM CAN]

ii. "U0131:LOST COMM [EPS]:433" and "U0131:LOST COMM [EPS]:434" are indicated. This means HV ECU cannot receive the signal from EPS. Draw a line to indicate an error between HV ECU and EPS (line 1-a-ii in the figure below).



- b. Reception item of "ENGINE":
- i. "U0293" and "U1020" are indicated. This means ECM cannot receive the signal from HV ECU. Draw a line to indicate an error between ECM and HV ECU (line 1-b-i in the figure below).

< BASIC INSPECTION >

[HEV SYSTEM CAN]

ii. "U0129" and "U1022" are indicated. This means ECM cannot receive the signal from ABS. Draw a line to indicate an error between ECM and ABS (line 1-b-ii in the figure below).



- 2. Based on information received from the printed or saved All DTC Reading, place a check mark on the known good HEV SYSTEM CAN communication line between ECM and HV ECU.
- a. Through the previous procedure, the circuit between EPS splice and ABS splice has the most amount of lines (shade 2-a in the figure below).
- b. Place a check mark on the known good lines to establish the error circuit.

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[HEV SYSTEM CAN]

Reception item of "ABS": "U0073", "U0123" and "U0124" are not indicated. ABS communicates normally with YAW. Put a check mark on the normal circuit between ABS and YAW (check mark 2-b in the figure below).



3. Through the above procedure, the error is detected in between EPS and DLC main line (shaded in the figure below).

NOTE:

For abbreviations, refer to LAN-50, "Abbreviation List".

4. Perform the inspection for the detected error circuit. For the inspection procedure, refer to <u>LAN-68</u>, "Main <u>Line"</u>. (When the error is detected on branch line, refer to <u>LAN-68</u>, "Branch Line".)



< BASIC INSPECTION >

[HEV SYSTEM CAN]



DTC Related to HEV SYSTEM CAN List

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< BASIC INSPECTION >

Unit	DTC (INF code)	Diagnos- tic unit	Self-diagno- sis item (CONSULT-III indication)	DTC detection logic	Possible cause
Hybrid vehicle control ECU	P0A1D (924)P0A1D (925)	_	HV ECU	Hybrid vehicle control ECU malfunc- tions.	Hybrid vehicle control ECU
	• U0100 (211) • U0100 (530)	ECM	LOST COMM [ECM]	CAN communication signal is not transmitted or received between ECM and hybrid vehicle control ECU for 1 second or more.	 HEV SYSTEM CAN communication line between ECM and hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	U0100 (212)	ECM	LOST COMM [ECM]	Malfunction signal of CAN communi- cation line between ECM and hybrid vehicle control ECU is received.	 HEV SYSTEM CAN communication line between ECM and hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	 U0129 (220) U0129 (528) 	ABS	LOST COMM [BRAKE]	CAN communication signal is not transmitted or received between brake ECU and hybrid vehicle control ECU for 2 seconds or more.	 HEV SYSTEM CAN communication line between brake ECU and hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	U0129 (222)	ABS	LOST COMM [BRAKE]	Malfunction signal of CAN communi- cation line between brake ECU and hybrid vehicle control ECU is re- ceived.	 HEV SYSTEM CAN communication line between brake ECU and hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	• U0131 (433) • U0131 (434)	EPS	LOST COMM [EPS]	CAN communication signal is not re- ceived between EPS control unit and hybrid vehicle control ECU for 1 sec- ond or more.	 HEV SYSTEM CAN communication line between EPS control unit and hybrid vehicle control ECU HEV SYSTEM CAN communication line short

< BASIC INSPECTION >

Unit	DTC (INF code)	Diagnos- tic unit	Self-diagno- sis item (CONSULT-III indication)	DTC detection logic Possible cause	
	C1300	—	ECU	Brake ECU malfunctions.	Brake ECU
	U0073	• YAW • STRG	LOST COMM YAW/STRG	 CAN communication is stopped for more than 1 second. The following phenomenon occur more than 10 times in 60 seconds. CAN communication with yaw rate/ side/decel G sensor or steering an- gle sensor is suspended more than 1 time per 5 seconds. 	 HEV SYSTEM CAN communication line between brake ECU and yaw rate/ side/decel G sensor, steering angle sensor HEV SYSTEM CAN communication line short
	U0123	YAWHV ECU	LOST COMM [YAW]	CAN communication signal is not received between yaw rate/side/de-	HEV SYSTEM CAN com-
	U0124	• YAW • HV ECU	LOST COMM [DECEL]	 Cell G sensor and brake ECU for 1 second or more. The following phenomenon occur more than 10 times in 60 seconds. CAN communication with hybrid vehicle control ECU is suspended more than 1 time per 5 seconds. 	 munication line between brake ECU and yaw rate/ side/decel G sensor, hy- brid vehicle control ECU HEV SYSTEM CAN com- munication line short
Brake ECU	U0126	• STRG • HV ECU	LOST COMM [STRG]	 CAN communication signal is not received between steering angle sensor and brake ECU for 1 second or more. The following phenomenon occur more than 10 times in 60 seconds. CAN communication with hybrid ve- hicle control ECU is suspended more than 1 time per 5 seconds. 	 HEV SYSTEM CAN communication line between brake ECU and steering angle sensor, hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	U0293	HV ECU	LOST COMM [HV ECU]	 CAN communication signal is not received between hybrid vehicle control ECU and brake ECU for 2 seconds or more. CAN communication signal from hybrid vehicle control ECU has error. The following phenomenon occur more than 10 times in 60 seconds. CAN communication with hybrid vehicle control ECU is suspended more than 1 time per 5 seconds. 	 HEV SYSTEM CAN communication line between brake ECU and hybrid vehicle control ECU HEV SYSTEM CAN communication line short
	C1608	_	CONTROL UNIT	EPS control unit malfunctions.	EPS control unit CAUTION: Before replace EPS con- trol unit, inspect EPS con- trol unit. Refer to <u>BRC-5</u> , <u>"Work Flow"</u> .
EPS control unit	U0129	ABS	LOST COMM [BRAKE]	CAN communication signal is not re- ceived between brake ECU and EPS control unit for 2 seconds or more.	 HEV SYSTEM CAN communication line between brake ECU and EPS control unit HEV SYSTEM CAN communication line short
	U0293	HV ECU	LOST COMM [HV ECU]	CAN communication signal is not re- ceived between hybrid vehicle control ECU and EPS control unit for 2 sec- onds or more.	 HEV SYSTEM CAN com- munication line between hybrid vehicle control ECU and EPS control unit HEV SYSTEM CAN com- munication line short

