SECTION LAN

LAN SYSTEM

CONTENTS

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:0000000006977544

- “CAN FUNDAMENTAL” of LAN Section describes the basic knowledge of the CAN communication system and the method of trouble diagnosis.
- For information peculiar to a vehicle and inspection procedure, refer to “CAN”.

PRECAUTION

PRECAUTIONS

Precautions for Trouble Diagnosis

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CAUTION:

Follow the instructions listed below. Failure to do this may cause damage to parts:

- **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 power switch OFF and disconnect the 12V battery cable from the negative terminal when checking the harness.**

Precautions for Harness Repair

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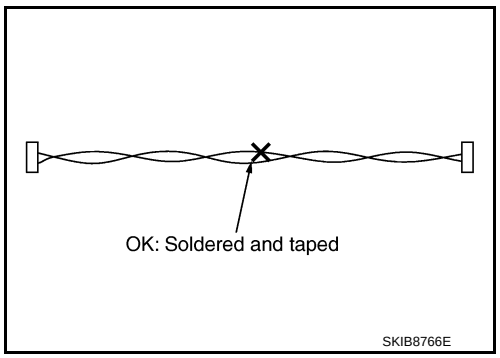
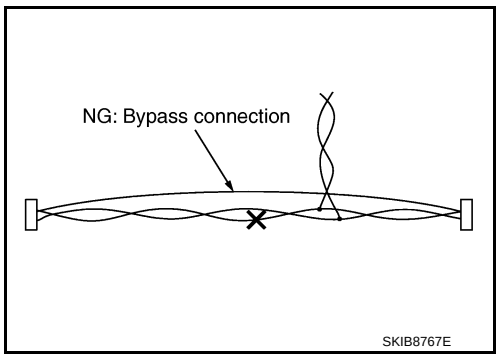
- Solder the repaired area and wrap tape around the soldered area.
  NOTE:
  A fray of twisted lines must be within 110 mm (4.33 in).



- 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.

SYSTEM DESCRIPTION

SYSTEM

CAN COMMUNICATION SYSTEM

CAN COMMUNICATION SYSTEM : System Description

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CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DIAG ON CAN

DIAG ON CAN : System Description

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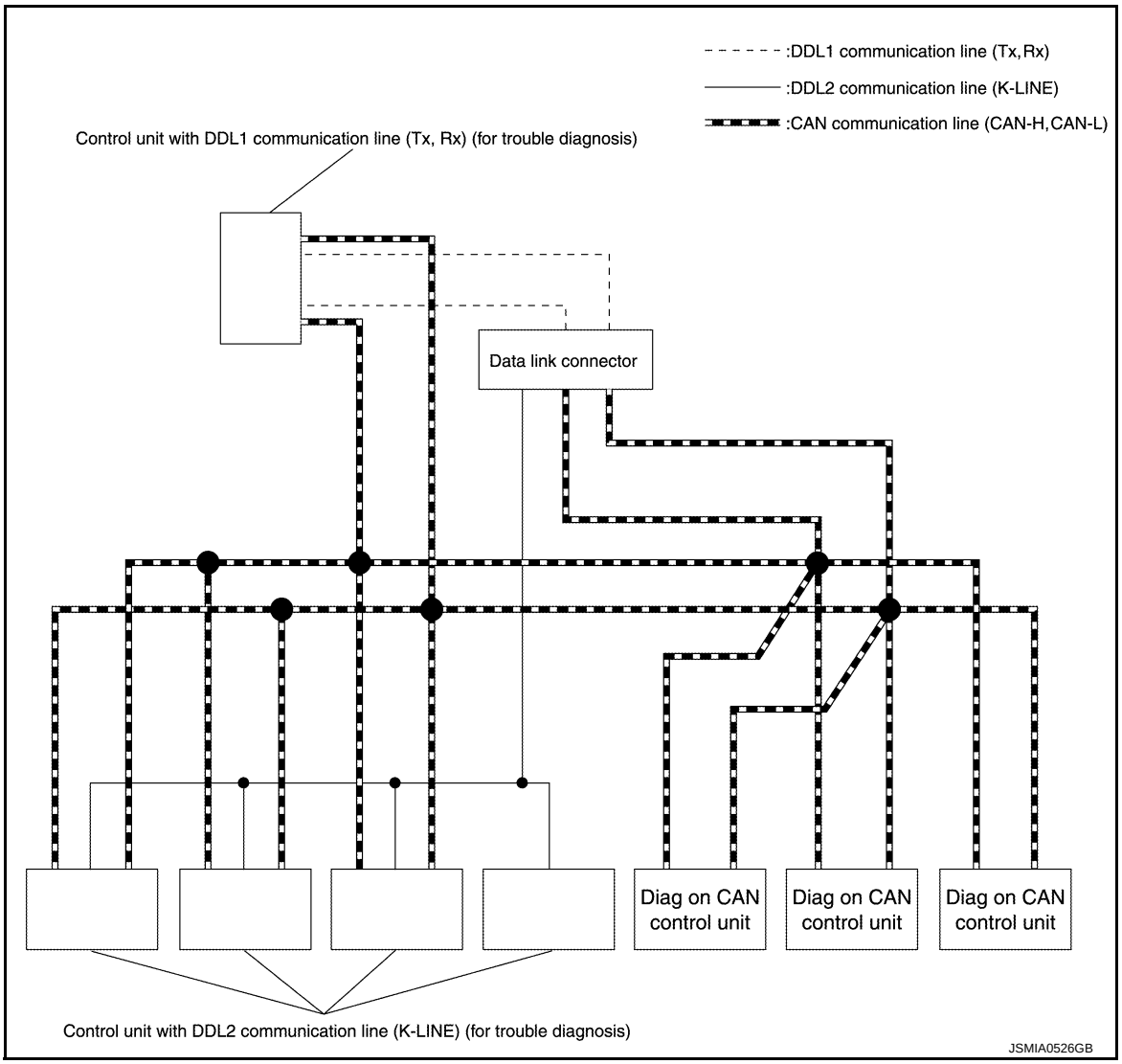
SYSTEM DIAGRAM



Name	Harness	Description
DDL1	Tx Rx	For communications with the diagnostic tool. (CAN-H and CAN-L are used for controlling)
DDL2	K-LINE	For communications with the diagnostic tool. (CAN-H and CAN-L are used for controlling)
Diag on CAN	CAN-H CAN-L	For communications with the diagnostic tool. (CAN-H and CAN-L are also used for control and diagnoses.)

DESCRIPTION

“Diag on CAN” is a diagnosis method which uses the CAN communication line for the communication between the control unit and the diagnostic tool.

TROUBLE DIAGNOSIS

Component Description

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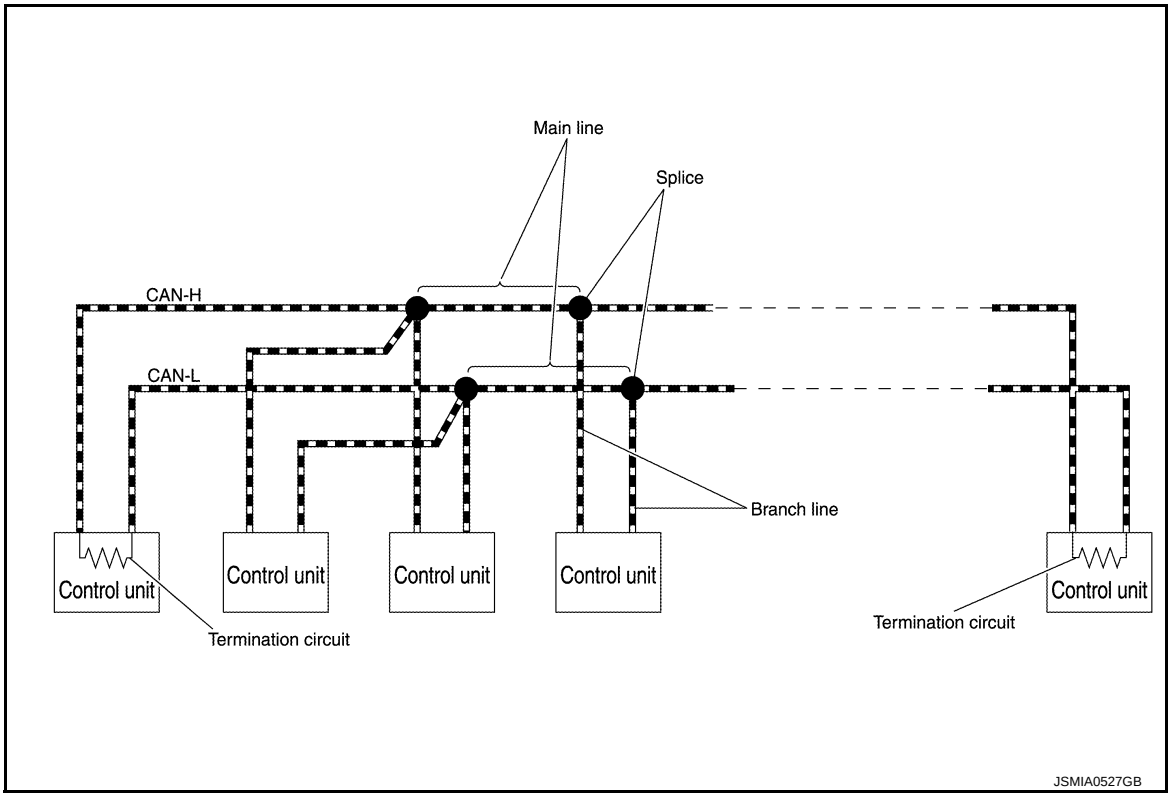

Component	Description
Main line	CAN communication line between splices
Branch line	CAN communication line between splice and a control unit
Splice	A point connecting a branch line with a main line
Termination circuit	Circuit connected across the CAN communication system. (Resistor)

Condition of Error Detection

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DTC (e.g. U1000 and U1001) of CAN communication is indicated on SELF-DIAG RESULTS on CONSULT if a 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 DTC OF CAN COMMUNICATION 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 12V 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 DTC of CAN communication is indicated on SELF-DIAG RESULTS of CONSULT under the above conditions. Erase the memory of the self-diagnosis of each control unit.

Symptom When Error Occurs in CAN Communication System

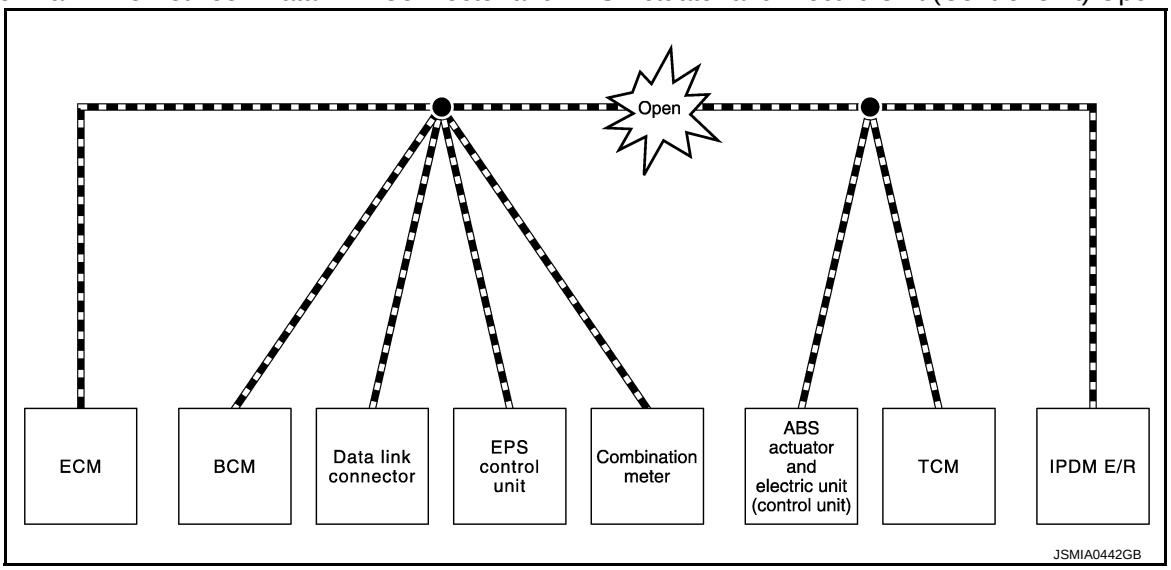
INFOID:0000000006977551

In CAN communication system, multiple control units mutually transmit and receive signals. Each control 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

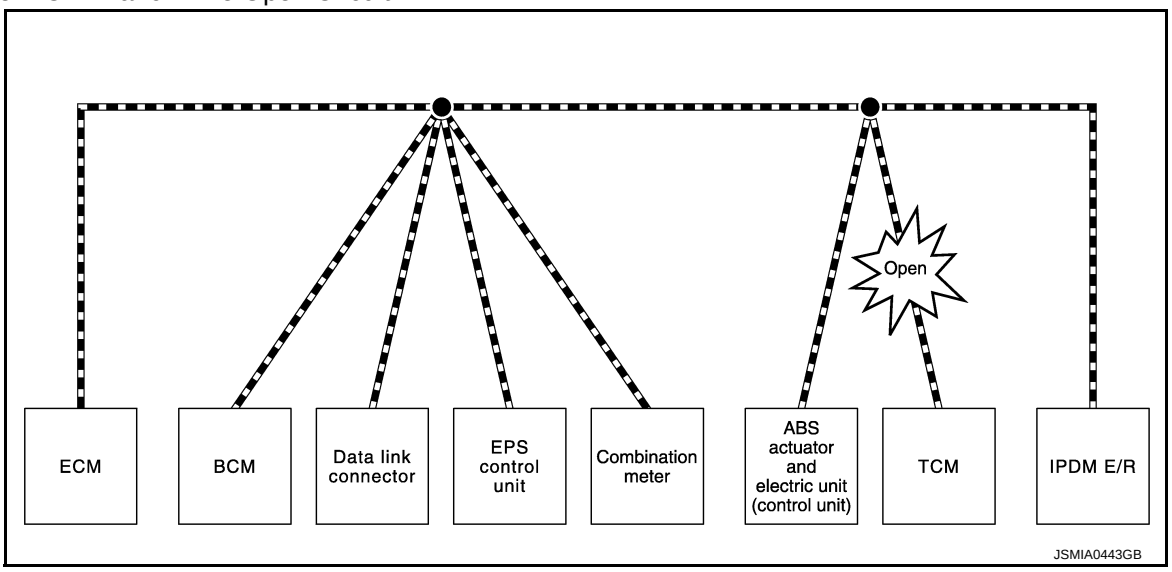
NOTE:
Each vehicle differs in symptom of each control unit under fail-safe mode and CAN communication line wiring.

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



Unit name	Major symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	• Reverse warning buzzer 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.
TCM	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: TCM Branch Line Open Circuit

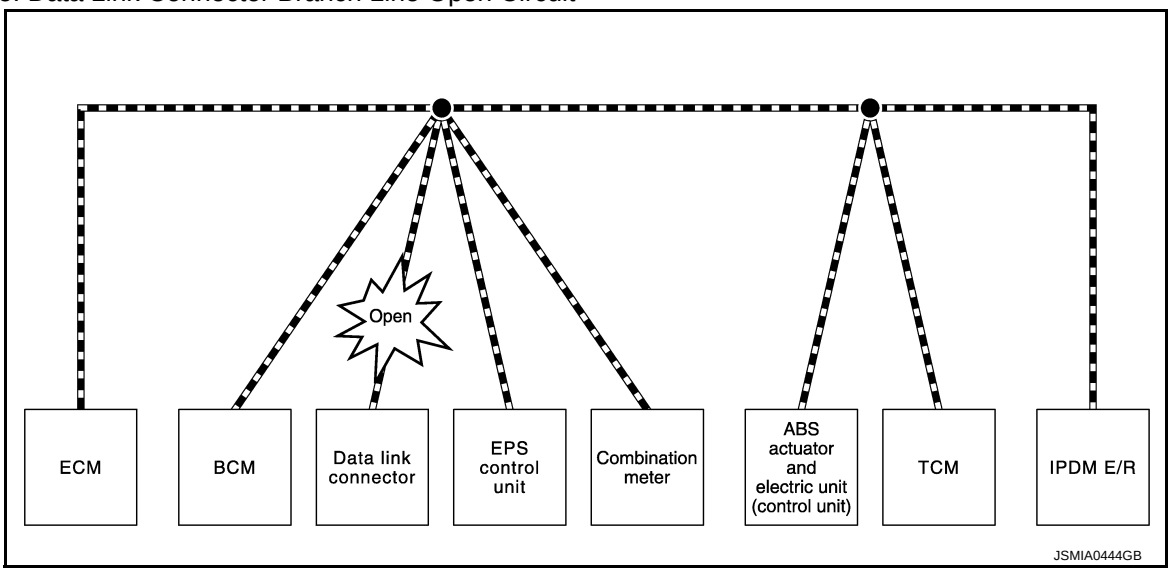


Unit name	Major symptom
ECM	Engine torque limiting is affected, and shift harshness increases.
BCM	Reverse warning buzzer does not sound.
EPS control unit	Normal operation.
Combination meter	• Shift position indicator and O/D OFF indicator turn OFF. • Warning lamps turn ON.
ABS actuator and electric unit (control unit)	Normal operation.
TCM	No impact on operation.
IPDM E/R	Normal operation.

