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APPLICATION NOTICE

< HOW TO USE THIS MANUAL >

HOW TO USE THIS MANUAL

APPLICATION NOTICE

How to Check VCM Group

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The control specification depends on a VCM part number identified by "ECU Identification" of CONSULT. For reason, VCM numbers in this manual are divided into a number of groups as follows: **NOTE:**

The numbers shown below are old numbers. Those not included are described as "except for Group XX".

Group A

VCM part number

- 237D0 3NA0B 237D0 3NA0E
- 237D0 3NA1A 237D0 3NA1C

Group B

VCM part number 237D0 3NA2A, 237D0 3NA1D

< PRECAUTION >

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:0000000007540723

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.

Point to Be Checked Before Starting Maintenance Work

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS

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< PRECAUTION >

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:

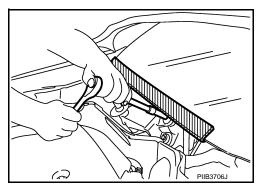
Always observe the following items for preventing accidental activation.

- 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.

Precaution for Procedure without Cowl Top Cover

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When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing Battery Terminal

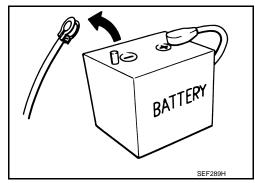
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 When removing the 12V battery terminal, turn OFF the power switch and wait at least 5 minutes.

NOTE:

ECU may be active for several minutes after the power switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.

- Always disconnect the battery terminal within 60 minutes after turning OFF the power switch. Even when the power switch is OFF, the 12V battery automatic charge control may automatically start after a lapse of 60 minutes from power switch OFF.
- Disconnect 12V battery terminal according to the following steps.



WORK PROCEDURE

Check that EVSE is not connected.

NOTE:

If EVSE is connected, the air conditioning system may be automatically activated by the timer A/C function.

2. Turn the power switch OFF \rightarrow ON \rightarrow OFF. Get out of the vehicle. Close all doors (including back door).

< PRECAUTION >

Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.NOTE:

If the battery is removed within 5 minutes after the power switch is turned OFF, plural DTCs may be detected.

 Remove 12V battery terminal within 60 minutes after turning the power switch OFF → ON → OFF. CAUTION:

- After all doors (including back door) are closed, if a door (including back door) is opened before battery terminals are disconnected, start over from Step 1.
- After turning the power switch OFF, if "Remote A/C" is activated by user operation, stop the air conditioner and start over from Step 1.

NOTE:

Once the power switch is turned ON \rightarrow OFF, the 12V battery automatic charge control does not start for approximately 1 hour.

• For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the power switch.

NOTE:

If the power switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.

After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
 NOTE:

The removal of 12V battery may cause a DTC detection error.

High Voltage Precautions

DANGER:

Since 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.

WARNING:

- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.
- Be sure to wear insulated protective equipment before beginning work on the high voltage system.
- Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.

CAUTION:

Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

All the high voltage harnesses and connectors are orange. The Li-ion battery and other high voltage devices include an orange high voltage label. Never touch these harnesses and high voltage 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 heart 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

Hybrid vehicles and electric vehicles contain parts with high voltage and intense magnetic force. Never carry metal products and magnetic recording media (e.g. cash card, prepaid card) to repair/inspect high voltage parts. If this is not observed, the metal products may create a risk of short circuit and the magnetic recording media may lose their magnetic recording.

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General Precautions

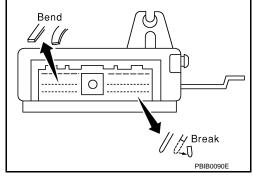
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- Never disassemble VCM and DC/DC junction box.
- If the 12V battery is disconnected, the diagnostic information will be lost within 3 minutes.

< PRECAUTION >

 When connecting or disconnecting harness connectors into or from VCM, take care not to damage pin terminals (bend or break).

Check that there are not any bends or breaks on VCM pin terminal, when connecting harness connectors.



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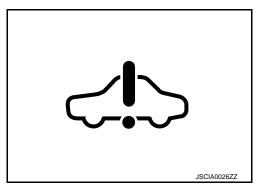
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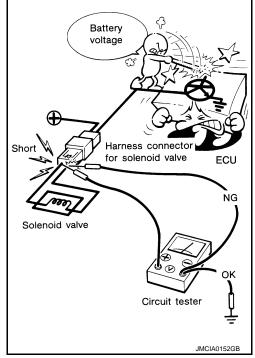
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 After performing each TROUBLE DIAGNOSIS, perform DTC confirmation procedure or Component Function Check.
 The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.