< BASIC INSPECTION >

Unit	DTC (INF code)	Diagnos- tic unit	Self-diagno- sis item (CONSULT-III indication)	DTC detection logic	Possible cause
	P0607	—	ECM	ECM malfunctions.	ECM
ECM	• U0293 • U1020	HV ECU	LOST COMM [HV ECU]	CAN communication signal is not re- ceived between hybrid vehicle control ECU and ECM for 1 second or more.	 HEV SYSTEM CAN communication line between hybrid vehicle control ECU and ECM HEV SYSTEM CAN communication line short
	• U0129 • U1022	ABS	LOST COMM [BRAKE]	CAN communication signal is not re- ceived between brake ECU and ECM for 1 second or more.	 HEV SYSTEM CAN communication line between brake ECU and ECM HEV SYSTEM CAN communication line short

COMPONENT DIAGNOSIS CAN COMMUNICATION SYSTEM

Component Parts Location

[HEV SYSTEM CAN]

INFOID:000000003071908 В



- Brake ECU E61 1.
- 4. EPS control unit E302
- Data link connector M22 7.
- Hybrid vehicle control ECU E66 5. Steering angle sensor M53
- 3. ECM F13
- 6. Yaw rate/side/decel G sensor M55

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< COMPONENT DIAGNOSIS >

■ : DATA LINE

HEV SYSTEM CAN

Wiring Diagram - HEV SYSTEM CAN -

INFOID:000000003071909

[HEV SYSTEM CAN]



AWMWA0091G

CAN COMMUNICATION SYSTEM

< COMPONENT DIAGNOSIS >





CAN COMMUNICATION SYSTEM

< COMPONENT DIAGNOSIS >

[HEV SYSTEM CAN]

Signal Name

Color of

Wire

Ferminal No.

Signal Name

Color of

Terminal No.

Wire

ВВ

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[HEV SYSTEM CAN]



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MALFUNCTION AREA CHART

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MALFUNCTION AREA CHART

Main Line

INFOID:000000003071910

Malfunction Area	Reference
Main line between EPS control unit and data link connector	LAN-69, "Diagnosis Procedure"
Main line between data link connector and brake ECU	LAN-70, "Diagnosis Procedure"

Branch Line

INFOID:000000003071911

Malfunction Area	Reference	
ECM branch line circuit	LAN-71, "Diagnosis Procedure"	
EPS control unit branch line circuit	LAN-72, "Diagnosis Procedure"	
Data link connector branch line circuit	LAN-73, "Diagnosis Procedure"	
Steering angle sensor branch line circuit	LAN-74, "Diagnosis Procedure"	
Yaw rate/side/decel G sensor branch line circuit	LAN-75, "Diagnosis Procedure"	
Brake ECU branch line circuit	LAN-76, "Diagnosis Procedure"	
Hybrid vehicle control ECU branch line circuit	LAN-77, "Diagnosis Procedure"	

Short Circuit

INFOID:000000003071912

Malfunction Area	Reference	
CAN communication circuit	LAN-78. "Diagnosis Procedure"	

		WEEN EPS ANI		HEV SYSTEM CANI
MAIN LINE BET	WEEN EPS A	ND DLC CIRCU	JIT	
Diagnosis Proced	ure			INFOID:000000003071913
	OR			
1. Turn the ignition sy	witch OFF.			
 Disconnect the bat Check the followir and harness side). Harness connecto Harness connecto 	ttery cable from the ne ig terminals and conr r E30 r M1	egative terminal. nectors for damage, t	pend and loose conn	ection (connector side
Is the inspection result	normal?			
YES >> GO TO 2. NO >> Repair the	terminal and connect	or.		
Z.CHECK HARNESS	CONTINUITY (OPEN	I CIRCUIT)		
 Disconnect the foll Harness connecto Harness connecto Check the continuit 	owing harness conne rs E301 and E67 rs E30 and M1 ty between the harne	ctors. ss connectors.		
Harness	connector	Harness	connector	Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
E67	2	E30	15G 8G	Existed Existed
Is the inspection result	normal?			
YES >> GO TO 3. NO >> Repair the	main line between the	e harness connector l	E67 and E30.	
3.CHECK HARNESS	CONTINUITY (OPEN	I CIRCUIT)		
Check the continuity be	etween the harness co	onnector and the data	link connector.	
Harness	connector	Data link	connector	Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
M1	15G	M22	13	Existed
	8G		12	Existed
YES >> GO TO 4. NO >> Repair the 4. ERASE ALL DTC	main line between th	e harness connector l	M1 and the data link c	connector.
1. Connect all the con	nnectors.			
 Erase the DTCs of Turn the ignition sy Turn the ignition sy Perform All DTC R 	unit connected to HE witch OFF. witch ON. eading with CONSUL	EV SYSTEM CAN and	CAN.	
NOTE: For DTCs related to HI	EV SYSTEM CAN ref	fer to LAN-59 "DTC F	elated to HEV SVST	EM CAN List"
Is the DTC related to H	IEV SYSTEM CAN dis	splaved?		
YES >> Reconfirm NO >> Error was	the procedure for det detected in the main I	ecting root cause. ine between the EPS	control unit and the d	ata link connector.

LAN-69

< COMPONENT DIAGNOSIS >

MAIN LINE BETWEEN DLC AND ABS CIRCUIT

Diagnosis Procedure

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).
- Harness connector M89
- Harness connector E64

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M89 and E64.

2. Check the continuity between the data link connector and the harness connector.

Data link	connector	Harness connector		Continuity	
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity	
M22 13 12	M8Q	5	Existed		
	12	WI09	4	Existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the main line between the data link connector and the harness connector M89.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of brake ECU.

2. Check the continuity between the harness connector and the brake ECU harness connector.

Harness	connector	Brake ECU harness connector		Continuity	
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity	
E64 5 4	5	– E61	81	Existed	
	4		70	Existed	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the main line between the harness connector E64 and the brake ECU.

4.ERASE ALL DTC

- 1. Connect all the connectors.
- 2. Erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.
- 5. Perform All DTC Reading with CONSULT-III.