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

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

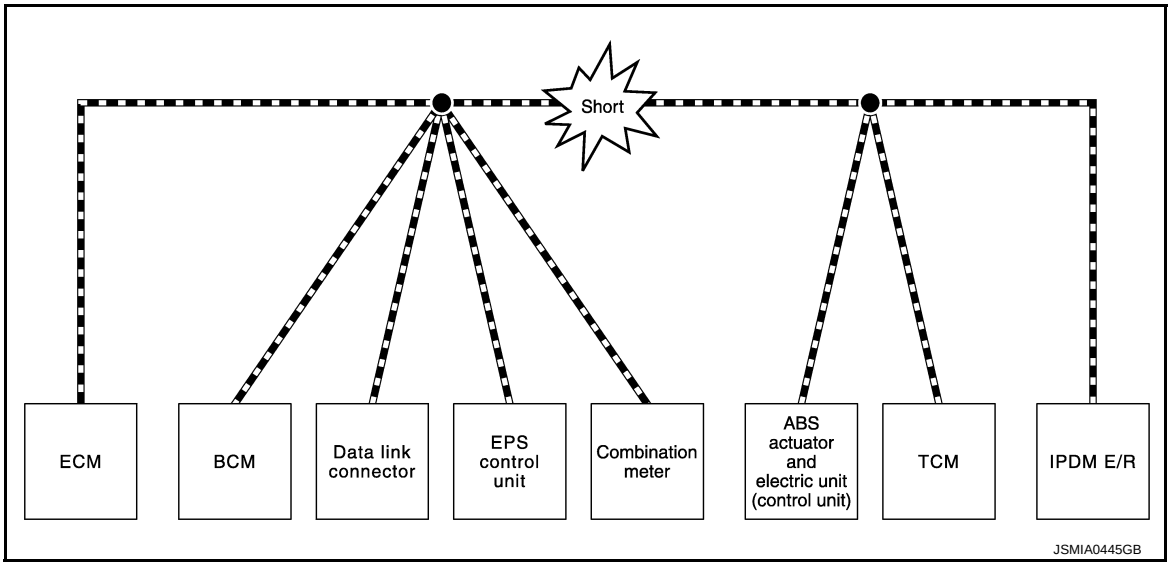
Example: Data Link Connector Branch Line Open Circuit



Unit name	Major symptom
ECM	Normal operation.
BCM	
EPS control unit	
Combination meter	
ABS actuator and electric unit (control unit)	
TCM	
IPDM E/R	

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.

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



Unit name	Major symptom
ECM	• Engine torque limiting is affected, and shift harshness increases. • Engine speed drops.
BCM	• Reverse warning buzzer 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.
TCM	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

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CAN diagnosis on CONSULT 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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If communication signals cannot be transmitted or received among control units communicating via CAN communication line, CAN communication-related DTC is displayed on the CONSULT “Self Diagnostic Result” screen.

NOTE:
The following table shows examples of CAN communication-related DTC. For other DTC, refer to the applicable sections.

DTC	Self-diagnosis item (CONSULT indication)	DTC detection condition		Inspection/Action
U1000	CAN COMM CIRCUIT	ECM	When ECM is not transmitting or receiving CAN communication signal of OBD (emission-related diagnosis) for 2 seconds or more.	Start the inspection. Refer to the applicable section of the indicated control unit.
		Except for ECM	When a control unit (except for ECM) is not transmitting or receiving CAN communication signal for 2 seconds or more.	
U1001	CAN COMM CIRCUIT	When ECM is not transmitting or receiving CAN communication signal other than OBD (emission-related diagnosis) for 2 seconds or more.		
U1002	SYSTEM COMM	When a control unit is not transmitting or receiving CAN communication signal for 2 seconds or less.		
U1010	CONTROL UNIT(CAN)	When an error is detected during the initial diagnosis for CAN controller of each control unit.		Replace the control unit indicating “U1010”.

CAN Diagnostic Support Monitor

INFOID:0000000006977554

MONITOR ITEM (CONSULT)

Example: CAN DIAG SUPPORT MNTR indication

Without PAST

ECM		
	PRSNT	PAST
INITIAL DIAG	OK	
TRANSMIT DIAG	OK	
TCM	OK	
VDC/TCS/ABS	UNKWN	
METER/M&A	OK	
ICC	UNKWN	
BCM/SEC	OK	
IPDM E/R	OK	

With PAST

ECM		
	PRSNT	PAST
TRANSMIT DIAG	OK	OK
VDC/TCS/ABS	-	-
METER/M&A	OK	OK
BCM/SEC	OK	OK
ICC	-	-
HVAC	-	-
TCM	OK	OK
EPS	-	-
IPDM E/R	OK	OK
e4WD	-	-
AWD/4WD	OK	OK

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Without PAST

Item	PRSNT	Description
Initial diagnosis	OK	Normal at present
	NG	Control unit error (Except for some control units)

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

With PAST

Item	PRSNT	PAST	Description
Transmission diagnosis	OK	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	OK	Normal at present and in the past
		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)

How to Use CAN Communication Signal Chart

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The CAN communication signal chart lists the signals transmitted/received among control units. It is useful for detecting the root cause by finding a signal related to the symptom, and by checking transmission and reception unit.

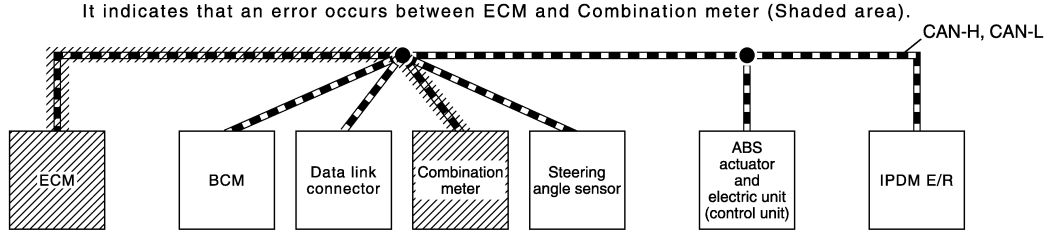
Example: Tachometer does not move even though the engine rotates.

T: Transmit R: Receive

Signal name/Connecting unit	ECM	BCM	M&A	STRG	ABS	IPDM-E
A/C compressor feedback signal	T		R			
A/C compressor request signal	T					R
Accelerator pedal position signal	T				R	
Cooling fan motor operation signal	T					R
Engine coolant temperature signal	T		R			
Engine speed signal	T		R		R	
Fuel consumption monitor signal	T		R			
Malfunction indicator lamp signal	T		R			
A/C switch signal	R	T				
Ignition switch signal		T				R
Sleep/wake up signal		T	R			R

No communication between ECM and M&A (Combination meter).

It indicates that an error occurs between ECM and Combination meter (Shaded area).



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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Trouble Diagnosis Flow Chart

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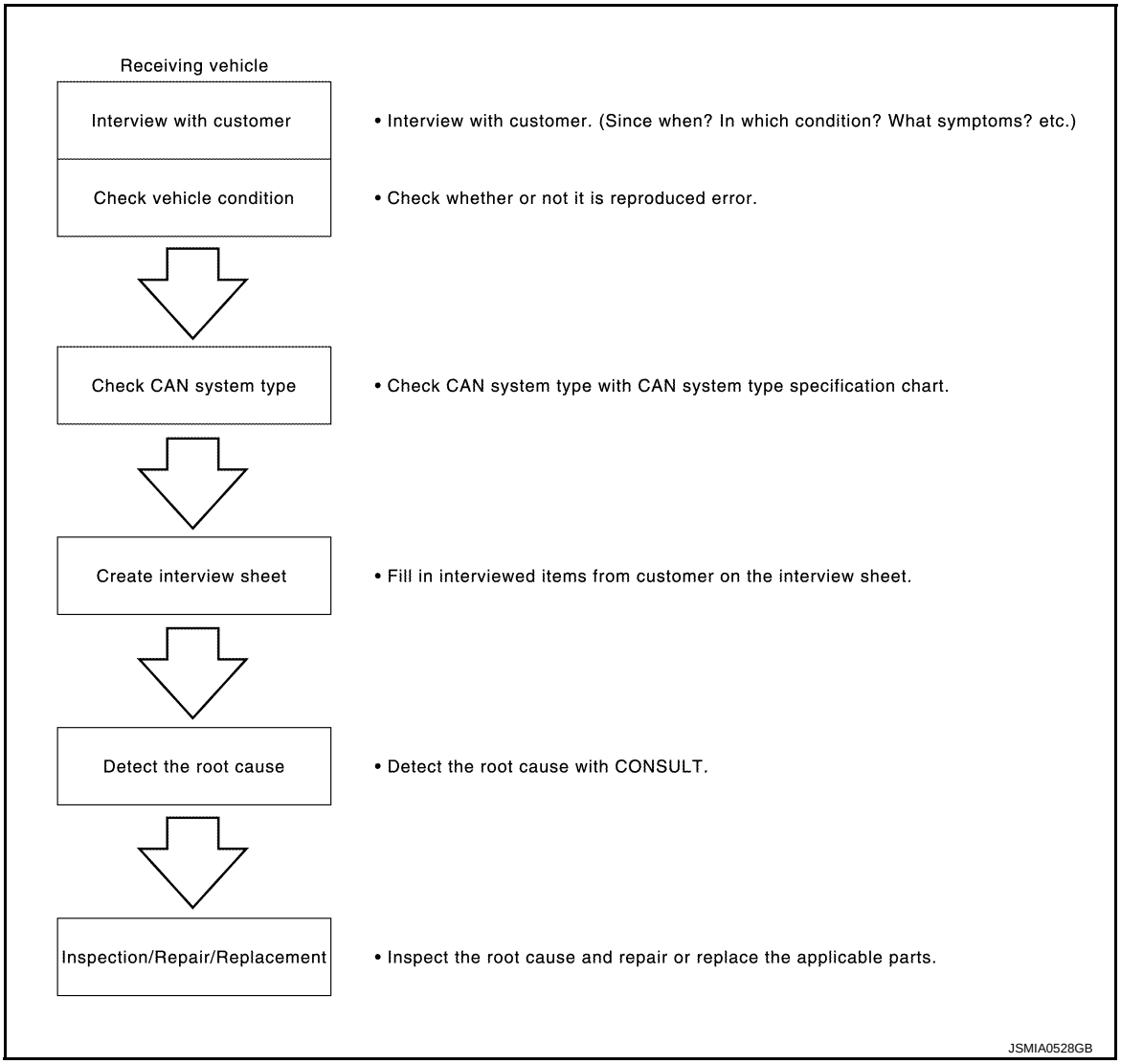

Trouble Diagnosis Procedure

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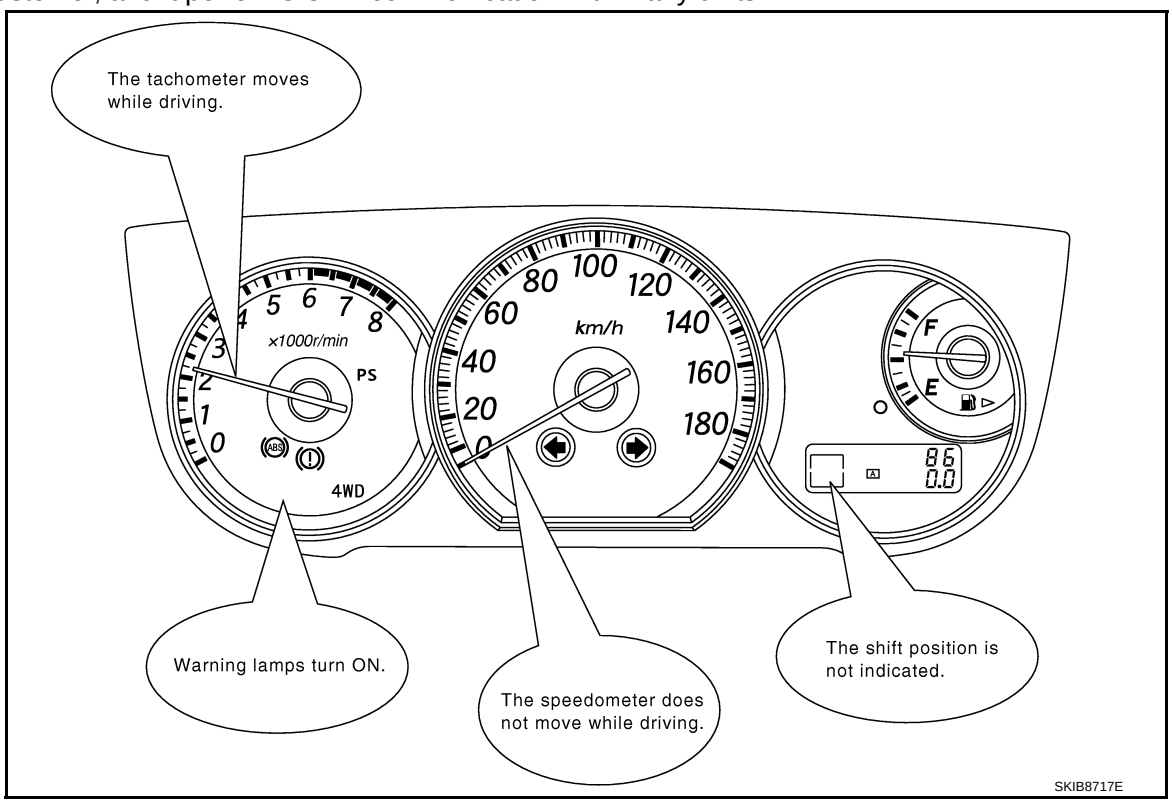
INTERVIEW WITH CUSTOMER

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

Notes for checking error symptoms:
- 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 fail-safe mode.

- 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 12V 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 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:

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. (○ shows an example of CAN system type.)

CAN System Specification Chart
Determine CAN system type from the following specification chart.

Body type	Wagon					
Axle	2WD				AWD	
Engine	QR25DE		VQ35DE			
Transmission	A/T		CVT			
Brake control	ABS				VDC	
Intelligent Key system		×		×		×
CAN system type	1	2	3	4	5	6
CAN communication control unit						
ECM	×	×	×	×	×	×
AWD control unit					×	×
Air bag diagnosis sensor unit	×	×	×	×	×	×
BCM	×	×	×	×	×	×
Intelligent Key unit		×		×		×
Steering angle sensor					×	×
EPS control unit	×	×	×	×	×	×
Combination meter	×	×	×	×	×	×
ABS actuator and electric unit (control unit)	×	×	×	×	×	×
TCM	×	×	×	×	×	×
IPDM E/R	×	×	×	×	×	×

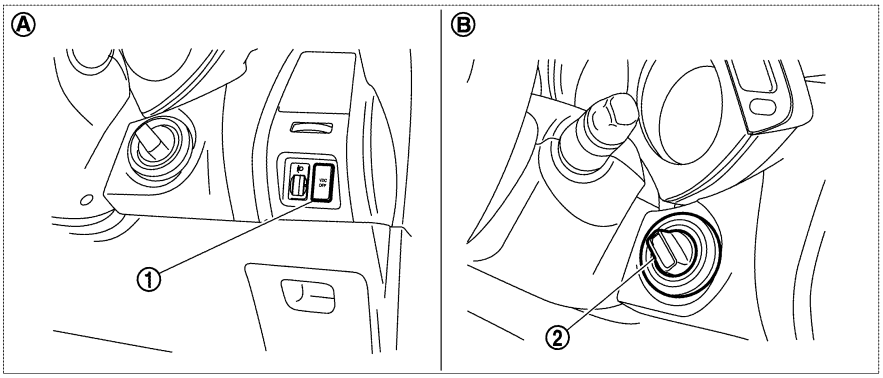
×: Applicable

Check the vehicle equipment with the vehicle identification number plate.

Check the vehicle equipment.

The number indicates the CAN system type of the vehicle.

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION
NOTE:
Check CAN system type from the vehicle shape and equipment.



In the above example,
- Checking VDC OFF switch leads to judge whether or not VDC is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.

1. VDC OFF switch
2. Ignition knob
A. With VDC
B. With Intelligent Key system

For the above case, CAN system type is "6".

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CAN System Type Specification Chart (Style B)
NOTE:

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

Example:
Vehicle is equipped as follows: Sedan, 2WD, MR20DE, CVT, ABS, Active AFS, Intelligent Key system, Navigation system and Automatic drive positioner. ( ) shows an example of CAN system type.)

CAN System Specification Chart

Refer to the specification as shown in the chart.

Body type	Sedan		
Axle	2WD		AWD
Engine	HR15DE	MR20DE	HR15DE
Transmission	A/T	CVT	A/T
Brake control	ABS		
Specification chart	XX.XX. SPECIFICATION CHART A	XX.XX. SPECIFICATION CHART B	XX.XX. SPECIFICATION CHART C

Check the vehicle equipment with the vehicle identification number plate.
Check the vehicle equipment.
Select the applicable vehicle equipment. Refer to the specification chart.

×: Applicable

SPECIFICATION CHART B

Determine CAN system type from the following specification chart.

Body type	Sedan										
Axle	2WD										
Engine	MR20DE										
Transmission	CVT										
Brake control	ABS										
Active AFS		×			×	×			×	×		×
Intelligent Key system			×		×		×	×	×	×	×	×
Navigation system				×		×	×		×		×	×
Automatic drive positioner								×		×	×	×
CAN system type	9	10	11	12	13	14	15	16	17	18	19	20
CAN communication control unit												
ECM	×	×	×	×	×	×	×	×	×	×	×	×
AFS control unit		×			×	×			×	×		×
BCM	×	×	×	×	×	×	×	×	×	×	×	×
IPDM E/R	×	×	×	×	×	×	×	×	×	×	×	×

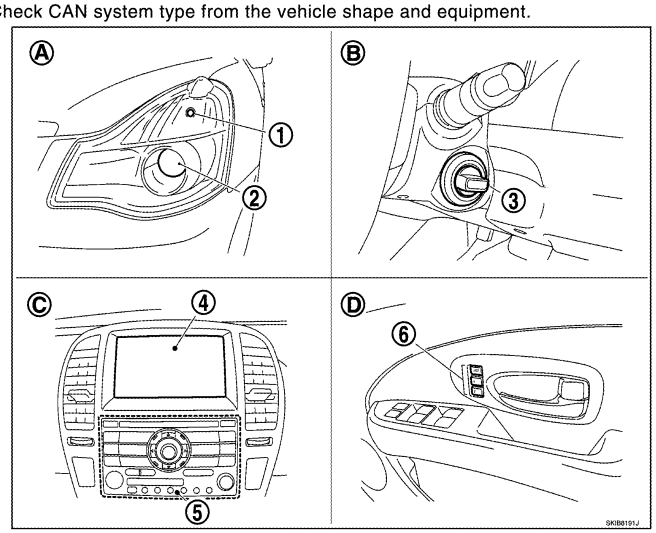
Check the vehicle equipment.
The number indicates the CAN system type of the vehicle.

×: Applicable

VEHICLE EQUIPMENT IDENTIFICATION INFORMATION

NOTE:

Check CAN system type from the vehicle shape and equipment.