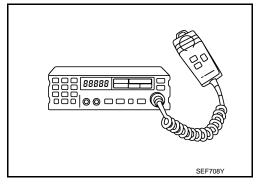


 When measuring ECU signals with a circuit tester, never allow the two tester probes to contact.
 Accidental contact of probes will cause a short circuit and damage the ECU power transistor.



< PRECAUTION >

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



PREPARATION

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PREPARATION

PREPARATION

Commercial Service Tools

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Tool n	ame	Description	EVO
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	WWW JMCIA0149ZZ	Removing and installing high voltage components	D E
Leather gloves [Use leather gloves that can fasten the wrist tight]	JPCIA0066ZZ	 Removing and installing high voltage components Protect insulated gloves 	F G
Insulated safety shoes	JPCIA0011ZZ	Removing and installing high voltage components	H I J
Safety glasses [ANSI Z87.1]	JPCIA0012ZZ	 Removing and installing high voltage components To protect eye from the spatter on the work to electric line 	K
Face shield	JPCIA0167ZZ	 Removing and installing high voltage components To protect face from the spatter on the work to electric line 	M N

PREPARATION

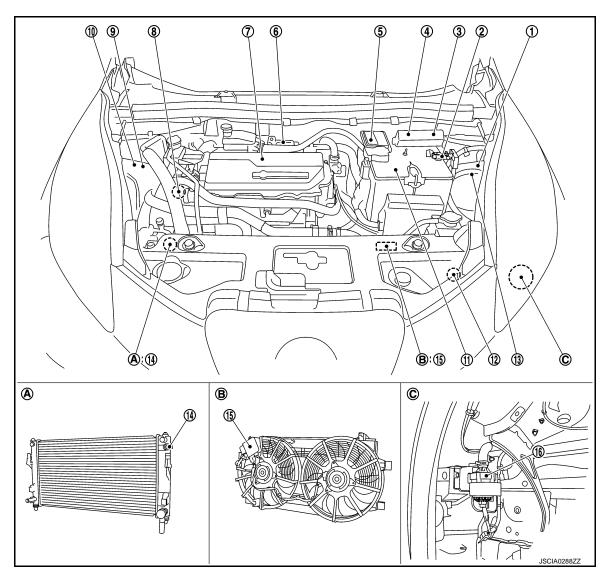
< PREPARATION >		
Too	ol name	Description
Insulated helmet	JPCIA0013ZZ	Removing and installing high voltage com ponents
Insulation resistance tester (Multi tester)	JPCIA0014ZZ	Measuring voltage and insulation resistance

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

MOTOR ROOM COMPARTMENT



A. Radiator assembly

B. Cooling fan assembly

C: Front fender protector LH remove condition

Component Parts Description

No.	Component parts	Function
1	F/S relay (IPDM E/R)	EVC-19, "F/S Relay"
2	Battery Current Sensor (With Battery Temperature Sensor)	EVC-22, "Battery Current Sensor (With Battery Temperature Sensor)"
3	M/C relay	EVC-19. "M/C Relay"
4	Reverse lamp relay	EVC-20, "Reverse Lamp Relay"
5	Electrically-driven intelligent brake unit	BR-11, "Electrically-driven Intelligent Brake Unit"
6	DC/DC-J/B	EVC-21, "DC/DC Junction Box"

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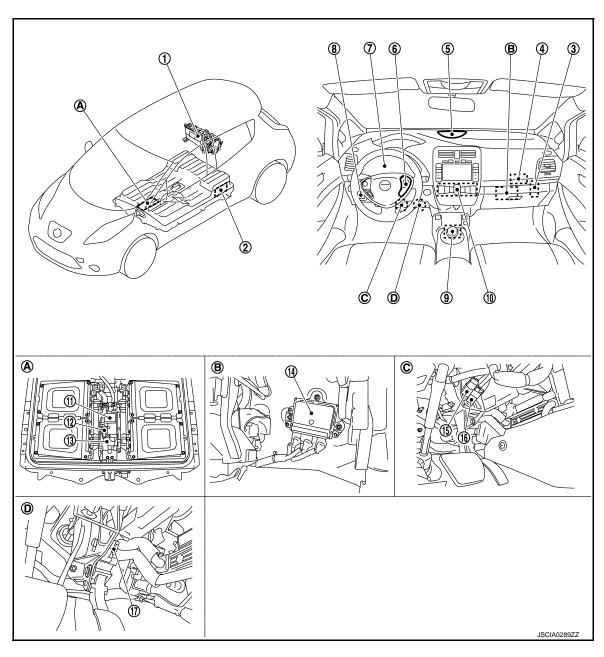
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< SYSTEM DESCRIPTION >