NOTE:

For DTCs related to HEV SYSTEM CAN, refer to <u>LAN-59</u>, "<u>DTC Related to HEV SYSTEM CAN List</u>". <u>Is the DTC related to HEV SYSTEM CAN displayed?</u>

YES >> Reconfirm the procedure for detecting root cause.

NO >> Error was detected in the main line between the data link connector and the brake ECU.

LAN-70

ECM BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

ECM BRANCH LINE	ECIRCUIT			Λ
Diagnosis Procedure			INFOID:00000003071915	A
1.CHECK CONNECTOR				В
 Turn the ignition switch (2) Disconnect the battery of 3. Check the following term nector side). ECM Harness connector F80 Harness connector F68 	OFF. able from the negative ter ninals and connectors for c	minal. Jamage, bend and loose co	nnection (unit side and con-	C
Is the inspection result norm	al?			
YES >> GO TO 2. NO >> Repair the termi	nal and connector.			Е
 Disconnect the connect Check the resistance be 	or of ECM. Itween the ECM harness c	onnector terminals.		F
	ECM harness connector		Posistance (0)	G
Connector No.	Termi	nal No.		
F13	74	73	Approx. 108 – 132	
Is the measurement value w YES >> GO TO 3. NO >> Repair the ECM 3.CHECK POWER SUPPL	ithin the specification? branch line. Y AND GROUND CIRCUI	Г		
Check the power supply and Is the inspection result norm YES >> GO TO 4. NO >> Repair the power	l the ground circuit of the E <u>al?</u> er supply and the ground c	CM. Refer to <u>EC-118, "Dia</u>	<u>gnosis Procedure"</u> .	J
4 ERASE ALL DTC				Κ
 Connect the connector of Erase the DTCs of unit of Turn the ignition switch of Turn the ignition switch of Deform All DTC Depoint 	of ECM. connected to HEV SYSTE OFF. ON.	M CAN and CAN.		L
NOTE:				LAN
For DTCs related to HEV SY	STEM CAN, refer to LAN-	59, "DTC Related to HEV S	SYSTEM CAN List".	
Is the DTC related to HEV S YES >> Replace the EC UNIT : Special F NO >> Error was detect	YSTEM CAN displayed? CM. Refer to <u>EC-14, "ADI</u> Repair Requirement". ted in the ECM branch line	DITIONAL SERVICE WHE	N REPLACING CONTROL	Ν
				0

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071916

[HEV SYSTEM CAN]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).
- EPS control unit
- Harness connector E301
- Harness connector E67

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2.CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of EPS control unit.

2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (O)
Connector No.	Termi		
E302	8	9	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the EPS control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the EPS control unit. Refer to <u>STC-44, "Wiring Diagram —</u> ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM —...

Is the inspection result normal?

- YES >> GO TO 4.
- NO >> Repair the power supply and the ground circuit.

4.ERASE ALL DTC

- 1. Connect the connector of EPS control unit.
- 2. Erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.
- 5. Perform All DTC Reading with CONSULT-III.

NOTE:

For DTCs related to HEV SYSTEM CAN, refer to <u>LAN-59</u>. "DTC Related to HEV SYSTEM CAN List". <u>Is the DTC related to HEV SYSTEM CAN displayed?</u>

- YES >> Replace the EPS control unit. Refer to <u>STC-8, "Component Parts Location"</u>.
- NO >> Error was detected in the EPS control unit branch line.
DLC BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[HEV SYSTEM CAN]

Disconnect the battery c Check the terminals and (connector side and hard	able from the negative tern d connectors of the data liness side).	ninal. nk connector for damage	e, bend and loose connectio
the inspection result norm			
NO >> Repair the termi	nal and connector.		
CHECK HARNESS FOR	OPEN CIRCUIT		
neck the resistance betwee	en the data link connector te	erminals.	
	Data link connector		Desistance (O)
Connector No.	Termin	al No.	
M22	13	12	Approx. 54 – 66
YES >> Reconfirm the p NO >> Repair the data	ocedure for detecting root ink connector branch line.	cause.	
YES >> Reconfirm the p IO >> Repair the data	ocedure for detecting root ink connector branch line.	cause.	
YES >> Reconfirm the p NO >> Repair the data	ocedure for detecting root ink connector branch line.	cause.	
YES >> Reconfirm the p IO >> Repair the data	ocedure for detecting root ink connector branch line.	cause.	
YES >> Reconfirm the p NO >> Repair the data	rocedure for detecting root ink connector branch line.	cause.	

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071918

[HEV SYSTEM CAN]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the steering angle sensor for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

- 1. Disconnect the connector of steering angle sensor.
- 2. Check the resistance between the steering angle sensor harness connector terminals.

Steering angle sensor harness connector			Posistanco (O)
Connector No.	Terminal No.		
M53	5	Approx. 54 – 66	

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the steering angle sensor branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the steering angle sensor. Refer to <u>STC-44, "Wiring Diagram</u> — <u>ELECTRONICALLY CONTROLLED POWER STEERING SYSTEM —</u>".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the power supply and the ground circuit.

4.ERASE ALL DTC

- 1. Connect the connector of steering angle sensor.
- 2. Erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.
- 5. Perform All DTC Reading with CONSULT-III.

NOTE:

For DTCs related to HEV SYSTEM CAN, refer to <u>LAN-59</u>, "DTC Related to HEV SYSTEM CAN List". Is the DTC related to HEV SYSTEM CAN displayed?

YES >> Replace the steering angle sensor. Refer to <u>STC-8, "Component Parts Location"</u>.

NO >> Error was detected in the steering angle sensor branch line.