1.Bending lamp 2.Xenon bulb 3.Ignition knob
4.Display 5.Multifunction switch 6.Seat memory switch
A. With active AFS B. With Intelligent Key system C. With navigation system
D.With automatic drive positioner

In the above example,
- Checking Xenon bulb and bending lamp lead to judge whether or not Active AFS is equipped.
- Checking the ignition knob leads to judge whether or not Intelligent Key system is equipped.
- Checking display and multifunction switch lead to judge whether or not Navigation system is equipped.
- Checking seat memory switch leads to judge whether or not Automatic drive positioner is equipped.

For the above case, CAN system type is "20".

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CREATE INTERVIEW SHEET

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

Interview Sheet (Example)

CAN Communication System Diagnosis Interview Sheet

Date received: 3, Feb. 2006

Type: DBA-KG11

VIN No.: KG11-005040

Model: BDRARGZG11EDA-E-J-

First registration: 10, Jan. 2001

Mileage: 62,140

CAN system type: Type 19

Symptom (Results from interview with customer)

- Headlamps suddenly turn ON while driving the vehicle.
- The engine does not restart after stopping the vehicle and turning the ignition switch OFF.
- The cooling fan continues rotating 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 the cooling fan continues rotating.
- The interior lamp does not turn ON.

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DETECT THE ROOT CAUSE

CAN diagnosis function of CONSULT detects the root cause.

HOW TO USE THIS MANUAL

HOW TO USE THIS SECTION

Information

INFOID:0000000006977725

- “CAN” of LAN Section describes information peculiar to a vehicle and inspection procedures.
- For trouble diagnosis procedure, refer to LAN-15, "Trouble Diagnosis Flow Chart" of “CAN FUNDAMENTAL”.

Abbreviation List

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Control unit name abbreviations in CONSULT CAN diagnosis and in this section are as per the following list.

Abbreviation	Control unit name
A-BAG	Air bag diagnosis sensor unit
ABS	ABS actuator and electric unit (control unit)
AV	AV control unit
BCM	BCM
BRAKE	Electrically-driven intelligent brake unit
DLC	Data link connector
E-SHIFT	Electric shift control module
EHS/PKB	Electric parking brake control module
EPS	EPS control unit
EV/HEV	VCM
HVAC	A/C auto amp.
HV BAT	Li-ion battery controller
INV/MC	Traction motor inverter
IPDM-E	IPDM E/R
M&A	Combination meter
OBC	On board charger
STRG	Steering angle sensor
TCU	TCU

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

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OPERATION PROHIBITION

WARNING:

- **Parts with strong magnet is used in this vehicle.**
- **Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.**

NORMAL CHARGE PRECAUTION

WARNING:

- **If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.**
- **As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.**

Precaution at telematics system operation

WARNING:

- **If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.**
- **The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.**
- **If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator(ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.**

Precaution at intelligent key system operation

WARNING:

- **If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.**
- **The electromagnetic wave of intelligent key might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), at door operation, at each request switch operation, or at engine starting.**
- **If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of intelligent key might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before intelligent key use.**

High Voltage Precautions

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WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.**

- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

The colors of the high voltage harnesses and connectors are all orange. Orange "High Voltage" labels are applied to the Li-ion battery and other high voltage devices. Do not carelessly touch these harnesses and parts.

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

Immediately insulate disconnected high voltage connectors and terminals with insulating tape.

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

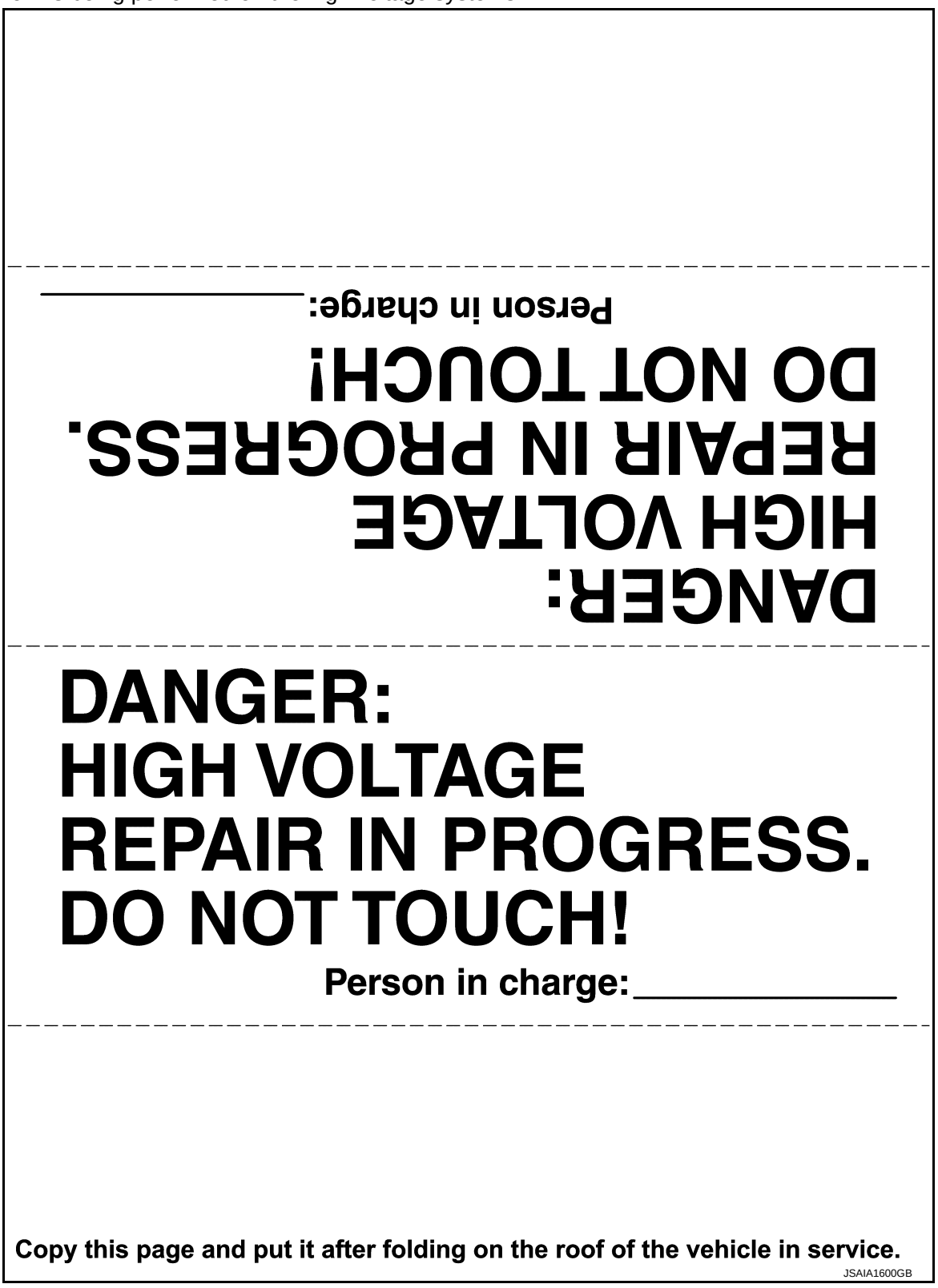
The vehicle contains parts that contain powerful magnets. If a person who is wearing a pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

Because this vehicle uses components that contain high voltage and powerful magnetism, due not carry any metal products which may cause short circuits, or any magnetic media (cash cards, prepaid cards, etc.) which may be damaged on your person when working.

POSTING A SIGN OF “DANGER! HIGH VOLTAGE AREA. KEEP OUT”

To call the attention of other workers, indicate "High voltage work in progress. Do not touch!" on vehicles where work is being performed on the high voltage systems.



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

INFOID:0000000006968937

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 AIR BAG” and “SEAT BELT” of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that 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 “SRS AIR BAG”.**
- **Never 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 WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

WARNING:

Always observe the following items for preventing accidental activation.

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the power switch ON, never use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the power switch OFF, disconnect the 12V battery, and wait at least 3 minutes before performing any service.**

Point to Be Checked Before Starting Maintenance Work

INFOID:0000000007079506

The high voltage system may starts automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.

NOTE:

If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

Precaution for Removing 12V Battery

INFOID:0000000006968932

When removing the 12V battery, turn ON/OFF the power switch and check that the charging status indicator does not blink. The 12V battery must be removed within one hour after checking the indicator lamp.

NOTE:

- The automatic 12V battery charge control may start even when the power switch is in OFF state.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

Precautions for Trouble Diagnosis

INFOID:0000000006968933

CAUTION:

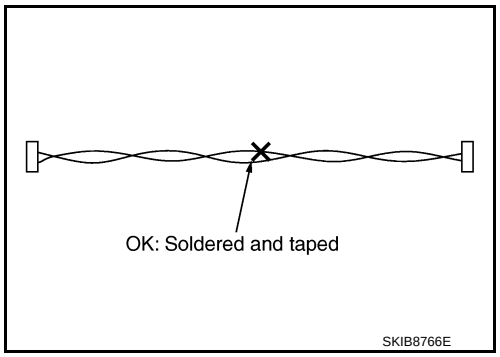
Follow the instructions listed below. Failure to do this may cause damage to parts:

- **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 power switch OFF and disconnect the 12 V battery cable from the negative terminal when checking the harness.**

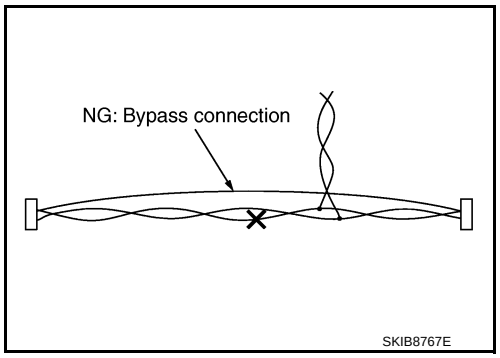
Precautions for Harness Repair

INFOID:0000000006968934

- 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.



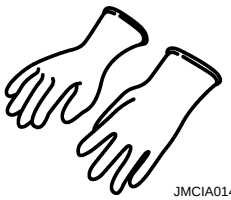
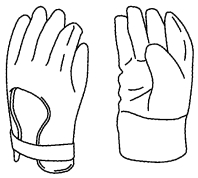
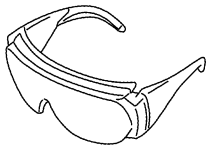
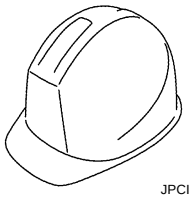
- Replace the applicable harness as an assembly if error is detected on the shield lines of CAN communication line.

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000006968935

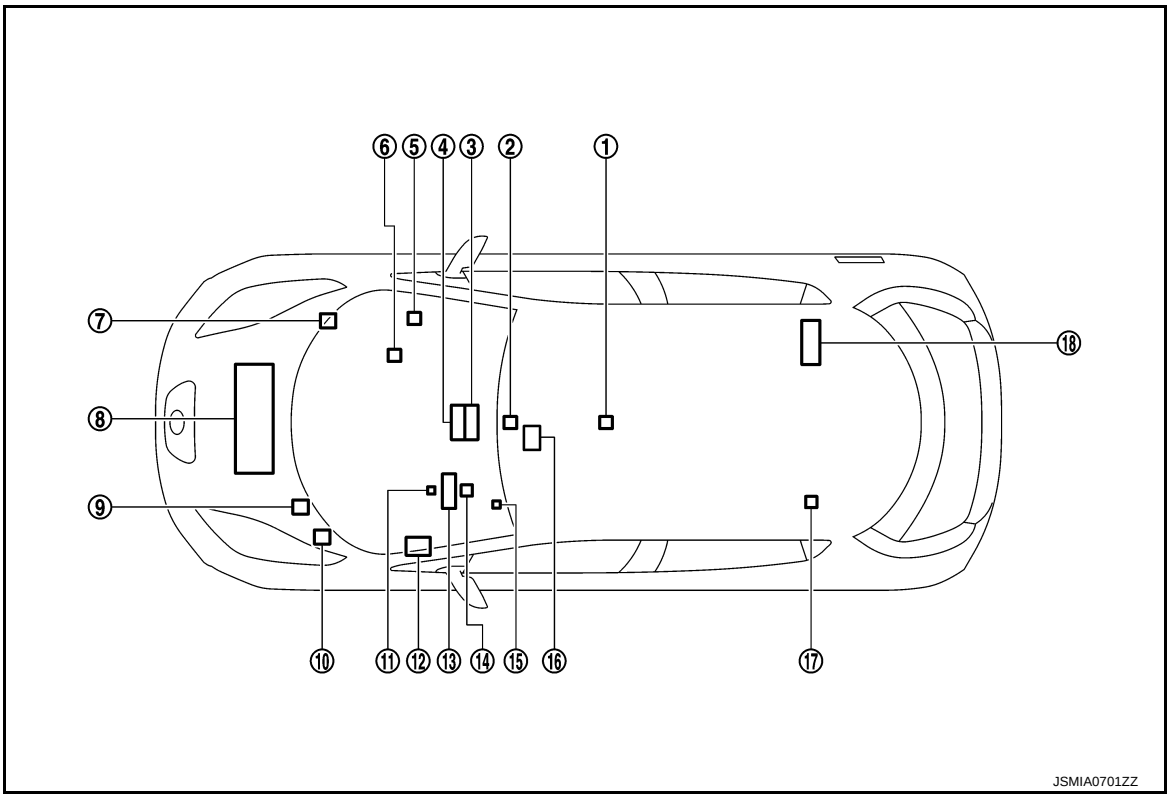
Tool name		Description
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	 JMCIA0149ZZ	Removing and installing high voltage components
Leather gloves [Use leather gloves that can fasten the wrist tight]	 JPCIA0066ZZ	• Removing and installing high voltage components • Protect insulated gloves
Insulated safety shoes	 JPCIA0011ZZ	Removing and installing high voltage components
Safety glasses [ANSI Z87.1]	 JPCIA0012ZZ	• Removing and installing high voltage components • To protect eye from the spatter on the work to electric line
Insulated helmet	 JPCIA0013ZZ	Removing and installing high voltage components

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000006977727

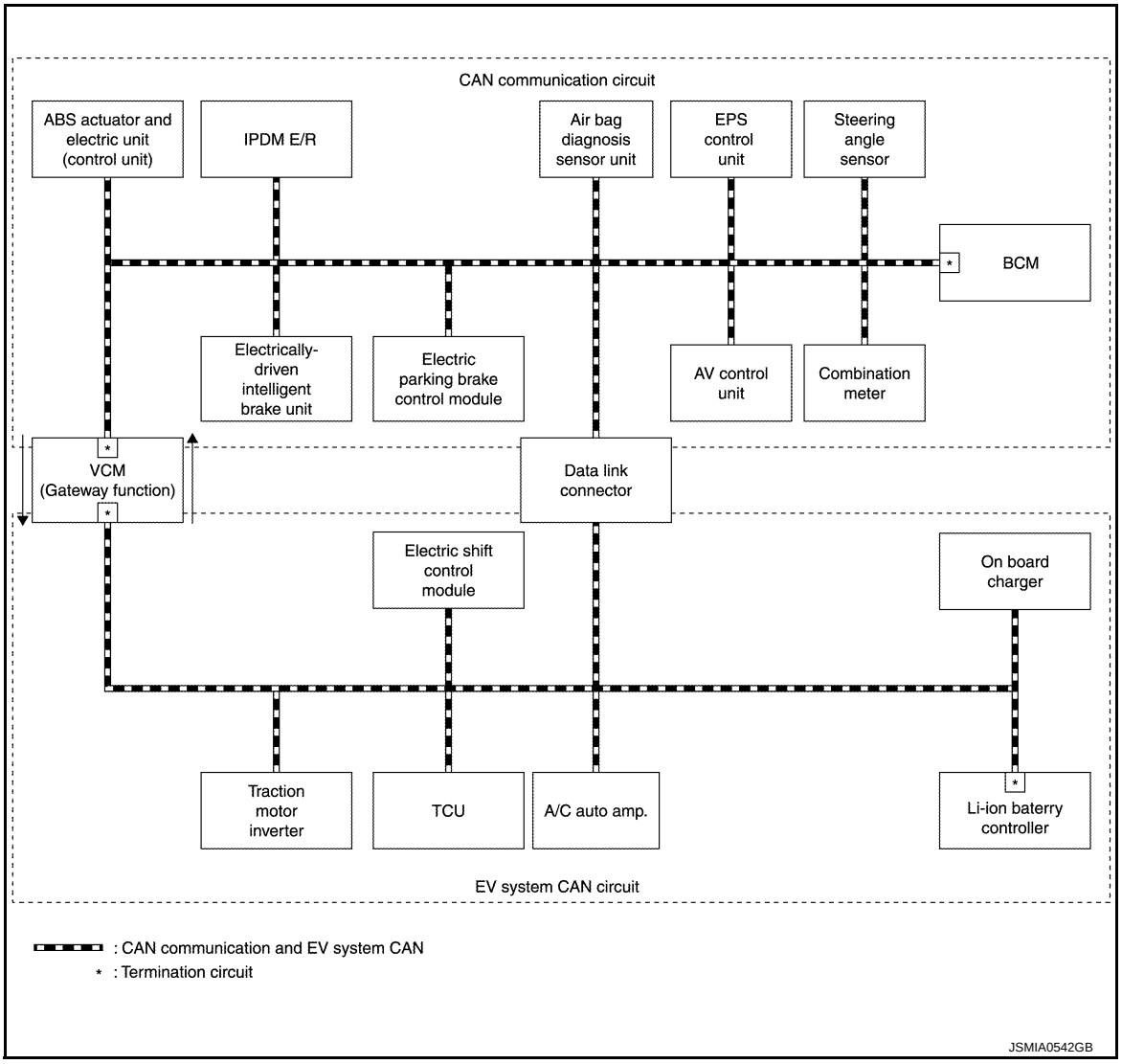


1. Air bag diagnosis sensor unit
2. Electric shift control module
3. AV control unit
4. A/C auto amp.
5. TCU
6. VCM
7. ABS actuator and electric unit (control unit)
8. Traction motor inverter
9. Electrically-driven intelligent brake unit
10. IPDM E/R
11. EPS control unit
12. BCM
13. Combination meter
14. Steering angle sensor
15. Data link connector
16. Li-ion battery
17. Electric parking brake control module
18. On board charger