YAW BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[HEV SYSTEM CAN]

YAW BRANCH LINE	E CIRCUIT			Λ
Diagnosis Procedure			INFOID:000000003071919	A
1. CHECK CONNECTOR				В
 Turn the ignition switch Disconnect the battery of Check the terminals and nection (unit side and constrained in the inspection result norm YES >> GO TO 2. 	OFF. cable from the negative terr l connectors of the yaw rate onnector side). al?	ninal. e/side/decel G sensor for da	mage, bend and loose con-	C
2.CHECK HARNESS FOR	OPEN CIRCUIT			
 Disconnect the connect Check the resistance be 	or of yaw rate/side/decel G atween the yaw rate/side/de	sensor. ecel G sensor harness conr	nector terminals.	E
Yaw rat	e/side/decel G sensor harness co	onnector	Resistance (Ω)	F
Connector No.	Termir	nal No.	Approv. 54	
YES >> GO TO 3. NO >> Repair the yaw 3.CHECK POWER SUPPL	<u>ithin the specification?</u> rate/side/decel G sensor br Y AND GROUND CIRCUIT	anch line.		Н
Check the power supply and Diagram - BRAKE CONTRO Is the inspection result norm	the ground circuit of the ya <u>L SYSTEM -"</u> . al?	aw rate/side/decel G sensor	: Refer to <u>BRC-142, "Wiring</u>	I
YES >> GO TO 4. NO >> Repair the powe 4. ERASE ALL DTC	er supply and the ground cir	rcuit.		J
 Connect the connector of Erase the DTCs of unit of Turn the ignition switch 	of yaw rate/side/decel G se connected to HEV SYSTEM OFF.	nsor. /I CAN and CAN.		K
 Turn the ignition switch Perform All DTC Readin NOTE: 	ON. ig with CONSULT-III.			L
For DTCs related to HEV SY Is the DTC related to HEV SY YES >> Replace the yaw	/STEM CAN, refer to <u>LAN-</u> <u>YSTEM CAN displayed?</u> w rate/side/decel G sensor	59, "DTC Related to HEV S	SYSTEM CAN List".	A
NO >> Error was detec	ted in the yaw rate/side/dec	cel G sensor branch line.		Ν

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071920

[HEV SYSTEM CAN]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the brake ECU for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of brake ECU.

2. Check the resistance between the brake ECU harness connector terminals.

Brake ECU harness connector			Posistanco (O)
Connector No.	Terminal No.		
E61	81 70		Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the brake ECU branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the brake ECU. Refer to <u>BRC-142, "Wiring Diagram -</u> <u>BRAKE CONTROL SYSTEM -"</u>.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the power supply and the ground circuit.

4.ERASE ALL DTC

1. Connect the connector of brake ECU.

- 2. Erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.
- 5. Perform All DTC Reading with CONSULT-III.

NOTE:

For DTCs related to HEV SYSTEM CAN, refer to <u>LAN-59</u>, "<u>DTC Related to HEV SYSTEM CAN List</u>". Is the DTC related to HEV SYSTEM CAN displayed?

YES >> Replace the brake ECU. Refer to <u>BRC-190</u>, "Exploded View".

NO >> Error was detected in the brake ECU branch line.

HV ECU BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[HEV	SYSTEM	CAN]
------	--------	------

Diagnosis Procedure		
Blaghoolo i roocaaro		INFOID:000000003071921
1.CHECK CONNECTOR		
 Turn the ignition switch C Disconnect the battery ca Check the terminals and nection (unit side and con ls the inspection result normation YES >> GO TO 2. NO >> Repair the terminal 	FF. Ible from the negative terminal. connectors of the hybrid vehicle contro nector side). I?	I ECU for damage, bend and loose con-
2.CHECK HARNESS FOR (DPEN CIRCUIT	
 Disconnect the connecto Check the resistance bet 	r of hybrid vehicle control ECU. ween the hybrid vehicle control ECU ha	rness connector terminals.
	rehicle control ECU harness connector	Resistance (Ω)
E66	171 17	70 Approx. 108 – 132
3.CHECK POWER SUPPLY	AND GROUND CIRCUIT the ground circuit of the hybrid vehicle	control ECU Refer to HBC-592 "Wiring
<u>Diagram</u> ". <u>Is the inspection result norma</u> YES >> GO TO 4.	<u> ?</u>	
Diagram". Is the inspection result normal YES >> GO TO 4. NO >> Repair the power	supply and the ground circuit.	

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HEV SYSTEM CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

HEV SYSTEM CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:000000003071922

[HEV SYSTEM CAN]

1.CONNECTOR INSPECTION

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Disconnect all the unit connectors on HEV SYSTEM CAN.
- 4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

	Data link connector		
Connector No.	Terminal No.		Continuity
M22	13	Not existed	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the harness and repair the root cause.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector and the ground.

Data link connector			Continuity	
Connector No.	Terminal No.	Ground	Continuity	
M22	13	Ground	Not existed	
	12		Not existed	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Check the harness and repair the root cause.

4.CHECK ECM AND HYBRID VEHICLE CONTROL ECU TERMINATION CIRCUIT

- 1. Remove the ECM and the hybrid vehicle control ECU.
- 2. Check the resistance between the ECM terminals.

E	СМ	Resistance (O)	
Terminal No.			
74	73	Approx. 108 – 132	

Check the resistance between the hybrid vehicle control ECU terminals.

Hybrid vehicle control ECU		Resistance (O)	
Terminal No.			
171 170		Approx. 108 – 132	

Is the measurement value within the specification?

YES >> GO TO 5.

NO >> Replace the ECM and/or the hybrid vehicle control ECU.

5.CHECK DTC

1. Connect all the connectors.



LAN-78

HEV SYSTEM CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

- 2. Erase the DTCs of unit connected to HEV SYSTEM CAN and CAN.
- 3. Turn the ignition switch OFF.
- 4. Turn the ignition switch ON.

5. Perform All DTC Reading with CONSULT-III. Check if the symptoms listed below are reproduced.

Item (CONSULT-III)	Indication
The printed or saved All DTC Reading	 The items of EPS and ABS are not displayed. U0129, U0293, U1020 and U1022 are displayed as the ENGINE items. U0100^{*1}, U0129^{*2} and U0131^{*3} are displayed as the HYBRID SYSTEM items.
 *1: Hybrid vehicle control ECU may d (530). 	splay one or more DTCs (INF code) listed as follows; U0100 (211), U0100 (212), U0100
 *2: Hybrid vehicle control ECU may d (528). 	splay one or more DTCs (INF code) listed as follows; U0129 (220), U0129 (222), U0129
• *3: Hybrid vehicle control ECU may dia	splay one or more DTCs (INF code) listed as follows; U0131 (433), U0131 (434).
re the symptoms listed above repro	duced?
YES >> GO TO 6. NO >> Short circuit was detecte	d in HEV SYSTEM CAN.
CHECK UNIT REPRODUCTION	
 erform the reproduction test as per Turn the ignition switch OFF. Disconnect the battery cable fror Disconnect one of the unit connect 	the following procedure for each unit. In the negative terminal.
NOTE:	
ECM and hybrid vehicle control E . Connect the battery cable to the CAN and CAN	ECU have a termination circuit. Check other units first. negative terminal. Erase the DTCs of unit connected to HEV SYSTEM
Perform All DTC Reading with C	ONSULT-III. Check if the symptoms listed below are reproduced.
Item (CONSULT-III)	Indication
The printed or saved All DTC Reading	 The items of EPS and ABS are not displayed. U0129, U0293, U1020 and U1022 are displayed as the ENGINE items. U0100^{*1}, U0129^{*2} and U0131^{*3} are displayed as the HYBRID SYSTEM items.

• *1: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0100 (211), U0100 (212), U0100 (530).

*2: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0129 (220), U0129 (222), U0129 (528).

• *3: Hybrid vehicle control ECU may display one or more DTCs (INF code) listed as follows; U0131 (433), U0131 (434).

Are the symptoms listed above reproduced?

- YES >> Connect the connector. Check other units as per the above procedure.
- NO >> Replace the unit whose connector was disconnected.

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[HEV SYSTEM CAN]

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MAIN LINE BETWEEN DLC AND HV ECU CIRCUIT

< COMPONENT DIAGNOSIS >

COMPONENT DIAGNOSIS MAIN LINE BETWEEN DLC AND HV ECU CIRCUIT

Diagnosis Procedure

INFOID:000000003302823

INSPECTION PROCEDURE

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the following terminals and connectors for damage, bend and loose connection (connector side and harness side).
- Harness connector M89
- Harness connector E64

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors M89 and E64.

2. Check the continuity between the data link connector and the harness connector.

Data link	connector	Harness connector Connector No. Terminal No.		Continuity
Connector No.	Terminal No.			Continuity
Maa	6 M80	7	Existed	
17122	14	1009	8	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the main line between the data link connector and the harness connector M89.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

- 1. Disconnect the connector of hybrid vehicle control ECU.
- Check the continuity between the harness connector and the hybrid vehicle control ECU harness connector.

Harness	Harness connector Hybrid vehicle control ECU harness connector		Continuity	
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
E64	7	Ecc	173	Existed
E04	8	E00	172	Existed

Is the inspection result normal?

YES (Present error)>>Check CAN system type decision again.

YES (Past error)>>Error was detected in the main line between the data link connector and the hybrid vehicle control ECU.

NO >> Repair the main line between the harness connector E64 and the hybrid vehicle control ECU.

ECM BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 13)]

ECM BRANCH LIN	E CIRCUIT			Λ
Diagnosis Procedure			INF0ID:000000003071924	A
1.CHECK CONNECTOR				В
 Turn the ignition switch Disconnect the battery of Check the following terr nector side). ECM Harness connector E47 	OFF. cable from the negative tern ninals and connectors for d	ninal. amage, bend and loose co	nnection (unit side and con-	С
 Harness connector E47 Harness connector E48 Junction block Harness connector E30 Harness connector M1 				D
Is the inspection result normYES>> GO TO 2.NO>> Repair the term2.CHECK HARNESS FOR	nal? inal and connector. OPEN CIRCUIT			F
 Disconnect the connect Check the resistance be 	or of ECM. etween the ECM harness co	onnector terminals.		G
	ECM harness connector		Resistance (O)	Н
Connector No.	Termin	al No.		
E10	98	97	Approx. 108 – 132	
Is the measurement value w YES >> GO TO 3. NO >> Repair the ECM 3. CHECK POWER SUPPL	rithin the specification? I branch line. Y AND GROUND CIRCUIT			l J
Check the power supply and Is the inspection result norm YES (Present error)>>Rep <u>CONTROL UNI</u> YES (Past error)>>Error w NO	the ground circuit of the Eval? lace the ECM. Refer to <u>E</u> <u>T : Special Repair Requiren</u> as detected in the ECM bra	CM. Refer to <u>EC-118, "Diac</u> <u>C-14, "ADDITIONAL SER</u> <u>nent"</u> . nch line.	gnosis Procedure". VICE WHEN REPLACING	K
NO >> Repair the powe	er suppry and the ground ch	cuit.		LA
				N

A-BAG BRANCH LINE CIRCUIT

Diagnosis Procedure

1.CHECK AIR BAG DIAGNOSIS SENSOR UNIT

Check the air bag diagnosis sensor unit. Refer to SRC-3, "Work Flow".

Is the inspection result normal?

YES >> Replace the main harness.

NO >> Replace parts whose air bag system has a malfunction.

INFOID:000000003303471

BCM BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 13)]

BCM BRANCH LIN	E CIRCUIT		
Diagnosis Procedure			INFOID:000000003071926
1. CHECK CONNECTOR			
 Turn the ignition switch Disconnect the battery of Check the terminals an connector side). 	OFF. cable from the negative terr d connectors of the BCM f	ninal. or damage, bend and loos	e connection (unit side and
Is the inspection result normYES>> GO TO 2.NO>> Repair the term2.CHECK HARNESS FOR	inal and connector. OPEN CIRCUIT		
 Disconnect the connect Check the resistance be 	or of BCM. etween the BCM harness co	onnector terminals.	
	BCM harness connector		Resistance (Ω)
Connector No.	Termir	nal No.	
M19	79	78	Approx. 54 – 66
Is the measurement value wYES>> GO TO 3.NO>> Repair the BCW 3. CHECK POWER SUPPL	rithin the specification? I branch line. Y AND GROUND CIRCUIT	-	
Check the power supply and Is the inspection result norm	the ground circuit of the B al?	CM. Refer to <u>BCS-41, "Dia</u>	gnosis Procedure".
YES (Present error)>>Rep YES (Past error)>>Error w NO >> Repair the powe	lace the BCM. Refer to \underline{BCS} as detected in the BCM bra er supply and the ground cir	<u>S-85, "Removal and Installa</u> nch line. rcuit.	a <u>tion"</u> .

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DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003302857

[CAN SYSTEM (TYPE 13)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

	Data link connector		Resistance (O)
Connector No.	Termi	nal No.	
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.

YES (Past error)>>Error was detected in the data link connector branch line circuit.

NO >> Repair the data link connector branch line.