SYSTEM
CAN COMMUNICATION SYSTEM
CAN COMMUNICATION SYSTEM : System Description

INFOID:0000000006977728

SYSTEM DIAGRAM

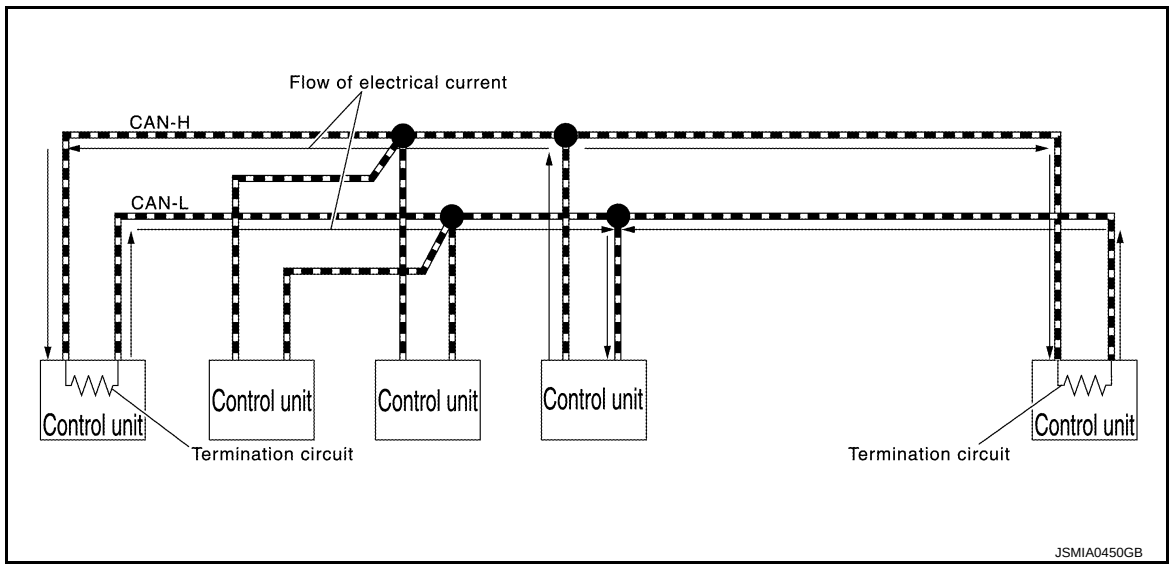


DESCRIPTION

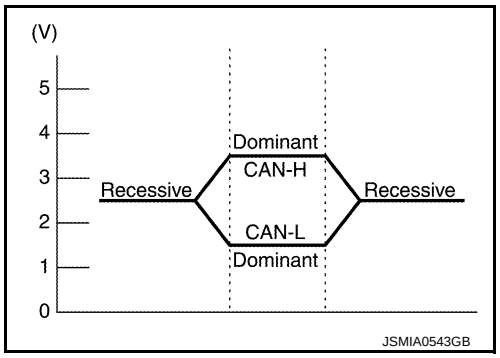
- CAN (Controller Area Network) is a serial communication line for real time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.
- VCM includes a gateway function and communicates signals between the CAN communication circuit and EV system CAN circuit. Refer to EVC-16, "VCM".

CAN COMMUNICATION SIGNAL GENERATION

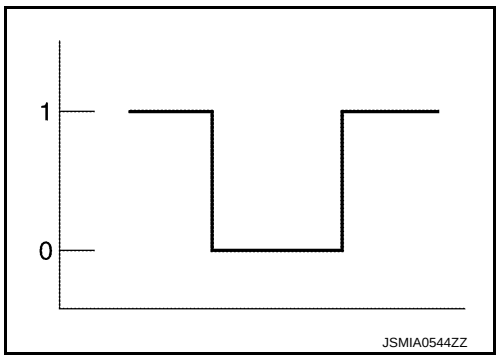
- Termination circuits (resistors) are connected across the CAN communication system. When transmitting a CAN communication signal, each control unit passes a current to the CAN-H line and the current returns to the CAN-L line.



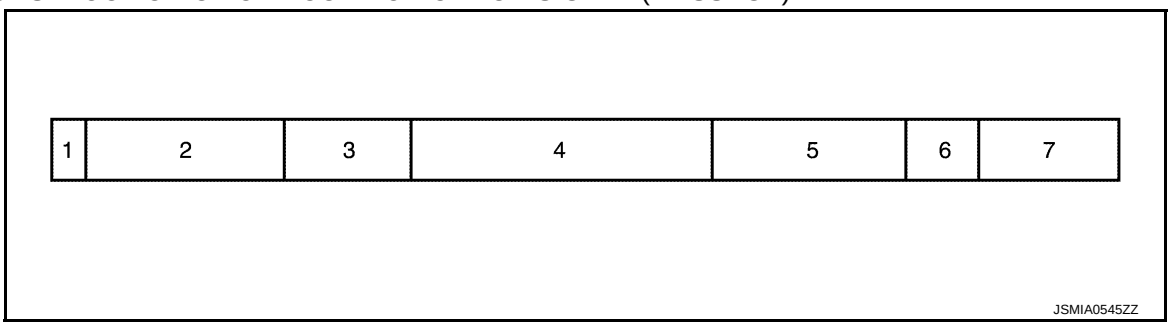
- The current flows separately into the termination circuits connected across the CAN communication system and the termination circuits drop voltage to generate a potential difference between the CAN-H line and the CAN-L line.
  NOTE:
  A signal with no current passage is called “Recessive” and one with current passage is called “Dominant”.



- The system produces digital signals for signal communications, by using the potential difference.



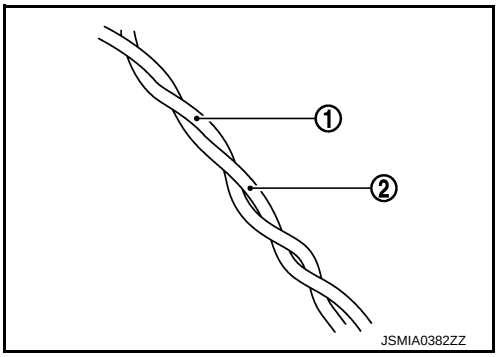
THE CONSTRUCTION OF CAN COMMUNICATION SIGNAL (MESSAGE)



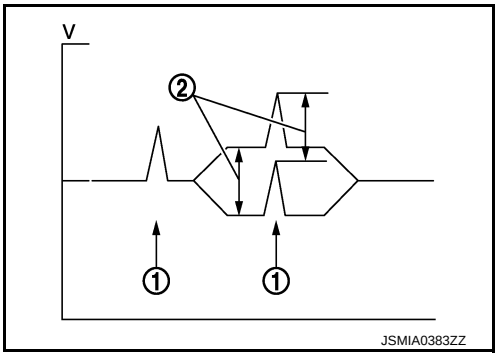
No.	Message name	Description
1	Start of frame (1 bit)	Start of message.
2	Arbitration of field (11 bit)	Priorities of message-sending are shown when there is a possibility that multiple messages are sent at the same time.
3	Control field (6 bit)	Signal quantity in data field is shown.
4	Data field (0-64 bit)	Actual signal is shown.
5	CRC field (16 bit)	• The transmitting control unit calculates sending data in advance and writes the calculated value in a message. • The receiving control unit calculates received data and judges that the data reception is normal when the calculated value is the same as the value written in the sent data.
6	ACK field (2 bit)	The completion of normal reception is sent to the transmitting unit.
7	End of frame (7 bit)	End of message.

CAN Communication Line

The CAN communication line is a twisted pair wire consisting of strands of CAN-L (1) and CAN-L (2) and has noise immunity.



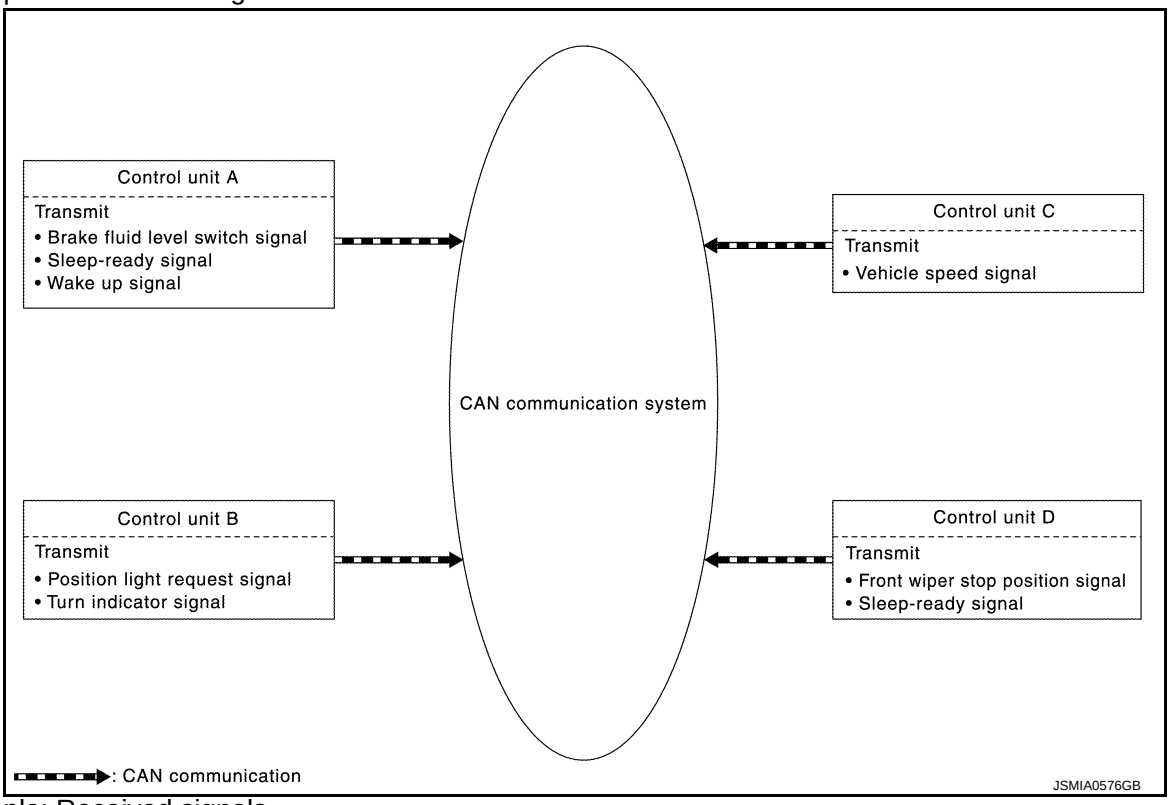
NOTE:
The CAN communication system has the characteristics of noise-resistant because this system produces digital signals by using the potential difference between the CAN-H line and the CAN-L line and has the twisted pair wire structure.
Since the CAN-H line and the CAN-L line are always adjacent to each other, the same degree of noise occurs, respectively, when a noise (1) occurs. Although the noise changes the voltage, the potential difference (2) between the CAN-H line and the CAN-L line is insensitive to noise. Therefore, noise-resistant signals can be obtained.



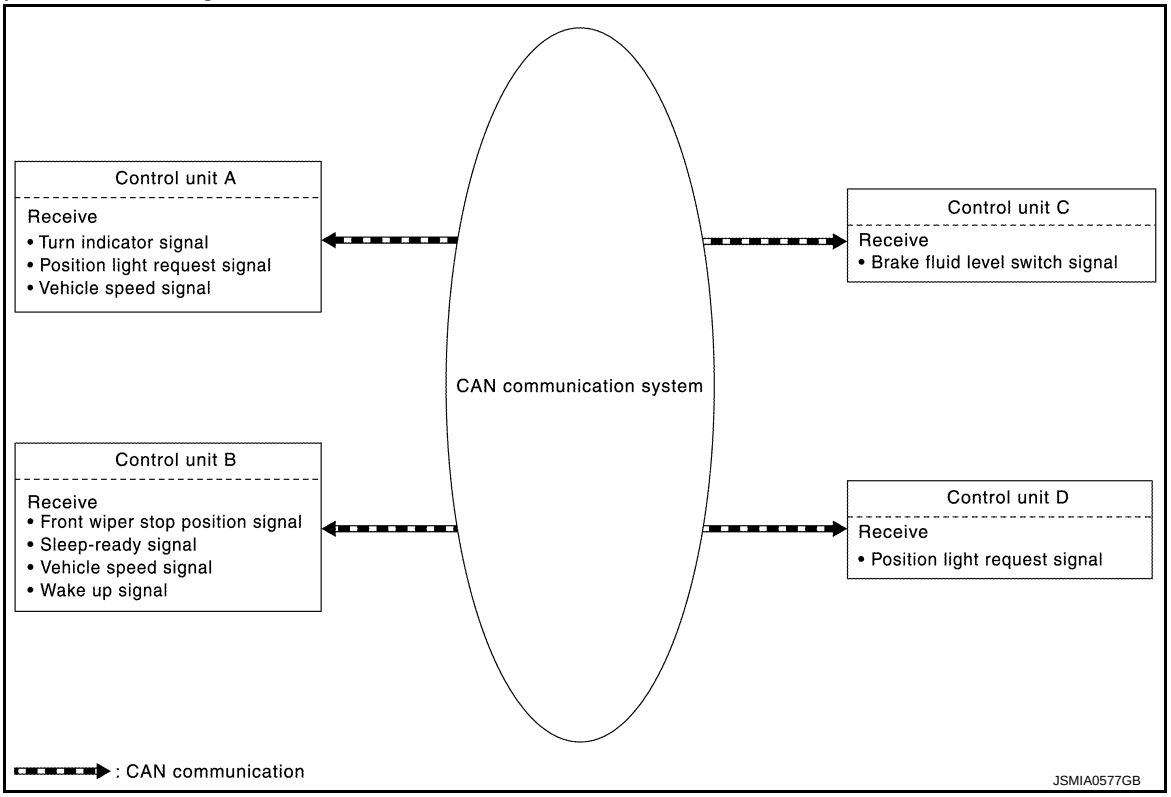
CAN Signal Communications

Each control unit of the CAN communication system transmits signals through the CAN communication control circuit included in the control unit and receives only necessary signals from each control unit to perform various kinds of control.

- Example: Transmitted signals



- Example: Received signals

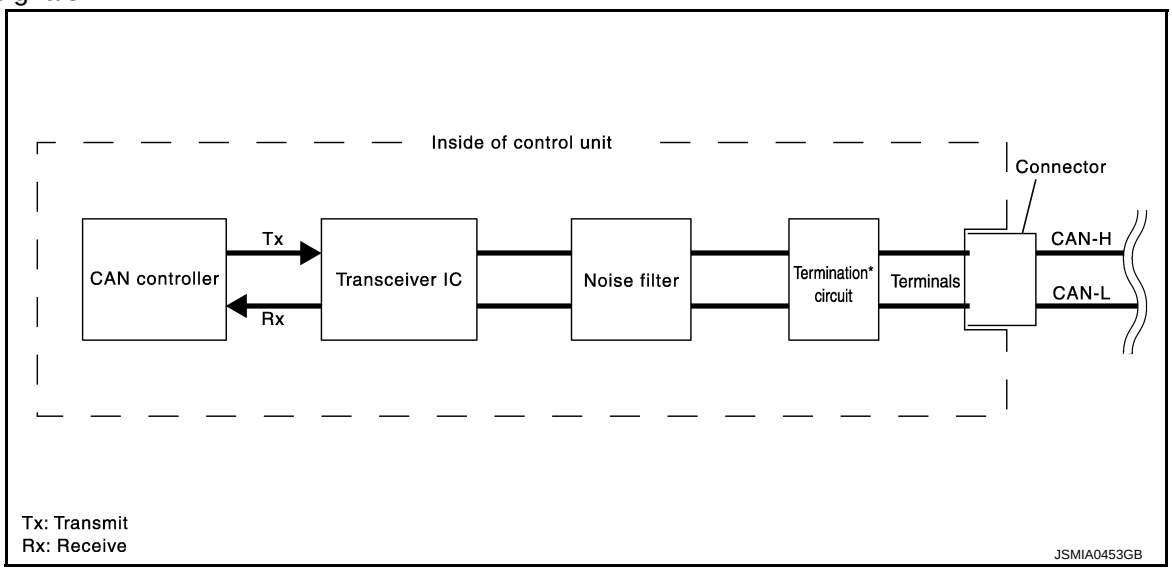


NOTE:
The above signal names and signal communications are provided for reference purposes. For CAN communications signals of this vehicle, refer to LAN-33, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart".

CAN COMMUNICATION SYSTEM : CAN Communication Control Circuit

INFOID:0000000006977729

CAN communication control circuit is incorporated into the control unit and transmits/receives CAN communication signals.



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)	Generates a potential difference between CAN-H and CAN-L.

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

CAN COMMUNICATION SYSTEM : CAN System Specification Chart

INFOID:0000000006977730

Determine CAN system type from the following specification chart.

NOTE:

Refer to LAN-15, "Trouble Diagnosis Procedure" for how to use CAN system specification chart.

Body type	4-door hatch back
Motor	EM61
Axle	2WD
Transmission	Reduction gear
Brake control	VDC
CAN system type	1
CAN communication control unit	
VCM	×
ABS actuator and electric unit (control unit)	×
Electrically-driven intelligent brake unit	×
IPDM E/R	×
Electric parking brake control module	×
Air bag diagnosis sensor unit	×
AV control unit	×
Data link connector	×
EPS control unit	×

Body type	4-door hatch back
Motor	EM61
Axle	2WD
Transmission	Reduction gear
Brake control	VDC
Combination meter	×
Steering angle sensor	×
BCM	×
EV system CAN control unit	
VCM	×
Traction motor inverter	×
Data link connector	×
Electric shift control module	×
A/C auto amp.	×
TCU	×
On board charger	×
Li-ion battery controller	×

×: Applicable

CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart

INFOID:0000000006833640

Refer to LAN-14, "How to Use CAN Communication Signal Chart" for how to use CAN communication signal chart.

NOTE:

Refer to LAN-20, "Abbreviation List" for the abbreviations of the connecting units.