HVAC BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 13)]

HVAC BRANCH LIN	IE CIRCUIT			Λ
Diagnosis Procedure			INFOID:000000003071928	~
1.CHECK CONNECTOR				В
 Turn the ignition switch (Disconnect the battery c Check the terminals and (unit side and connector) 	OFF. able from the negative terr I connectors of the controll- side).	ninal. er (auto amp.) for damage,	bend and loose connection	С
YES >> GO TO 2. NO >> Repair the termin	al? nal and connector.			D
 Disconnect the connect Check the resistance be 	or of controller (auto amp.). tween the controller (auto	amp.) harness connector te	rminals.	E
Cont	troller (auto amp.) harness conne	ector	Resistance (O)	F
Connector No.	Termir	nal No.		
M37	15	35	Approx. 54 – 66	G
Is the measurement value with YES >> GO TO 3.NO >> Repair the control 3. CHECK POWER SUPPLY	ithin the specification? oller (auto amp.) branch lir Y AND GROUND CIRCUIT	ie. -		Н
Check the power supply and cedure".	the ground circuit of the co	ontroller (auto amp.). Refer	to HAC-86, "Diagnosis Pro-	I
Is the inspection result norma YES (Present error)>>Repla YES (Past error)>>Error wa NO >> Repair the powe	al? ace the controller (auto am as detected in the controlle or supply and the ground ci	np.). Refer to <u>HAC-14, "Com</u> r (auto amp.) branch line. rcuit.	ponent Part Location".	J
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M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071929

[CAN SYSTEM (TYPE 13)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

- 1. Disconnect the connector of combination meter.
- 2. Check the resistance between the combination meter harness connector terminals.

Co	ombination meter harness connect	ctor	Resistance (O)
Connector No.	Termi	nal No.	
M24	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to <u>MWI-40, "COMBINATION</u> <u>METER : Diagnosis Procedure"</u>.

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-135, "Removal and Installation".

YES (Past error)>>Error was detected in the combination meter branch line.

HV ECU BRANCH LINE CIRCUIT

				А
Diagnosis Procedure			INFOID:000000003302824	
1. СНЕСК ДТС				В
Check whether or not the DT NOTE:	C related to HEV SYSTEM	A CAN indicated on All DTC	Reading by CONSULT-III.	
For DTCs related to HEV SY	STEM CAN, refer to LAN-	59, "DTC Related to HEV SY	<u>'STEM CAN List"</u> .	С
Is the DTC related to HEV S	YSTEM CAN displayed?	52 "Trouble Diagnosia Flow	Chort"	
NO $>>$ GO TO 2.	STEW CAN. Relet to LAN	-55. HOUDIE DIAGHOSIS FIOW	<u>Chan</u> .	D
2.CHECK CONNECTOR				
 Turn the ignition switch (2. Disconnect the battery of the battery o	OFF. able from the negative terr	ninal.		Е
3. Check the terminals and	d connectors of the hybrid	vehicle control ECU for dam	age, bend and loose con-	
Is the inspection result norm	al?			F
YES >> GO TO 3.				
NO >> Repair the termi	nal and connector.			G
J.CHECK HARNESS FOR				
 Disconnect the connector Check the resistance be 	tween the hybrid vehicle control	ecu. ontrol ECU harness connecto	or terminals.	Н
Hybrid	vehicle control ECU harness cor	nnector		
Connector No.	Termir	nal No.	Resistance (Ω)	
E66	173	172	Approx. 54 – 66	
Is the measurement value w	ithin the specification?			I
YES >> GO TO 4. NO >> Repair the hybri	d vehicle control ECU bran	ich line.		0
4.CHECK POWER SUPPL		Γ		
Check the power supply and	the around circuit of the h	vbrid vehicle control ECU. H	3C-592. "Wiring Diagram".	Κ
Is the inspection result norm	al?			
YES (Present error)>>Repl YES (Past error)>>Error wa	ace the hybrid vehicle cont as detected in the hybrid ve	trol ECU. Refer to <u>HBC-636.</u> ehicle control ECU branch lin	<u>"Exploded View"</u> . e.	L
NO >> Repair the powe	er supply and the ground ci	rcuit.		
				LAN
				Ν

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IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071931

[CAN SYSTEM (TYPE 13)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.

2. Check the resistance between the IPDM E/R harness connector terminals.

	IPDM E/R harness connector		$Resistance\left(\Omega\right)$
Connector No.	Termi	nal No.	
E17	40	39	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the IPDM E/R branch line.

 $\mathbf{3.}$ Check power supply and ground circuit

Check the power supply and the ground circuit of the IPDM E/R. Refer to <u>PCS-18, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-34, "Removal and Installation".

YES (Past error)>>Error was detected in the IPDM E/R branch line.

CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 13)]

CAN COMMUNICATION CIRCUIT А **Diagnosis Procedure** INFOID:000000003071932 **1**.CONNECTOR INSPECTION В 1. Turn the ignition switch OFF. Disconnect the battery cable from the negative terminal. 2. Disconnect all the unit connectors on CAN communication system. 3. C Check terminals and connectors for damage, bend and loose connection. 4 Is the inspection result normal? YES >> GO TO 2. D NO >> Repair the terminal and connector. 2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT) E Check the continuity between the data link connector terminals. Data link connector Continuity F Connector No. Terminal No. M22 6 14 Not existed Is the inspection result normal? YES >> GO TO 3. NO >> Check the harness and repair the root cause. **3.**CHECK HARNESS CONTINUITY (SHORT CIRCUIT) Н Check the continuity between the data link connector and the ground. Data link connector Continuity Terminal No. Connector No. Ground 6 Not existed M22 14 Not existed Is the inspection result normal? Κ YES >> GO TO 4. NO >> Check the harness and repair the root cause. ${f 4}$. CHECK ECM AND IPDM E/R TERMINATION CIRCUIT Remove the ECM and the IPDM E/R. 1. 2. Check the resistance between the ECM terminals. LAN ECM and IPDM E/R ECM Resistance (Ω) Terminal No. Approx. 108 - 132 Ν 98 97 Check the resistance between the IPDM E/R terminals. 3 IPDM E/R Resistance (Ω) Terminal No. LKIA0037E 40 39 Approx. 108 - 132 Ρ Is the measurement value within the specification? YES >> GO TO 5. NO >> Replace the ECM and/or the IPDM E/R. 5. CHECK SYMPTOM Connect all the connectors. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced.