T: Transmit R: Receive

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Buzzer output signal	T		R								T						
Door switch signal	T		R					R	R								
Front fog light request signal	T		R					R									
Front wiper request signal	T							R									
High beam request signal	T		R					R									
Low beam request signal	T							R									
Low tire pressure warning lamp signal	T		R														
Meter display signal	T		R														
Position light request signal	T		R					R									
Rear window defogger control signal	T							R									
								T			R						
Sleep wake up signal	T		R					R	R								
Stop lamp switch signal	T						R										
									R	T							
											T		R				
Theft warning horn request signal	T							R									
TPMS warning lamp signal	T		R														

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Turn indicator signal	T		R														
Steering angle sensor signal		T			R				R	R							
Brake fluid level switch signal			T							R							
Odometer signal	R		T		R						R						
Parking brake switch signal			T							R							
Seat belt buckle switch signal (driver side)	R		T				R										
Sleep-ready signal	R		T					T									
Vehicle speed signal (Meter)	R		T	R	R			R			R						
Wake up signal	R		T														
EPS warning lamp signal			R	T													
Current time signal					T						R						
Car crash information signal						T					R						
Electric parking brake indicator lamp signal			R				T										
Master warning signal			R				T										
Front wiper status signal								T			R						
Front wiper stop position signal	R							T									
High beam status signal								T			R						
Interlock/PNP switch signal	R							T									
	T							R									
Low beam status signal								T			R						
P position signal	R							T									
Power switch ON signal	R						R	T									
	T							R	R								
Power switch (push switch) status signal	R							T									
Brake assist request signal									T	R							
Brake backup operation signal									T	R							
Brake fluid pressure command signal									T	R							
Brake system warning lamp signal			R						T								
Electrically-driven intelligent brake control signal									T	R							
Target braking force signal									T		R						
ABS actuator and electric unit (control unit) control signal									R	T							
ABS warning lamp signal			R							T							
Brake warning lamp signal			R							T							
Decel G signal							R		R	T							
EBD malfunction signal									R	T							
EBD operation signal									R	T							
Front LH wheel speed signal									R	T							
Front RH wheel speed signal									R	T							
Rear LH wheel speed signal							R		R	T							
Rear RH wheel speed signal							R		R	T							

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Side G signal									R	T							
Stop lamp OFF relay signal									R	T							
TCS operation signal									R	T	R						
Torque limit request signal										T	R						
VDC OFF switch signal			R							T							
VDC operation signal									R	T	R						
VDC warning lamp signal			R							T							
Vehicle speed signal (ABS)	R		R	R			R		R	T	R						
											T		R				
Yaw rate signal									R	T							
12-volt battery charge warning lamp request signal			R								T						
A/C consumption power status display signal					R						T						
A/C consumption signal			R		R						T						
A/C expected consumption signal											T				R		
A/C maximum power signal											T			R			
A/C OFF average electricity consumption for driving range signal			R								T						
			T		R												
A/C ON average electricity consumption for driving range signal			R								T						
			T		R												
Accelerator pedal position signal							R			R	T						
ASCD status signal			R								T						
Charge status signal											T				R		
Compressor ON inhibition signal											T			R			
Current motor power signal			R		R						T						
Current regenerative torque signal									R		T						
Driving range difference signal			R								T						
			T		R												
Driving range flashing request signal			R								T						
Driving range request signal			R								T						
Driving range signal			R								T						
ECO mode request signal											T			R			
ECO tree signal			R		R						T						
Electricity consumption signal			R								T						
F/S CHG relay status signal											T					R	
High voltage power supply status signal											T	R					
Instant ECO indicator signal			R								T						
Li-ion battery charging data signal					R						T						
Li-ion battery temperature signal			R								T						
Low battery charge warning lamp request signal			R								T						

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Maximum charge power signal											T					R	
Maximum motor output power signal			R								T						
Maximum regenerable power signal			R								T						
Motor charge preparation request signal											T	R					
Motor discharge request signal											T	R					
Motor torque control signal										R	T						
Next charge time signal			R								T						
Next departure time signal			R								T						
Next pre-A/C time signal			R								T						
Others consumption signal			R		R						T						
Plug in warning display signal			R								T						
Power limitation cause signal			R								T						
Power limitation indicator lamp request signal			R								T						
Power OFF permit signal	R										T						
Power steering start activation request signal				R							T						
Pre-A/C priority signal					R						T						
Pre-A/C status signal											T				R		
Pre-A/C timer signal					R						T						
Pulse signal OFF signal											T	R					
READY condition signal	R										T						
READY to drive indicator lamp request signal			R								T						
Rear window defogger status signal											T			R			
Refrigerant pressure signal											T			R			
Regenerative torque command signal											T	R					
Remaining time to charge completion (100 V) signal			R		R						T				R		
Remaining time to charge completion (200 V) signal			R		R						T				R		
Shift P range request display signal			R								T						
Soon charge switch request signal			R								T						
System cut off signal											T	R					
Target Li-ion battery remained energy signal											T						R
Target motor torque signal											T	R					
Timer A/C request signal											T			R			
Traction motor consumption signal					R						T						
VCM activation/deactivation command signal					R						T				R		
VCM malfunction signal									R	R	T						
VCM status signal	R				R		R				T				R		

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Vehicle stop and parking brake operation request display signal			R								T						
Vibration control switching signal											T	R					
High voltage power supply preparation completion signal											R	T					
Input high voltage signal											R	T					
Motor discharge status signal											R	T					
Motor speed signal							R				R	T					
Motor torque limit signal											R	T					
System main relay ON permit signal											R	T					T
Electric shift warning lamp signal											R		T				
			R								T						
Electric shift warning massage signal											R		T				
			R								T						
Shift position signal											R	R	T				
	R		R				R			R	T	R					
Shift refuse buzzer signal											R		T				
			R								T						
A/C switch ON signal											R			T			
Ambient sensor signal											R			T			
			R								T						
Blower fan ON signal											R			T			
Evaporator temperature signal											R			T			
Target evaporator temperature signal											R			T			
Timer A/C operation time signal											R			T			
HV harness interlock signal (PTC)											R			T			
Remote A/C request signal											R				T		
Remote charge request signal											R				T		
VCM sleep signal											R				T		
AC input type signal											R				R	T	
Charge stop request signal											R					T	
Diagnostic trouble code signal											R					T	
EV system warning lamp request signal											R					T	
			R								T						
EVSE connecting signal											R				R	T	
EVSE PWM communication signal											R					T	
HV harness interlock signal (OBC)											R					T	
Quick charge start/stop 1 signal											R					T	
Quick charge start/stop 2 signal											R					T	
Quick charge voltage signal											R					T	
Quick charger connecting signal											R					T	
Quick charger isolation check signal											R					T	

Signal name	CAN communication circuit										EV system CAN circuit						
	BCM	STRG	M&A	EPS	AV	A-BAG	EHS/PKB	IPDM-E	BRAKE	ABS	EV/HEV	INV/MC	E-SHIFT	HVAC	TCU	OBC	HV BAT
Charge type signal											R					R	T
High voltage discharge permit signal											R						T
Insulation resistance signal											R						T
Li-ion battery available charge signal											R						T
			R								T				R		
Li-ion battery capacity signal											R					R	T
			R								T				R		
Li-ion battery cell control signal											R						T
Li-ion battery charge completion signal											R						T
Li-ion battery chargeable power signal											R						T
Li-ion battery connector interlock signal											R						T
Li-ion battery current signal											R					R	T
Li-ion battery dischargeable power signal											R						T
Li-ion battery gradual capacity loss signal											R						T
											T				R		
Li-ion battery main relay cut request signal											R						T
Li-ion battery voltage signal											R					R	T
Power limit cause (LBC) signal											R						T
Remaining time to charge completion signal											R					R	T

WIRING DIAGRAM

CAN SYSTEM

Wiring Diagram

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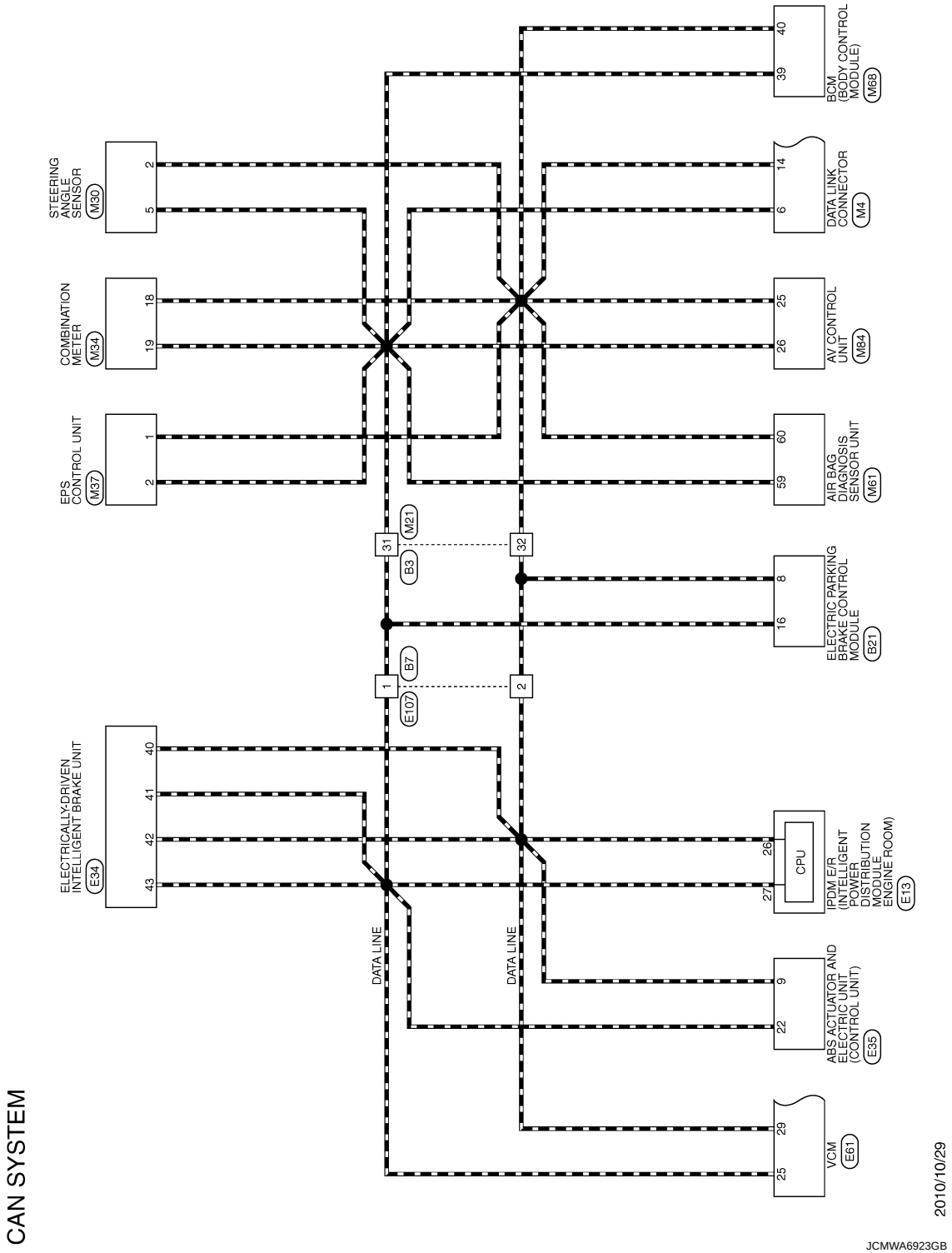

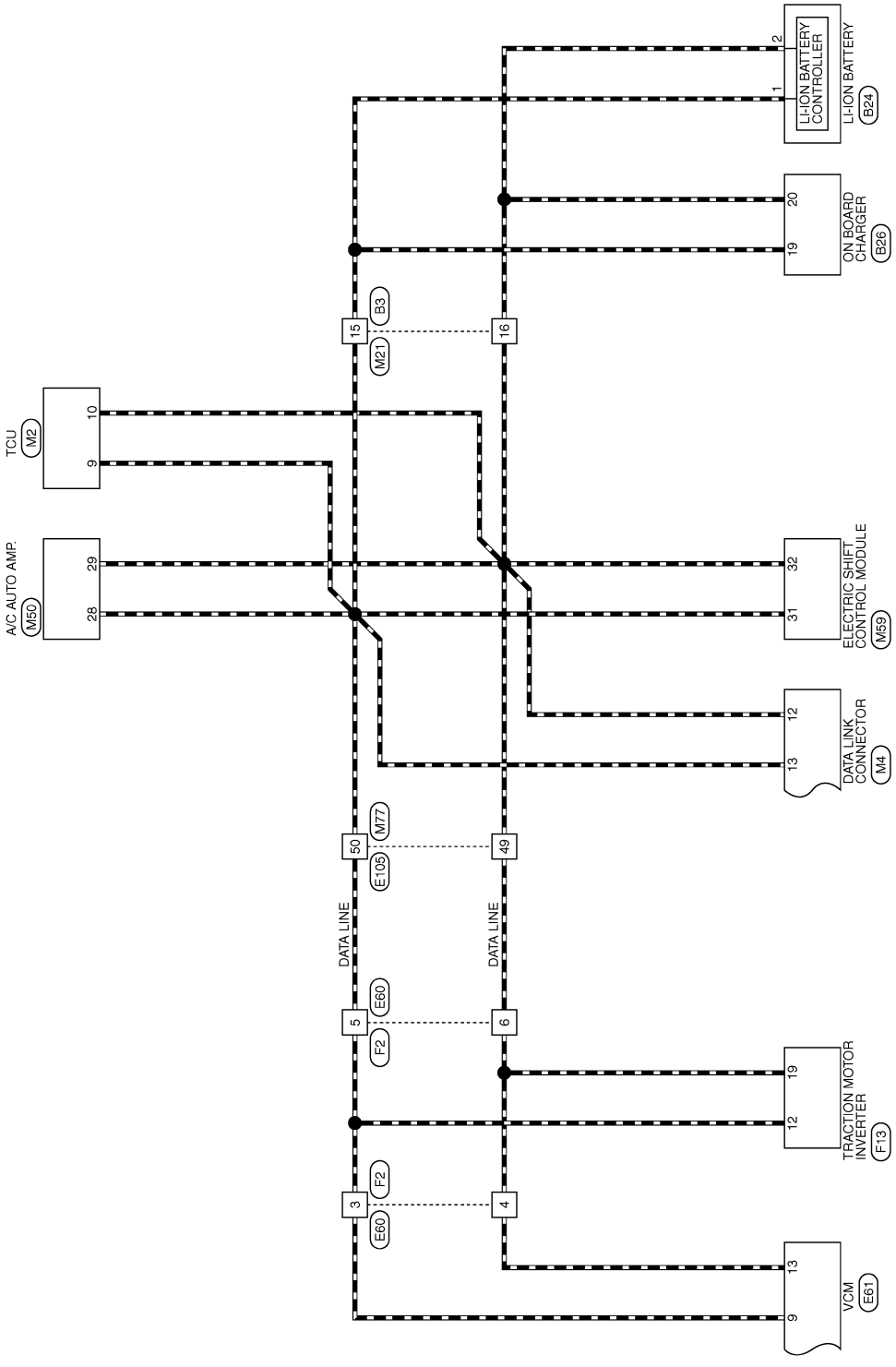

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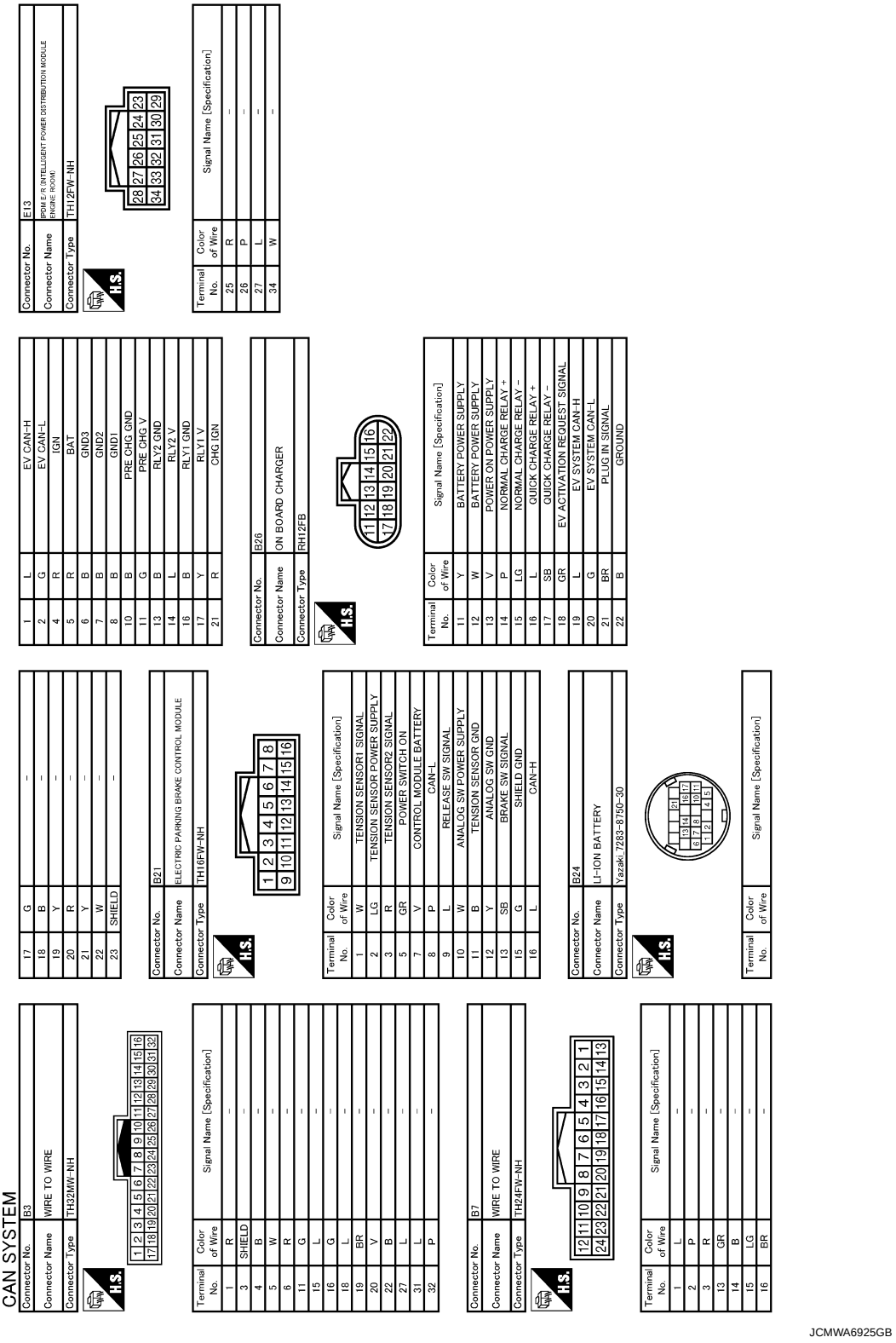

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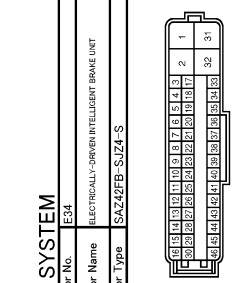
CAN SYSTEM

Connector No.	E34
Connector Name	ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT
Connector Type	SAZ42FB-SJZ4-S



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	MOTOR BATTERY
2	R	MOTOR BATTERY
5	L/O	STROKE SENSOR GND
7	W	PRESS SENSOR SIGNAL
8	O	BRAKE POWER SUPPLY BACKUP UNIT WAKEUP SIGNAL
10	W	BRAKE POWER SUPPLY BACKUP COMM
11	Y	CONTROL MODULE BATTERY
13	SB	STOP LAMP SW SIGNAL
19	W/L	STROKE SENSOR POWER SUPPLY
21	B	PRESS SENSOR POWER SUPPLY
22	W	BUZZER SIGNAL
24	B	BRAKE COMM
25	R	BUZZER POWER SUPPLY
26	V	POWER SWITCH ON
31	B	GND
32	W	BRAKE POWER SUPPLY BACKUP UNIT BACKUP SIGNAL
35	L/Y	STROKE SENSOR1 SIGNAL
37	G	STROKE SENSOR2 SIGNAL
38	R	PRESS SENSOR GND
40	P	CAN2-L
41	L	CAN2-H
42	P	CAN1-L
43	L	CAN1-H

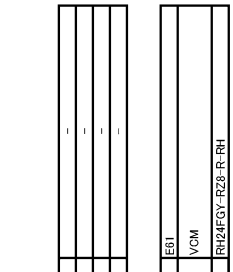
Connector No.	E35
Connector Name	ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)
Connector Type	RH26FB-NU4-DH

Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	–
2	G	–
3	L	–
4	G	–
5	L	–
6	G	–
7	L	–
8	SB	–

Connector No.	E60
Connector Name	WIRE TO WIRE
Connector Type	RH12MB

Terminal No.	Color of Wire	Signal Name [Specification]
9	V	–
10	O	–
11	BR	–
12	LG	–

Connector No.	E61
Connector Name	VCM
Connector Type	RH24FGY-RZ8-R-RH



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	POWER ON POWER SUPPLY
4	B/R	GROUND
5	SB	A/C RELAY
6	R	BATTERY POWER SUPPLY
7	W	SSOFF RELAY
8	B/R	GROUND
9	L	EV SYSTEM CAN-H
13	G	EV SYSTEM CAN-L
15	O	ASCD BRAKE SWITCH SIGNAL
18	SB	STOP LAMP SW SIGNAL
21	R	POWER ON POWER SUPPLY
23	P	HIGH VOLTAGE CABLE INTERLOCK
25	L	CAN-H
26	Y	WATER PUMP 2 SIGNAL
28	W	WATER PUMP 1 SIGNAL
29	P	CAN-L

Terminal No.	Color of Wire	Signal Name [Specification]
1	R	MOTOR BATTERY
2	R	MOTOR BATTERY
3	B	GND
4	B	GND
5	P	ESP OFF SW SIGNAL
6	O	BRAKE SW SIGNAL
7	L/Y	PRESS SENSOR SIGNAL
8	SB	STOP LAMP SW SIGNAL
9	P	CAN-L
10	W/L	PRESS SENSOR POWER SUPPLY
11	BR	RR RH WHEEL SENSOR POWER SUPPLY
12	W	FR RH WHEEL SENSOR SIGNAL
13	G	G SENSOR POWER SUPPLY
14	B	G SENSOR SIGNAL (+)
15	LG	RR RH WHEEL SENSOR SIGNAL
16	V	POWER SWITCH ON
20	B	BRAKE COMM
21	B	FR RH WHEEL SENSOR POWER SUPPLY
22	L	CAN-H
23	R	FR LH WHEEL SENSOR POWER SUPPLY
26	B	RR LH WHEEL SENSOR POWER SUPPLY
27	Y	FR LH WHEEL SENSOR SIGNAL
28	R	G SENSOR GND
29	Y	G SENSOR SIGNAL (-)
30	G	RR LH WHEEL SENSOR SIGNAL
32	L/O	PRESS SENSOR GND

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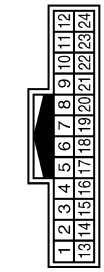
Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4

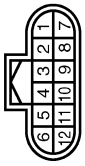
Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	–
2	R	–
3	GR	–
4	LG	–
6	W	–
7	V	–
8	P	–
9	G	–
10	R	–
11	O	–
12	W	–
13	B	–
14	Y	–
15	BR	–
16	LG	–
17	L	–
19	G	–
20	V	–
21	P	–
22	LG	–
23	GR	–
24	L	–
25	R	–
26	SB	–
27	B	–
29	BR	–
30	W	–
31	V	–
32	LG	–
33	O	–
34	L	–
35	BR	–
38	SB	–
39	GR	–
40	Y	–
41	R	–
42	W	–
43	SB	–
44	GR	–
45	G	–
46	P	–
47	LG	–
48	V	–
49	G	–
50	L	–
51	W	–
54	P	–
55	O	–
56	Y	–
57	P	–
58	LG	–
60	LG	–
61	GR	–
62	BR	–
64	R	–
65	Y	–
66	G	–
67	V	–
68	W	–
69	SB	–
71	Y	–
72	L	–
73	R	–
74	L	–
75	V	–
76	P	–
80	O	–
81	L	–
82	SB	–
83	G	–
84	BR	–
85	LG	–
86	GR	–
88	B	–
89	W	–
90	SHIELD	–
91	Y	–
92	BR	–
93	W	–
94	R	–
95	V	–
96	P	–
97	G	–
98	SB	–
99	O	–

Connector No.	E107
Connector Name	WIRE TO WIRE
Connector Type	TH24MW-NH



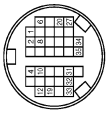
Terminal No.	Color of Wire	Signal Name [Specification]
1	L	–
2	P	–
3	SB	–
13	G	–
14	B	–
15	LG	–
16	BR	–
17	G	–
18	B	–
19	Y	–
20	R	–
21	O	–
22	W	–
23	SHIELD	–

Connector No.	F2
Connector Name	WIRE TO WIRE
Connector Type	RH12FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	–
2	LG	–
3	L	–
4	G	–
5	L	–
6	G	–
7	V	–
8	Y/V	–

Connector No.	F13
Connector Name	TRACTION MOTOR INVERTER
Connector Type	RH36FG-GY



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	TRACTION MOTOR RESOLVER SIGNAL (S1)
2	B	GROUND
4	G	POWER SUPPLY (BATTERY)
6	W	TRACTION MOTOR RESOLVER SIGNAL (S3)
8	B	GROUND
10	G	POWER SUPPLY (BATTERY)
12	L	EV SYSTEM CAN-H
19	G	EV SYSTEM CAN-L
20	L	TRACTION MOTOR RESOLVER SIGNAL (S2)
27	P	TRACTION MOTOR RESOLVER SIGNAL (S4)
31	O	TRACTION MOTOR TEMPERATURE SENSOR GROUND
32	B/P	TRACTION MOTOR TEMPERATURE SENSOR POWER SUPPLY (IGN)
33	LG	
34	R	TRACTION MOTOR RESOLVER SIGNAL (R1)
35	G	TRACTION MOTOR RESOLVER SIGNAL (R2)

Terminal No.	Color of Wire	Signal Name [Specification]
9	V	–
10	O	–
11	R/Y	–
12	W/R	–

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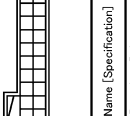
Connector No.	M2
Connector Name	TCU
Connector Type	TH40FW-NH

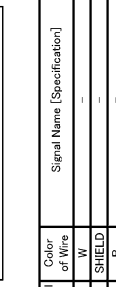
Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	BATTERY POWER SUPPLY
2	B	GROUND
3	G	ACC POWER SUPPLY
4	V	POWER SWITCH ON SIGNAL
9	L	EV SYSTEM CAN-H
10	G	EV SYSTEM CAN-L
11	LG	EV SYSTEM ACTIVATION REQUEST SIGNAL

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD16FW



Terminal No.	Color of Wire	Signal Name [Specification]
3	LG	–
4	B	–
5	B	–
6	L	–
7	GR	–
8	G	–
11	SB	–
12	G	–
13	L	–
14	P	–
16	Y	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Type	TH32FW-NH

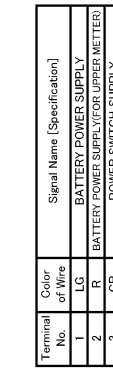


Terminal No.	Color of Wire	Signal Name [Specification]
1	W	–
3	SHIELD	–
4	B	–
5	W	–
6	R	–
11	G	–
15	L	–
16	G	–
18	BR	–
19	G	–
20	V	–
22	B	–
27	L	–
31	L	–
32	P	–

Connector No.	M30
Connector Name	STEERING ANGLE SENSOR
Connector Type	TH08FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	B	–
2	P	–
4	Y	–
5	L	–

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY POWER SUPPLY
2	R	BATTERY POWER SUPPLY(FOR UPPER METER)
3	GR	POWER SWITCH SUPPLY
4	BR	POWER SWITCH SUPPLY (FOR UPPER METER)
5	B	GROUND
6	B	GROUND
7	V	ELECTRIC SHIFT WARNING SIGNAL
9	G	PLUG IN SIGNAL
10	L	COMMUNICATION SIGNAL (METER → VSP)
11	P	COMMUNICATION SIGNAL (VSP → METER)
12	V	METER CONTROLSWITCH GROUND
13	LG	ENTER SWITCH SIGNAL
14	W	SELECT SWITCH SIGNAL
15	BR	TRIP RESET SWITCH SIGNAL
16	BR	ILLUMINATION CONTROL SWITCH SIGNAL
17	V	ILLUMINATION CONTROL SIGNAL (FOR UPPER METER)
18	P	CAN-L
19	L	CAN-H
20	V	SEAT BELT BUCKLE SWITCH SIGNAL (PASSENGER SIDE)
22	GR	GROUND (FOR UPPER METER)
24	BR	ELECTRIC PARKING BRAKE CONTROL MODULE WAKEUP SIGNAL
25	SB	BRAKE FLUID LEVEL SWITCH SIGNAL
26	B	ILLUMINATION CONTROL SIGNAL
27	R	AIR BAG SIGNAL
28	R	SECURITY SIGNAL
30	GR	VEHICLE SPEED SIGNAL (8-PULSE)
32	W	COMMUNICATION SIGNAL (METER → UPPER)
33	LG	COMMUNICATION SIGNAL (UPPER → METER)
34	L	PLUG IN INDICATOR LAMP SIGNAL
38	V	LED HEADLAMP (RH) WARNING SIGNAL
39	LG	LED HEADLAMP (LH) WARNING SIGNAL
40	Y	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)

Connector No.	M37
Connector Name	EPS CONTROL UNIT
Connector Type	TH08FW-NH

Terminal No.	Color of Wire	Signal Name [Specification]
1	P	CAN-L
2	L	CAN-H
4	V	POWER SUPPLY (POWER SWITCH)

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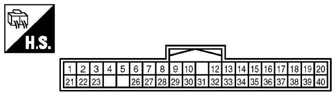
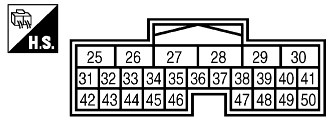
Connector No.	M50
Connector Name	A/C AUTO AMP.
Connector Type	TH40FW-NH



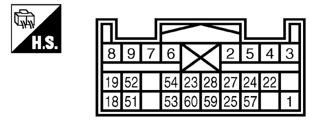
Terminal No.	Color of Wire	Signal Name [Specification]
1	V	REC
2	R	MODE4
3	P	MODE3
4	Y	MODE2
5	V	MODE1
6	BR	MIX4
7	SB	MIX3
8	LG	MIX2
9	L	MIX1
10	B	GND
12	GR	BLOWER PWM
13	V	W/PUMP PWM
14	L	COMP TX
15	W	RR DEF SW O/P
17	R	W/PUMP F/B
18	W	COMP RX
19	W	LIGHT+
20	B	LIGHT−
21	G	FRESH
27	W	5V OUT
28	L	EV CAN-H
29	G	EV CAN-L
30	R	SENS GND
31	W	BATT
32	Y	IGN 1
33	LG	INCAR SENS
34	G	INTAKE SENS
35	P	SUN SENS
36	GR	AMB SENS
37	BR	WATER SENS
38	SB	INT F/B
40	SB	PTC LIN

Connector No.	M59
Connector Name	ELECTRIC SHIFT CONTROL MODULE
Connector Type	TH20FW-TB6-1V



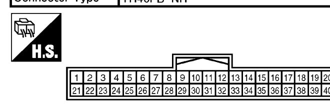
Terminal No.	Color of Wire	Signal Name [Specification]
25	B	GND (MOTOR)
26	R	D POSITION OUTPUT
27	BR	MOTOR COIL B U-PHASE
28	GR	MOTOR COIL B V-PHASE
29	R	MOTOR COIL B W-PHASE
30	Y	R POSITION OUTPUT
31	L	EV SYSTEM CAN-H
32	G	EV SYSTEM CAN-L
33	GR	PARKING ACTUATOR RELAY B
34	B	ELECTRIC SHIFT SENSOR NO. 1
35	L	ELECTRIC SHIFT SENSOR NO. 2
36	R	ELECTRIC SHIFT SENSOR NO. 3
37	Y	ELECTRIC SHIFT SENSOR NO. 4
38	B	P POSITION OUTPUT
39	LG	ANGLE SENSOR 2 POWER SUPPLY
40	P	ANGLE SENSOR 2 SIGNAL
41	BR	ELECTRIC SHIFT SENSOR GND 1
42	G	POWER SW 2
43	W	MAIN POWER SUPPLY 2
44	W	ELECTRIC SHIFT SENSOR NO. 5
45	G	ELECTRIC SHIFT SENSOR NO. 6
46	R	P POSITION SWITCH NO. 7
47	B	P POSITION SWITCH NO. 8
48	SB	ELECTRIC SHIFT SENSOR POWER SUPPLY 2
49	G	ANGLE SENSOR 2 GND
50	LG	ELECTRIC SHIFT SENSOR GND 2

Connector No.	M61
Connector Name	AIR BAG DIAGNOSIS SENSOR UNIT
Connector Type	NH28FY-EX



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	IGN
2	B	GND
3	Y	DR 1 (+)
4	GR	DR1 (−) DR2 (−)
5	Y/V	DR 2 (+)
6	Y/G	AS1 (+)
7	Y/B	AS1 (−)
8	Y/L	AS2 (+)
9	Y/V	AS2 (−)
18	R	ECZS (+)
19	W	ECZS (−)
22	SHIELD	SHIELD
23	R	AIR BAG W/L
24	LG	SEAT BELT W/L
25	R	CUTOFF TELLTALE
51	Y	FMVSS SENS RH+
52	BR	FMVSS SENS RH−
53	G	FMVSS SENS LH+
54	R	FMVSS SENS LH−
59	L	CAN-H
60	P	CAN-L

Connector No.	M68
Connector Name	BCM (BODY CONTROL MODULE)
Connector Type	TH40FB-NH



Terminal No.	Color of Wire	Signal Name [Specification]
2	L	COMBI SW INPUT 5
3	GR	COMBI SW INPUT 4
4	BR	COMBI SW INPUT 3
5	G	COMBI SW INPUT 2
6	V	COMBI SW INPUT 1
7	GR	KEY CYL UNLK SW
8	R	KEY CYL LOCK SW
9	BR	STOP LAMP SW 1
12	Y	DOOR LK & UNLK SW LOCK
13	BR	DOOR LK & UNLK SW UNLOCK
14	G	OPTICAL SENS
15	W	REAR WINDOW DEF SW
16	R	DIMMER
17	Y	OPTICAL SENS PWR SPLY
18	V	SENS/RECEIV GND
21	P	NATS ANTENNA AMP.
23	R	SECURITY IND LAMP CONT
25	LG	NATS ANTENNA AMP.
29	P	HAZARD SW
30	L	BK DOOR OPENER SW
31	W	DR DOOR UNLK SENS
32	LG	COMBI SW OUTPUT 5
33	Y	COMBI SW OUTPUT 4
34	W	COMBI SW OUTPUT 3
35	R	COMBI SW OUTPUT 2
36	P	COMBI SW OUTPUT 1
37	W	P POSITION
38	SB	RECEIVER COMM
39	L	CAN-H
40	P	CAN-L

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Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	–
2	V	–
3	GR	–
4	LG	–
6	W	–
7	V	–
8	P	–
9	SB	–
10	L	–
11	LG	–
12	W	–
13	R	–
14	Y	–
15	R	–
16	GR	–
17	BR	–
19	G	–
20	G	–
21	P	–
22	LG	–
23	GR	–
24	L	–
25	V	–
26	W	–
27	L	–
29	V	–
30	W	–
31	SB	–
32	LG	–
33	V	–
34	L	–
35	SB	–
38	LG	–
39	GR	–
40	Y	–
41	R	–
42	W	–
43	SB	–
44	GR	–
45	P	–
46	R	–
47	W	–
48	L	–
49	G	–
50	L	–
51	L	–
54	W	–
55	G	–
56	BR	–
57	P	–
58	R	–
60	Y	–
61	GR	–
62	SB	–
64	G	–
65	V	–
66	P	–
67	Y	–
68	P	–
69	BR	–
71	Y	–
72	L	–
73	G	–
74	L	–
75	V	–
76	R	–
80	W	–
81	L	–
82	SB	–
83	R	–
84	BR	–
85	R	–
86	GR	–
88	R	–
89	W	–
90	SHIELD	–
91	Y	–
92	BR	–
93	W	–
94	P	–
95	V	–
96	P	–
97	G	–
98	R	–
99	LG	–

Connector No.	M84
Connector Name	AV CONTROL UNIT
Connector Type	TH40FW-NH

H.S.