LAN-89

Inspection result

Reproduced>>GO TO 6.

Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Disconnect one of the unit connectors of CAN communication system. **NOTE:**

ECM and IPDM E/R have a termination circuit. Check other units first.

 Connect the battery cable to the negative terminal. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced.
 NOTE:

Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure. Non-reproduced>>Replace the unit whose connector was disconnected.

		EEN DLC AND	HV ECU CIRCUI	T SYSTEM (TYPE 14)]
		SIS		
MAIN LINE BET	WEEN DLC A	ND HV ECU CI	RCUIT	
Diagnosis Proced	ure			INFOID:000000003302825
INSPECTION PROCE	DURE			
1.CHECK CONNECT	OR			
 Turn the ignition sv Disconnect the bat Check the followin and harness side). Harness connector Harness connector Is the inspection result YES >> GO TO 2. 	vitch OFF. tery cable from the ne ig terminals and conr r M89 r E64 <u>normal?</u>	egative terminal. nectors for damage, b	end and loose conne	ection (connector side
NO >> Repair the	terminal and connect	or.		
 Disconnect the har Check the continui 	rness connectors M89 ty between the data li) and E64. Ink connector and the	harness connector.	
Data link	connector	Harness of	connector	Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
M22	6	M89	7	Existed
	14		8	Existed
YES >> GO TO 3. NO >> Repair the 3.CHECK HARNESS 1. Disconnect the cor 2. Check the continui tor. Harness	main line between the CONTINUITY (OPEN nector of hybrid vehic ty between the harnes	e data link connector a I CIRCUIT) cle control ECU. ss connector and the I Hybrid vehicle control E	and the harness conn hybrid vehicle control	ector M89. ECU harness connec-
Connector No.	Terminal No.	Connector No.	Terminal No.	Continuity
F 04	7	F00	173	Existed
⊏04	8	E00	172	Existed
Is the inspection result YES (Present error)>> YES (Past error)>>Er cle control NO >> Repair the	<u>normal?</u> >Check CAN system to ror was detected in the ECU. main line between the	type decision again. 1e main line between t e harness connector E	the data link connecto	or and the hybrid vehi- hicle control ECU.

ECM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071934

[CAN SYSTEM (TYPE 14)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).
- ECM
- Harness connector E47
- Harness connector E48
- Junction block
- Harness connector E30
- Harness connector M1

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2.check harness for open circuit

- 1. Disconnect the connector of ECM.
- 2. Check the resistance between the ECM harness connector terminals.

	ECM harness connector		Posistanco (O)
Connector No.	Terminal No.		
E10	98	97	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the ECM branch line.

 ${f 3.}$ CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ECM. Refer to EC-118, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ECM. Refer to <u>EC-14. "ADDITIONAL SERVICE WHEN REPLACING</u> <u>CONTROL UNIT : Special Repair Requirement"</u>.

YES (Past error)>>Error was detected in the ECM branch line.

< COMPONENT DIAGNOSIS > A-BAG BRANCH LINE CIRCUIT А **Diagnosis Procedure** INFOID:000000003303472 1.CHECK AIR BAG DIAGNOSIS SENSOR UNIT В Check the air bag diagnosis sensor unit. Refer to SRC-3, "Work Flow". Is the inspection result normal? С YES >> Replace the main harness. NO >> Replace parts whose air bag system has a malfunction. D Е F G Н J Κ L LAN Ν Ο Ρ

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071936

[CAN SYSTEM (TYPE 14)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the AV control unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

- 1. Disconnect the connector of AV control unit.
- 2. Check the resistance between the AV control unit harness connector terminals.

	AV control unit harness connecto	r	Resistance (O)
Connector No.	Termi	nal No.	
M46	24	44	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the AV control unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the AV control unit. Refer to <u>AV-201, "AV CONTROL UNIT :</u> <u>Diagnosis Procedure"</u>.

Is the inspection result normal?

YES (Present error)>>Replace the AV control unit. Refer to AV-272, "Removal and Installation".

YES (Past error)>>Error was detected in the AV control unit branch line.

BCM BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 14)]

hagnosis Procedure			INFOID:000000003071937
.CHECK CONNECTOR			
 Turn the ignition switch Disconnect the battery of Check the terminals an connector side). the inspection result norm YES >> GO TO 2. NO >> Repair the term 	OFF. cable from the negative termin d connectors of the BCM for <u>al?</u> inal and connector.	nal. damage, bend and lo	ose connection (unit side and
. Disconnect the connect	or of BCM.		
. Check the resistance be	tween the BCM harness con	nector terminals.	
	BCM harness connector		Resistance (O)
Connector No.	Terminal	No.	
M19	79	78	Approx. 54 – 66
	μ η		
the measurement value w YES >> GO TO 3. NO >> Repair the BCM CHECK POWER SUPPL	I branch line. Y AND GROUND CIRCUIT		

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DLC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003302858

[CAN SYSTEM (TYPE 14)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the data link connector for damage, bend and loose connection (connector side and harness side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

Check the resistance between the data link connector terminals.

Data link connector			Posistanco (O)
Connector No.	Terminal No.		1(e3)3(a) (ce (22)
M22	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Check CAN system type decision again.

YES (Past error)>>Error was detected in the data link connector branch line circuit.

NO >> Repair the data link connector branch line.

HVAC BRANCH LINE CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 14)]

HVAC BRANCH LIN	IE CIRCUIT		
Diagnosis Procedure	INFOID:00000003071939		
1. CHECK CONNECTOR			
 Turn the ignition switch (Disconnect the battery c Check the terminals and (unit side and connector) 	OFF. able from the negative terr connectors of the controlle side).	ninal. er (auto amp.) for damage,	bend and loose connection
Is the inspection result normYES>> GO TO 2.NO>> Repair the termi2. CHECK HARNESS FOR	<u>al?</u> nal and connector. OPEN CIRCUIT		
 Disconnect the connect Check the resistance be 	or of controller (auto amp.).	amp.) harness connector te	rminals.
Con	Resistance (Ω)		
Connector No.	Terminal No.		
M37	15	35	Approx. 54 – 66
Is the measurement value wYES>> GO TO 3.NO>> Repair the control 3. CHECK POWER SUPPLY	ithin the specification? oller (auto amp.) branch lin Y AND GROUND CIRCUIT	e. -	
Check the power supply and <u>cedure</u> ".	the ground circuit of the co	ontroller (auto amp.). Refer	to <u>HAC-86, "Diagnosis Pro-</u>
Is the inspection result norm YES (Present error)>>Repl YES (Past error)>>Error wa NO >> Repair the powe	al? ace the controller (auto am as detected in the controlle ar supply and the ground ci	np.). Refer to <u>HAC-14, "Com</u> r (auto amp.) branch line. rcuit.	ponent Part Location".