Terminal No.	Color of Wire	Signal Name [Specification]
21	LG	AV COMM (L)
22	SB	AV COMM (H)
23	LG	AV COMM (L)
24	SB	AV COMM (H)
25	P	CAN-L
26	L	CAN-H
28	GR	VEHICLE SPEED SIGNAL (8-PULSE)
29	BR	PARKING BRAKE SIGNAL
30	G	REVERSE SIGNAL
31	V	POWER SWITCH ON SIGNAL
32	R	DIMMER SIGNAL
46	L	MICROPHONE SIGNAL
47	Y	MICROPHONE VCC
48	SHIELD	MICROPHONE SHIELD
49	R	AUX SOUND SIGNAL LH (+)
50	W	AUX SOUND SIGNAL RH (+)
51	B	AUX SOUND SIGNAL (–)
52	SHIELD	SHIELD
56	B	CAMERA CONNECTION RECOGNITION SIGNAL
57	R	CAMERA POWER SUPPLY
58	W	CAMERA GROUND
59	R	CAMERA IMAGE SIGNAL
60	SHIELD	SHIELD

JCMWA6930GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORKFLOW

Interview Sheet

INFOID:0000000006977732

NOTE:
Refer to LAN-15, "Trouble Diagnosis Procedure" for how to use interview sheet.

CAN Communication System Diagnosis Interview Sheet

Date received:

Type: VIN No.:

Model:

First registration: Mileage:

CAN system type:

Symptom (Results from interview with customer)

Condition at inspection

Error symptom : Present / Past

SKIB8898E

DTC/CIRCUIT DIAGNOSIS

MALFUNCTION AREA CHART

CAN Communication Circuit

INFOID:0000000006977733

MAIN LINE

Malfunction area	Reference
Main line between IPDM E/R and electric parking brake control module	LAN-50, "Diagnosis Procedure"
Main line between electric parking brake control module and data link connector	LAN-51, "Diagnosis Procedure"

BRANCH LINE

Malfunction area	Reference
VCM branch line circuit (CAN communication circuit)	LAN-55, "Diagnosis Procedure"
ABS actuator and electric unit (control unit) branch line circuit	LAN-56, "Diagnosis Procedure"
Electrically driven intelligent brake unit branch line circuit	LAN-57, "Diagnosis Procedure"
IPDM E/R branch line circuit	LAN-58, "Diagnosis Procedure"
Electric parking brake control module branch line circuit	LAN-59, "Diagnosis Procedure"
Air bag diagnosis sensor unit branch line circuit	LAN-60, "Diagnosis Procedure"
AV control unit branch line circuit	LAN-61, "Diagnosis Procedure"
Data link connector branch line circuit (CAN communication circuit)	LAN-62, "Diagnosis Procedure"
EPS control unit branch line circuit	LAN-63, "Diagnosis Procedure"
Combination meter branch line circuit	LAN-64, "Diagnosis Procedure"
Steering angle sensor branch line circuit	LAN-65, "Diagnosis Procedure"
BCM branch line circuit	LAN-66, "Diagnosis Procedure"

SHORT CIRCUIT

Malfunction area	Reference
CAN communication circuit	LAN-76, "Diagnosis Procedure"

EV System CAN Circuit

INFOID:0000000006977734

MAIN LINE

Malfunction area	Reference
Main line between traction motor inverter and data link connector	LAN-52, "Diagnosis Procedure"
Main line between data link connector and on board charger	LAN-54, "Diagnosis Procedure"

BRANCH LINE

Malfunction area	Reference
VCM branch line circuit (EV system CAN circuit)	LAN-67, "Diagnosis Procedure"
Traction motor inverter branch line circuit	LAN-68, "Diagnosis Procedure"
Data link connector branch line circuit (EV system CAN circuit)	LAN-69, "Diagnosis Procedure"
Electric shift control module branch line circuit	LAN-70, "Diagnosis Procedure"
A/C auto amp. branch line circuit	LAN-71, "Diagnosis Procedure"

Malfunction area	Reference
TCU branch line circuit	LAN-72, "Diagnosis Procedure"
On board charger branch line circuit	LAN-73, "Diagnosis Procedure"
Li-ion battery controller branch line circuit	LAN-74, "Diagnosis Procedure"

SHORT CIRCUIT

Malfunction area	Reference
EV system CAN circuit	LAN-78, "Diagnosis Procedure"

MAIN LINE BETWEEN IPDM-E AND EHS/PKB CIRCUIT

Diagnosis Procedure

INFOID:0000000006977735

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 E107
- Harness connector B7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- IPDM E/R
- Harness connectors E107 and B7

2. Check the continuity between the IPDM E/R harness connector and the harness connector.

IPDM E/R harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E13	27	E107	1	Existed
	26		2	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the IPDM E/R and the harness connector E107.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of electric parking brake control module.
2. Check the continuity between the harness connector and the electric parking brake control module harness connector.

Harness connector		Electric parking brake control module harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B7	1	B21	16	Existed
	2		8	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the IPDM E/R and the electric parking brake control module.
NO >> Repair the main line between the harness connector B7 and the electric parking brake control module.

MAIN LINE BETWEEN EHS/PKB AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000006977736

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 B3
- Harness connector M21

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Electric parking brake control module
- Harness connectors B3 and M21

2. Check the continuity between the electric parking brake control module harness connector and the harness connector.

Electric parking brake control module harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B21	16	B3	31	Existed
	8		32	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the electric parking brake control module and the harness connector B3.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M21	31	M4	6	Existed
	32		14	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the electric parking brake control module and the data link connector.
NO >> Repair the main line between the harness connector M21 and the data link connector.

MAIN LINE BETWEEN INV/MC AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000006977737

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 F2
- Harness connector E60
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Traction motor inverter
- Harness connectors F2 and E60

2. Check the continuity between the traction motor inverter harness connector and the harness connector.

Traction motor inverter harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F13	12	F2	5	Existed
	19		6	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the traction motor inverter and the harness connector F2.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors E105 and M77.
2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E60	5	E105	50	Existed
	6		49	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair the main line between the harness connector E60 and the harness connector E105.

4.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	50	M4	13	Existed
	49		12	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".

YES (Past error)>>Error was detected in the main line between the traction motor inverter and the data link connector.

NO >> Repair the main line between the harness connector M77 and the data link connector.

MAIN LINE BETWEEN DLC AND OBC CIRCUIT

Diagnosis Procedure

INFOID:0000000006977738

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 M21
- Harness connector B3

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 M21 and B3.
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.	
M4	13	M21	15	Existed
	12		16	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M21.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of on board charger.
2. Check the continuity between the harness connector and the on board charger harness connector.

Harness connector		On board charger harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B3	15	B26	19	Existed
	16		20	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the data link connector and the on board charger.
NO >> Repair the main line between the harness connector B3 and the on board charger.

EV/HEV BRANCH LINE CIRCUIT (CAN COMMUNICATION CIRCUIT)

Diagnosis Procedure

INFOID:0000000006977739

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the VCM 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 VCM.
2. Check the resistance between the VCM harness connector terminals.

VCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E61	25	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the VCM branch line (CAN communication circuit side).

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the VCM. Refer to EVC-107, "VCM : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the VCM. Refer to EVC-315, "Removal and Installation".
YES (Past error)>>Error was detected in the VCM branch line (CAN communication circuit side).
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977740

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (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 ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E35	22	9	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-130, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-152, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

BRAKE BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977741

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electrically-driven intelligent brake 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 electrically-driven intelligent brake unit.
2. Check the resistance between the electrically-driven intelligent brake unit harness connector terminals.

Electrically-driven intelligent brake unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	41	40	Approx. 54 – 66
	43	42	

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electrically-driven intelligent brake unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electrically-driven intelligent brake unit. Refer to BR-187, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electrically-driven intelligent brake unit. Refer to BR-221, "Removal and installation".
YES (Past error)>>Error was detected in the electrically-driven intelligent brake unit branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977742

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
E13	27	26	Approx. 54 – 66

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 PCS-27, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-28, "Removal and Installation".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

EHS/PKB BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977743

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electric parking brake control module 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 electric parking brake control module.
2. Check the resistance between the electric parking brake control module harness connector terminals.

Electric parking brake control module harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B21	16	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electric parking brake control module branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electric parking brake control module. Refer to PB-73, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electric parking brake control module. Refer to PB-83, "Removal and Installation".
YES (Past error)>>Error was detected in the electric parking brake control module branch line.
NO >> Repair the power supply and the ground circuit.

A-BAG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977744

WARNING:

Always observe the following items for preventing accidental activation.

- **Before servicing, turn power switch OFF, disconnect 12V battery negative terminal, and wait 3 minutes or more. (To discharge backup capacitor.)**
- **Never use unspecified tester or other measuring device.**

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the air bag diagnosis sensor unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the main harness.

2.CHECK AIR BAG DIAGNOSIS SENSOR UNIT

Check the air bag diagnosis sensor unit. Refer to SRC-31, "Work Flow".

Is the inspection result normal?

YES >> Replace the main harness.
NO >> Replace parts whose air bag system has a malfunction.

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977745

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 connector			Resistance (Ω)
Connector No.	Terminal No.		
M84	26	25	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 AV-95, "AV CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the AV control unit. Refer to AV-119, "Removal and Installation".
YES (Past error)>>Error was detected in the AV control unit branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT (CAN COMMUNICATION CIRCUIT)

Diagnosis Procedure

INFOID:0000000006977746

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the data link connector branch line circuit (CAN communication circuit side).
NO >> Repair the data link connector branch line (CAN communication circuit side).

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977747

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS 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 EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	2	1	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 STC-20, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to STC-35, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977748

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M34	19	18	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 MWI-81, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-89, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977749

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M30	5	2	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 BRC-50, "Wiring Diagram".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-155, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977750

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M68	39	40	Approx. 108 – 132

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 BCS-70, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-76, "Removal and Installation".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

EV/HEV BRANCH LINE CIRCUIT (EV SYSTEM CAN CIRCUIT)

Diagnosis Procedure

INFOID:0000000006977751

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- VCM
- Harness connector E60
- Harness connector F2

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

VCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E61	9	13	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the VCM branch line (EV system CAN circuit side).

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the VCM. Refer to EVC-107, "VCM : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the VCM. Refer to EVC-315, "Removal and Installation".
YES (Past error)>>Error was detected in the VCM branch line (EV system CAN circuit side).
NO >> Repair the power supply and the ground circuit.

INV/MC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977752

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the traction motor inverter 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 traction motor inverter.
2. Check the resistance between the traction motor inverter harness connector terminals.

Traction motor inverter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F13	12	19	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the traction motor inverter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the traction motor inverter. Refer to TMS-62, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the traction motor inverter. Refer to TMS-115, "Removal and Installation".
YES (Past error)>>Error was detected in the traction motor inverter branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT (EV SYSTEM CAN CIRCUIT)

Diagnosis Procedure

INFOID:0000000006977753

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
M4	13	12	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the data link connector branch line circuit (EV system CAN circuit side).
NO >> Repair the data link connector branch line (EV system CAN circuit side).

E-SHIFT BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977754

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electric shift control module 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 electric shift control module.
2. Check the resistance between the electric shift control module harness connector terminals.

Electric shift control module harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M59	31	32	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electric shift control module branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electric shift control module. Refer to TM-75, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
YES (Past error)>>Error was detected in the electric shift control module branch line.
NO >> Repair the power supply and the ground circuit.

HVAC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977755

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the A/C 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 A/C auto amp.
2. Check the resistance between the A/C auto amp. harness connector terminals.

A/C auto amp. harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M50	28	29	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the A/C auto amp. branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the A/C auto amp. Refer to HAC-116, "A/C AUTO AMP. : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the A/C auto amp. Refer to HAC-134, "Removal and Installation".
YES (Past error)>>Error was detected in the A/C auto amp. branch line.
NO >> Repair the power supply and the ground circuit.

TCU BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977756

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the TCU 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 TCU.
2. Check the resistance between the TCU harness connector terminals.

TCU harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M2	9	10	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCU branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCU. Refer to AV-201, "TCU : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCU. Refer to AV-211, "Removal and Installation".
YES (Past error)>>Error was detected in the TCU branch line.
NO >> Repair the power supply and the ground circuit.

OBC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977757

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the on board charger 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 on board charger.
2. Check the resistance between the on board charger harness connector terminals.

On board charger harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B26	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the on board charger branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the on board charger. Refer to VC-39, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the on board charger. Refer to VC-98, "Removal and Installation".
YES (Past error)>>Error was detected in the on board charger branch line.
NO >> Repair the power supply and the ground circuit.

HV BAT BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006977758

WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to LAN-21, "High Voltage Precautions".**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the Li-ion battery 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 Li-ion battery.
2. Check the resistance between the Li-ion battery harness connector terminals.

Li-ion battery harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B24	1	2	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Li-ion battery branch line.

3.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-31, "How to Cut Off High Voltage".

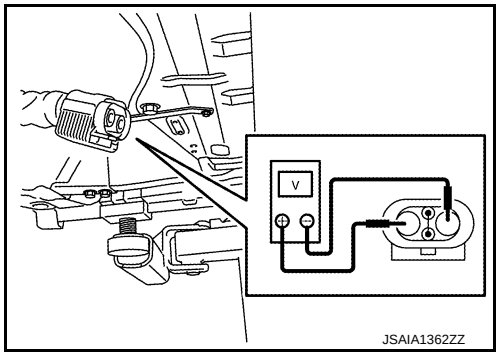
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Disconnect high voltage connector from front side of Li-ion battery. Refer to EVB-136, "Removal and Installation".

DANGER:

Touching high voltage components without using the appropriate protective equipment will cause electrocution.

2. Measure voltage between high voltage harness terminals.



DANGER:

Touching high voltage components without using the appropriate protective equipment will cause electrocution.

Standard : 5 V or less

CAUTION:

For voltage measurements, use a tester which can measure to 500V or higher.

>> GO TO 4.

4. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Li-ion battery controller. Refer to EVB-133, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair the power supply and the ground circuit.

5. CHECK HARNESS FOR OPEN CIRCUIT

1. Remove Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
2. Check the continuity between vehicle communication harness (harness between Li-ion battery harness connector side and Li-ion battery controller side) connector terminals. Refer to EVB-18, "Circuit Diagram".

Vehicle communication harness		Continuity
Li-ion battery harness connector side	Li-ion battery controller side	
Terminal No.	Terminal No.	
1	1	Existed
2	13	Existed

Is the measurement value within the specification?

YES (Present error)>>Replace the Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
YES (Past error)>>Error was detected in the Li-ion battery controller branch line.
NO >> Repair the vehicle communication harness.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000006977759

1.CONNECTOR INSPECTION

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect all the control unit connectors on CAN communication circuit.
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			Continuity
Connector No.	Terminal No.		
M4	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		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK VCM AND BCM TERMINATION CIRCUIT

1. Remove the VCM and the BCM.
2. Check the resistance between the VCM terminals.

VCM		Resistance (Ω)
Terminal No.		
25	29	Approx. 108 – 132

3. Check the resistance between the BCM terminals.

BCM		Resistance (Ω)
Terminal No.		
39	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the VCM and/or the BCM.

5.CHECK SYMPTOM

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

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK CONTROL UNIT REPRODUCTION

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

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect one of the control unit connectors of CAN communication circuit.
   NOTE:
   VCM and BCM have a termination circuit. Check other control units first.
4. Connect the 12V battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although control unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

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

EV SYSTEM CAN CIRCUIT

Diagnosis Procedure

INFOID:0000000006977760

WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to LAN-21, "High Voltage Precautions".**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-31, "How to Cut Off High Voltage".

Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Disconnect high voltage connector from front side of Li-ion battery. Refer to EVB-136, "Removal and Installation".

   DANGER:

   Touching high voltage components without using the appropriate protective equipment will cause electrocution.

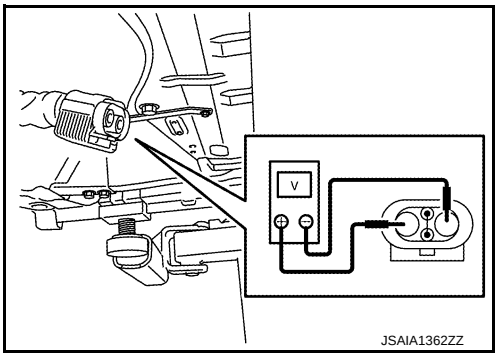
2. Measure voltage between high voltage harness terminals.

   DANGER:

   Touching high voltage components without using the appropriate protective equipment will cause electrocution.

   Standard : 5 V or less

   CAUTION:

   For voltage measurements, use a tester which can measure to 500V or higher.

>> GO TO 2.

2.CONNECTOR INSPECTION

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect all the control unit connectors on EV system CAN circuit. For the removal of Li-ion battery controller, refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the terminal and connector.

3. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	13	12	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4. CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

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

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	13		Not existed
	12		Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check the harness and repair the root cause.

5. CHECK VCM AND LI-ION BATTERY CONTROLLER TERMINATION CIRCUIT

1. Remove the VCM.
2. Check the resistance between the VCM terminals.

VCM		Resistance (Ω)
Terminal No.		
9	13	Approx. 108 – 132

3. Remove the Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
4. Check the resistance between the Li-ion battery controller terminals.

Li-ion battery controller		Resistance (Ω)
Terminal No.		
1	13	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 6.
NO >> Replace the VCM and/or the Li-ion battery controller.

6. CHECK SYMPTOM

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

Inspection result

Reproduced>>GO TO 7.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

7. CHECK CONTROL UNIT REPRODUCTION

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

1. Turn the power switch OFF.

2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect one of the control unit connectors of EV system CAN circuit.
   NOTE:
   VCM and Li-ion battery controller have a termination circuit. Check other control units first.
4. Connect the 12V battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although control unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

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

DTC/CIRCUIT DIAGNOSIS

MAIN LINE BETWEEN IPDM-E AND EHS/PKB CIRCUIT

Diagnosis Procedure

INFOID:0000000006983352

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 E107
- Harness connector B7

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- IPDM E/R
- Harness connectors E107 and B7

2. Check the continuity between the IPDM E/R harness connector and the harness connector.

IPDM E/R harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E13	27	E107	1	Existed
	26		2	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the IPDM E/R and the harness connector E107.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of electric parking brake control module.
2. Check the continuity between the harness connector and the electric parking brake control module harness connector.

Harness connector		Electric parking brake control module harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B7	1	B21	16	Existed
	2		8	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the IPDM E/R and the electric parking brake control module.
NO >> Repair the main line between the harness connector B7 and the electric parking brake control module.

MAIN LINE BETWEEN EHS/PKB AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000006983353

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 B3
- Harness connector M21

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Electric parking brake control module
- Harness connectors B3 and M21

2. Check the continuity between the electric parking brake control module harness connector and the harness connector.

Electric parking brake control module harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B21	16	B3	31	Existed
	8		32	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the electric parking brake control module and the harness connector B3.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M21	31	M4	6	Existed
	32		14	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the electric parking brake control module and the data link connector.
NO >> Repair the main line between the harness connector M21 and the data link connector.

MAIN LINE BETWEEN INV/MC AND DLC CIRCUIT

Diagnosis Procedure

INFOID:0000000006983354

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 F2
- Harness connector E60
- Harness connector E105
- Harness connector M77

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair the terminal and connector.

2.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the following harness connectors.

- Traction motor inverter
- Harness connectors F2 and E60

2. Check the continuity between the traction motor inverter harness connector and the harness connector.

Traction motor inverter harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
F13	12	F2	5	Existed
	19		6	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the traction motor inverter and the harness connector F2.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the harness connectors E105 and M77.
2. Check the continuity between the harness connectors.

Harness connector		Harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
E60	5	E105	50	Existed
	6		49	Existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair the main line between the harness connector E60 and the harness connector E105.

4.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

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

Harness connector		Data link connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
M77	50	M4	13	Existed
	49		12	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".

YES (Past error)>>Error was detected in the main line between the traction motor inverter and the data link connector.
NO >> Repair the main line between the harness connector M77 and the data link connector.

MAIN LINE BETWEEN DLC AND OBC CIRCUIT

Diagnosis Procedure

INFOID:0000000006983355

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 M21
- Harness connector B3

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 M21 and B3.
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.	
M4	13	M21	15	Existed
	12		16	Existed

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the main line between the data link connector and the harness connector M21.

3.CHECK HARNESS CONTINUITY (OPEN CIRCUIT)

1. Disconnect the connector of on board charger.
2. Check the continuity between the harness connector and the on board charger harness connector.

Harness connector		On board charger harness connector		Continuity
Connector No.	Terminal No.	Connector No.	Terminal No.	
B3	15	B26	19	Existed
	16		20	Existed

Is the inspection result normal?

YES (Present error)>>Connect all the connectors and diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the main line between the data link connector and the on board charger.
NO >> Repair the main line between the harness connector B3 and the on board charger.

EV/HEV BRANCH LINE CIRCUIT (CAN COMMUNICATION CIRCUIT)

Diagnosis Procedure

INFOID:0000000006983356

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the VCM 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 VCM.
2. Check the resistance between the VCM harness connector terminals.

VCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E61	25	29	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the VCM branch line (CAN communication circuit side).

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the VCM. Refer to EVC-107, "VCM : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the VCM. Refer to EVC-315, "Removal and Installation".
YES (Past error)>>Error was detected in the VCM branch line (CAN communication circuit side).
NO >> Repair the power supply and the ground circuit.

ABS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983357

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the ABS actuator and electric unit (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 ABS actuator and electric unit (control unit).
2. Check the resistance between the ABS actuator and electric unit (control unit) harness connector terminals.

ABS actuator and electric unit (control unit) harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E35	22	9	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the ABS actuator and electric unit (control unit) branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the ABS actuator and electric unit (control unit). Refer to BRC-130, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the ABS actuator and electric unit (control unit). Refer to BRC-152, "Removal and Installation".
YES (Past error)>>Error was detected in the ABS actuator and electric unit (control unit) branch line.
NO >> Repair the power supply and the ground circuit.

BRAKE BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983358

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electrically-driven intelligent brake 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 electrically-driven intelligent brake unit.
2. Check the resistance between the electrically-driven intelligent brake unit harness connector terminals.

Electrically-driven intelligent brake unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E34	41	40	Approx. 54 – 66
	43	42	

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electrically-driven intelligent brake unit branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electrically-driven intelligent brake unit. Refer to BR-187, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electrically-driven intelligent brake unit. Refer to BR-221, "Removal and installation".
YES (Past error)>>Error was detected in the electrically-driven intelligent brake unit branch line.
NO >> Repair the power supply and the ground circuit.

IPDM-E BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983359

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
E13	27	26	Approx. 54 – 66

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 PCS-27, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the IPDM E/R. Refer to PCS-28, "Removal and Installation".
YES (Past error)>>Error was detected in the IPDM E/R branch line.
NO >> Repair the power supply and the ground circuit.

EHS/PKB BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983360

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electric parking brake control module 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 electric parking brake control module.
2. Check the resistance between the electric parking brake control module harness connector terminals.

Electric parking brake control module harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B21	16	8	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electric parking brake control module branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electric parking brake control module. Refer to PB-73, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electric parking brake control module. Refer to PB-83, "Removal and Installation".
YES (Past error)>>Error was detected in the electric parking brake control module branch line.
NO >> Repair the power supply and the ground circuit.

A-BAG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983361

WARNING:

Always observe the following items for preventing accidental activation.

- **Before servicing, turn power switch OFF, disconnect 12V battery negative terminal, and wait 3 minutes or more. (To discharge backup capacitor.)**
- **Never use unspecified tester or other measuring device.**

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the air bag diagnosis sensor unit for damage, bend and loose connection (unit side and connector side).

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the main harness.

2.CHECK AIR BAG DIAGNOSIS SENSOR UNIT

Check the air bag diagnosis sensor unit. Refer to SRC-31, "Work Flow".

Is the inspection result normal?

YES >> Replace the main harness.
NO >> Replace parts whose air bag system has a malfunction.

AV BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983362

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 connector			Resistance (Ω)
Connector No.	Terminal No.		
M84	26	25	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 AV-95, "AV CONTROL UNIT : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the AV control unit. Refer to AV-119, "Removal and Installation".
YES (Past error)>>Error was detected in the AV control unit branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT (CAN COMMUNICATION CIRCUIT)

Diagnosis Procedure

INFOID:0000000006983363

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
M4	6	14	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the data link connector branch line circuit (CAN communication circuit side).
NO >> Repair the data link connector branch line (CAN communication circuit side).

EPS BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983364

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the EPS 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 EPS control unit.
2. Check the resistance between the EPS control unit harness connector terminals.

EPS control unit harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M37	2	1	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 STC-20, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the EPS control unit. Refer to STC-35, "Removal and Installation".
YES (Past error)>>Error was detected in the EPS control unit branch line.
NO >> Repair the power supply and the ground circuit.

M&A BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983365

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M34	19	18	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 MWI-81, "COMBINATION METER : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the combination meter. Refer to MWI-89, "Removal and Installation".
YES (Past error)>>Error was detected in the combination meter branch line.
NO >> Repair the power supply and the ground circuit.

STRG BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983366

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M30	5	2	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 BRC-50, "Wiring Diagram".

Is the inspection result normal?

YES (Present error)>>Replace the steering angle sensor. Refer to BRC-155, "Removal and Installation".
YES (Past error)>>Error was detected in the steering angle sensor branch line.
NO >> Repair the power supply and the ground circuit.

BCM BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983367

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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			Resistance (Ω)
Connector No.	Terminal No.		
M68	39	40	Approx. 108 – 132

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 BCS-70, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the BCM. Refer to BCS-76, "Removal and Installation".
YES (Past error)>>Error was detected in the BCM branch line.
NO >> Repair the power supply and the ground circuit.

EV/HEV BRANCH LINE CIRCUIT (EV SYSTEM CAN CIRCUIT)

Diagnosis Procedure

INFOID:0000000006983368

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the following terminals and connectors for damage, bend and loose connection (unit side and connector side).

- VCM
- Harness connector E60
- Harness connector F2

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

VCM harness connector			Resistance (Ω)
Connector No.	Terminal No.		
E61	9	13	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the VCM branch line (EV system CAN circuit side).

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the VCM. Refer to EVC-107, "VCM : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the VCM. Refer to EVC-315, "Removal and Installation".
YES (Past error)>>Error was detected in the VCM branch line (EV system CAN circuit side).
NO >> Repair the power supply and the ground circuit.

INV/MC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983369

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the traction motor inverter 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 traction motor inverter.
2. Check the resistance between the traction motor inverter harness connector terminals.

Traction motor inverter harness connector			Resistance (Ω)
Connector No.	Terminal No.		
F13	12	19	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the traction motor inverter branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the traction motor inverter. Refer to TMS-62, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the traction motor inverter. Refer to TMS-115, "Removal and Installation".
YES (Past error)>>Error was detected in the traction motor inverter branch line.
NO >> Repair the power supply and the ground circuit.

DLC BRANCH LINE CIRCUIT (EV SYSTEM CAN CIRCUIT)

Diagnosis Procedure

INFOID:0000000006983370

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V 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 (Ω)
Connector No.	Terminal No.		
M4	13	12	Approx. 54 – 66

Is the measurement value within the specification?

YES (Present error)>>Diagnose again. Refer to LAN-15, "Trouble Diagnosis Flow Chart".
YES (Past error)>>Error was detected in the data link connector branch line circuit (EV system CAN circuit side).
NO >> Repair the data link connector branch line (EV system CAN circuit side).

E-SHIFT BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983371

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the electric shift control module 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 electric shift control module.
2. Check the resistance between the electric shift control module harness connector terminals.

Electric shift control module harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M59	31	32	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the electric shift control module branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the electric shift control module. Refer to TM-75, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the electric shift control module. Refer to TM-130, "Removal and Installation".
YES (Past error)>>Error was detected in the electric shift control module branch line.
NO >> Repair the power supply and the ground circuit.

HVAC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983372

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the A/C 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 A/C auto amp.
2. Check the resistance between the A/C auto amp. harness connector terminals.

A/C auto amp. harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M50	28	29	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the A/C auto amp. branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the A/C auto amp. Refer to HAC-116, "A/C AUTO AMP. : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the A/C auto amp. Refer to HAC-134, "Removal and Installation".
YES (Past error)>>Error was detected in the A/C auto amp. branch line.
NO >> Repair the power supply and the ground circuit.

TCU BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983373

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the TCU 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 TCU.
2. Check the resistance between the TCU harness connector terminals.

TCU harness connector			Resistance (Ω)
Connector No.	Terminal No.		
M2	9	10	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the TCU branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the TCU. Refer to AV-201, "TCU : Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the TCU. Refer to AV-211, "Removal and Installation".
YES (Past error)>>Error was detected in the TCU branch line.
NO >> Repair the power supply and the ground circuit.

OBC BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983374

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the on board charger 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 on board charger.
2. Check the resistance between the on board charger harness connector terminals.

On board charger harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B26	19	20	Approx. 54 – 66

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the on board charger branch line.

3.CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the on board charger. Refer to VC-39, "Diagnosis Procedure".

Is the inspection result normal?

YES (Present error)>>Replace the on board charger. Refer to VC-98, "Removal and Installation".
YES (Past error)>>Error was detected in the on board charger branch line.
NO >> Repair the power supply and the ground circuit.

HV BAT BRANCH LINE CIRCUIT

Diagnosis Procedure

INFOID:0000000006983375

WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to LAN-21, "High Voltage Precautions".**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

1.CHECK CONNECTOR

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Check the terminals and connectors of the Li-ion battery 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 Li-ion battery.
2. Check the resistance between the Li-ion battery harness connector terminals.

Li-ion battery harness connector			Resistance (Ω)
Connector No.	Terminal No.		
B24	1	2	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 3.
NO >> Repair the Li-ion battery branch line.

3.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-31, "How to Cut Off High Voltage".

Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Disconnect high voltage connector from front side of Li-ion battery. Refer to EVB-136, "Removal and Installation".

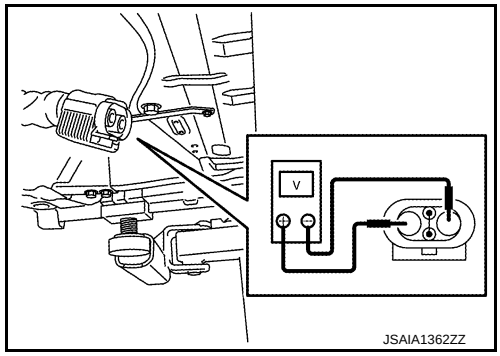
DANGER:

Touching high voltage components without using the appropriate protective equipment will cause electrocution.

2. Measure voltage between high voltage harness terminals.

DANGER:

Touching high voltage components without using the appropriate protective equipment will cause electrocution.



Standard : 5 V or less

CAUTION:

For voltage measurements, use a tester which can measure to 500V or higher.

>> GO TO 4.

4. CHECK POWER SUPPLY AND GROUND CIRCUIT

Check the power supply and the ground circuit of the Li-ion battery controller. Refer to EVB-133, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair the power supply and the ground circuit.

5. CHECK HARNESS FOR OPEN CIRCUIT

1. Remove Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
2. Check the continuity between vehicle communication harness (harness between Li-ion battery harness connector side and Li-ion battery controller side) connector terminals. Refer to EVB-18, "Circuit Diagram".

Vehicle communication harness		Continuity
Li-ion battery harness connector side	Li-ion battery controller side	
Terminal No.	Terminal No.	
1	1	Existed
2	13	Existed

Is the measurement value within the specification?

YES (Present error)>>Replace the Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
YES (Past error)>>Error was detected in the Li-ion battery controller branch line.
NO >> Repair the vehicle communication harness.

CAN COMMUNICATION CIRCUIT

Diagnosis Procedure

INFOID:0000000006983376

1.CONNECTOR INSPECTION

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect all the control unit connectors on CAN communication circuit.
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			Continuity
Connector No.	Terminal No.		
M4	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		Ground	Continuity
Connector No.	Terminal No.		
M4	6		Not existed
	14		Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK VCM AND BCM TERMINATION CIRCUIT

1. Remove the VCM and the BCM.
2. Check the resistance between the VCM terminals.

VCM		Resistance (Ω)
Terminal No.		
25	29	Approx. 108 – 132

3. Check the resistance between the BCM terminals.

BCM		Resistance (Ω)
Terminal No.		
39	40	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 5.
NO >> Replace the VCM and/or the BCM.

5.CHECK SYMPTOM

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

Inspection result

Reproduced>>GO TO 6.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

6.CHECK CONTROL UNIT REPRODUCTION

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

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect one of the control unit connectors of CAN communication circuit.
   NOTE:
   VCM and BCM have a termination circuit. Check other control units first.
4. Connect the 12V battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although control unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

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

EV SYSTEM CAN CIRCUIT

Diagnosis Procedure

INFOID:0000000006983377

WARNING:

- **Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.**
- **Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to LAN-21, "High Voltage Precautions".**

CAUTION:

There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the Service Manual.

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-31, "How to Cut Off High Voltage".

Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Disconnect high voltage connector from front side of Li-ion battery. Refer to EVB-136, "Removal and Installation".

   DANGER:

   Touching high voltage components without using the appropriate protective equipment will cause electrocution.

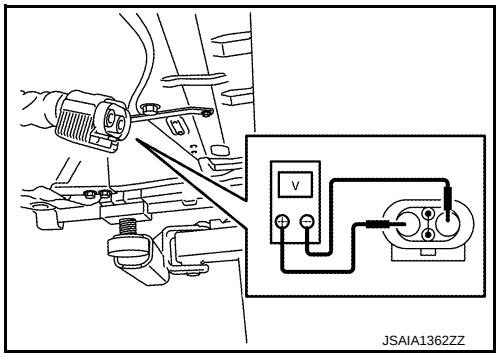
2. Measure voltage between high voltage harness terminals.

   DANGER:

   Touching high voltage components without using the appropriate protective equipment will cause electrocution.

   Standard : 5 V or less

   CAUTION:

   For voltage measurements, use a tester which can measure to 500V or higher.

>> GO TO 2.

2.CONNECTOR INSPECTION

1. Turn the power switch OFF.
2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect all the control unit connectors on EV system CAN circuit. For the removal of Li-ion battery controller, refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
4. Check terminals and connectors for damage, bend and loose connection.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Repair the terminal and connector.

3.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

Check the continuity between the data link connector terminals.

Data link connector			Continuity
Connector No.	Terminal No.		
M4	13	12	Not existed

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check the harness and repair the root cause.

4.CHECK HARNESS CONTINUITY (SHORT CIRCUIT)

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

Data link connector		Ground	Continuity
Connector No.	Terminal No.		
M4	13		Not existed
	12		Not existed

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check the harness and repair the root cause.

5.CHECK VCM AND LI-ION BATTERY CONTROLLER TERMINATION CIRCUIT

1. Remove the VCM.
2. Check the resistance between the VCM terminals.

VCM		Resistance (Ω)
Terminal No.		
9	13	Approx. 108 – 132

3. Remove the Li-ion battery controller. Refer to EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
4. Check the resistance between the Li-ion battery controller terminals.

Li-ion battery controller		Resistance (Ω)
Terminal No.		
1	13	Approx. 108 – 132

Is the measurement value within the specification?

YES >> GO TO 6.
NO >> Replace the VCM and/or the Li-ion battery controller.

6.CHECK SYMPTOM

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

Inspection result

Reproduced>>GO TO 7.
Non-reproduced>>Start the diagnosis again. Follow the trouble diagnosis procedure when past error is detected.

7.CHECK CONTROL UNIT REPRODUCTION

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

1. Turn the power switch OFF.

2. Disconnect the 12V battery cable from the negative terminal.
3. Disconnect one of the control unit connectors of EV system CAN circuit.
   NOTE:
   VCM and Li-ion battery controller have a termination circuit. Check other control units first.
4. Connect the 12V battery cable to the negative terminal. Check if the symptoms described in the “Symptom (Results from interview with customer)” are reproduced.
   NOTE:
   Although control unit-related error symptoms occur, do not confuse them with other symptoms.

Inspection result

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