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M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071940

[CAN SYSTEM (TYPE 14)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the combination meter for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

- 1. Disconnect the connector of combination meter.
- 2. Check the resistance between the combination meter harness connector terminals.

Combination meter harness connector			Posistanco (O)
Connector No.	Terminal No.		
M24	21	22	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the combination meter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the combination meter. Refer to <u>MWI-40, "COMBINATION</u> <u>METER : Diagnosis Procedure"</u>.

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-135, "Removal and Installation".

YES (Past error)>>Error was detected in the combination meter branch line.

< COMPONENT DIAGNOSIS > **HV ECU BRANCH LINE CIRCUIT** А **Diagnosis** Procedure INFOID:00000003302826 1.CHECK DTC В Check whether or not the DTC related to HEV SYSTEM CAN indicated on All DTC Reading by CONSULT-III. NOTE: For DTCs related to HEV SYSTEM CAN, refer to LAN-59, "DTC Related to HEV SYSTEM CAN List". Is the DTC related to HEV SYSTEM CAN displayed? YES >> Inspect HEV SYSTEM CAN. Refer to LAN-53, "Trouble Diagnosis Flow Chart". NO >> GO TO 2. D 2. CHECK CONNECTOR 1. Turn the ignition switch OFF. Е Disconnect the battery cable from the negative terminal. 2. Check the terminals and connectors of the hybrid vehicle control ECU for damage, bend and loose con-3. nection (unit side and connector side). F Is the inspection result normal? YES >> GO TO 3. NO >> Repair the terminal and connector. ${ m 3.}$ CHECK HARNESS FOR OPEN CIRCUIT Disconnect the connector of hybrid vehicle control ECU. 1. Check the resistance between the hybrid vehicle control ECU harness connector terminals. 2. Н Hybrid vehicle control ECU harness connector Resistance (Ω) Terminal No. Connector No. 173 172 E66 Approx. 54 - 66 Is the measurement value within the specification?

YES >> GO TO 4.

NO >> Repair the hybrid vehicle control ECU branch line.

 ${f 4}$. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the hybrid vehicle control ECU. HBC-592, "Wiring Diagram". Is the inspection result normal?

YES (Present error)>>Replace the hybrid vehicle control ECU. Refer to <u>HBC-636</u>, "Exploded View".

YES (Past error)>>Error was detected in the hybrid vehicle control ECU branch line.

>> Repair the power supply and the ground circuit. NO

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IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:000000003071942

[CAN SYSTEM (TYPE 14)]

1.CHECK CONNECTOR

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Check the terminals and connectors of the IPDM E/R for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair the terminal and connector.

2. CHECK HARNESS FOR OPEN CIRCUIT

1. Disconnect the connector of IPDM E/R.

2. Check the resistance between the IPDM E/R harness connector terminals.

IPDM E/R harness connector			Posistanaa (O)
Connector No.	Terminal No.		
E17	40	39	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.

NO >> Repair the IPDM E/R branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the IPDM E/R. Refer to <u>PCS-18, "Diagnosis Procedure"</u>. <u>Is the inspection result normal?</u>

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-34, "Removal and Installation".

YES (Past error)>>Error was detected in the IPDM E/R branch line.

CAN COMMUNICATION CIRCUIT

< COMPONENT DIAGNOSIS >

[CAN SYSTEM (TYPE 14)]

CAN COMMUNICATION CIRCUIT А **Diagnosis Procedure** INFOID:000000003071943 **1**.CONNECTOR INSPECTION 1. Turn the ignition switch OFF. Disconnect the battery cable from the negative terminal. 2. Disconnect all the unit connectors on CAN communication system. 3. C Check terminals and connectors for damage, bend and loose connection. 4 Is the inspection result normal? YES >> GO TO 2. D NO >> Repair the terminal and connector. 2. CHECK HARNESS CONTINUITY (SHORT CIRCUIT) E Check the continuity between the data link connector terminals. Data link connector Continuity F Connector No. Terminal No. M22 6 14 Not existed Is the inspection result normal? YES >> GO TO 3. NO >> Check the harness and repair the root cause. **3.**CHECK HARNESS CONTINUITY (SHORT CIRCUIT) Н Check the continuity between the data link connector and the ground. Data link connector Continuity Terminal No. Connector No. Ground 6 Not existed M22 14 Not existed Is the inspection result normal? Κ YES >> GO TO 4. NO >> Check the harness and repair the root cause. ${f 4}$. CHECK ECM AND IPDM E/R TERMINATION CIRCUIT Remove the ECM and the IPDM E/R. 1. 2. Check the resistance between the ECM terminals. LAN ECM and IPDM E/R ECM Resistance (Ω) Terminal No. Approx. 108 - 132 Ν 98 97 Check the resistance between the IPDM E/R terminals. 3 IPDM E/R Resistance (Ω) Terminal No. LKIA0037E 40 39 Approx. 108 - 132 Ρ Is the measurement value within the specification? YES >> GO TO 5. NO >> Replace the ECM and/or the IPDM E/R. 5. CHECK SYMPTOM Connect all the connectors. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced.

LAN-101

Inspection result

Reproduced>>GO TO 6.

Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK UNIT REPRODUCTION

Perform the reproduction test as per the following procedure for each unit.

- 1. Turn the ignition switch OFF.
- 2. Disconnect the battery cable from the negative terminal.
- 3. Disconnect one of the unit connectors of CAN communication system. **NOTE:**

ECM and IPDM E/R have a termination circuit. Check other units first.

 Connect the battery cable to the negative terminal. Check if the symptoms described in the "Symptom (Results from interview with customer)" are reproduced.
 NOTE:

Although unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

Reproduced>>Connect the connector. Check other units as per the above procedure. Non-reproduced>>Replace the unit whose connector was disconnected.