No.	Component parts	Function
7	Traction Motor Inverter	TMS-13, "Traction Motor Inverter"
8	Electric water pump 1	EVC-23, "Electric Water Pump"
9	F/S CHG relay	EVC-19, "F/S CHG Relay"
10	A/C relay	EVC-20, "A/C Relay"
11	12V battery	PG-9, "12V Battery"
12	Refrigerant pressure sensor	EVC-20, "Refrigerant Pressure Sensor"
13	SSOFF relay (IPDM E/R)	EVC-20, "SSOFF Relay"
14	Water temperature sensor	EVC-22, "Coolant Temperature Sensor"
15	Cooling fan control module	EVC-23, "Cooling Fan Control Module"
16	Electric water pump 2	EVC-23, "Electric Water Pump"

BODY COMPARTMENT



- A. Li-ion battery junction box
- D. Accelerator pedal upper part
- B. Grove box cover is removed.
- C: Brake pedal upper part

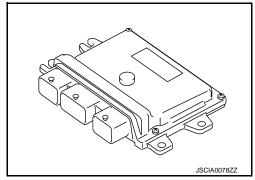
< SYSTEM DESCRIPTION >

Component Parts Description

No.	Component parts	Function	
1	On-board charger	VC-10, "On-board Charger"	
2	Li-ion battery controller	EVB-26, "Li-ion Battery Controller" (TYPE 1), EVB-239, "Li-ion Battery Controller" (TYPE 2), EVB-479, "Li-ion Battery Controller" (TYPE 3) or EVB-705, "Li-ion Battery Controller" (TYPE 4)	
3	TCU (telematics communication unit)	AV-144, "TCU"	
4	VSP control unit	VSP-9, "Approaching Vehicle Sound For Pedestrians (VSP) Control Unit"	
5	Charging status indicator	VC-12, "Charging Status Indicator"	
6	ASCD steering switch	EVC-21, "ASCD Steering Switch"	
7	Combination meter	EVC-23, "Combination Meter"	
8	Immediate charging switch	VC-11, "Immediate Charging Switch"	
9	Electric shift control module	TM-34, "Electric Shift Control Module"	
10	A/C auto amp.	HAC-13, "A/C Auto Amp."	
11	System main relay 2	EVC-20, "System Main Relay 2"	
12	Pre-charge relay	EVC-20, "Pre-charge Relay"	
13	System main relay 1	EVC-20, "System Main Relay 1"	
14	VCM (vehicle control module)	EVC-19, "VCM"	
15	Stop lamp switch	EVC-21, "Stop Lamp Switch"	
16	ASCD brake switch	EVC-21, "ASCD Brake Switch"	
17	Accelerator pedal position sensor	EVC-20, "Accelerator Pedal Position Sensor"	

VCM

VCM (Vehicle control module) judges the vehicle status according to signals from various sensors and ECUs, and VCM controls EV system in a comprehensive manner. VCM also has a gateway function for EV system CAN communication and CAN communication, which enables communication between an ECU performing EV system CAN communication and an ECU performing CAN communication.



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M/C Relay

The M/C (motor control) relay supplies the main power to the EV system. VCM activates the M/C relay and supplies power to the EV system when the EV system needs to be started.

F/S Relay

The F/S (fail-safe) relay supplies the driving power for the system main relay inside the Li-ion battery. VCM activates the F/S relay to make the system main relay controllable when the system is set to READY or when the battery is charged.

When VCM detects a malfunction in the EV system and judges that the system main relay must be deactivated, VCM deactivates the F/S relay to shut off the system main relay driving power.

F/S CHG Relay

The F/S CHG (fail-safe charge) relay supplies the driving power for the quick charge relay inside the DC/DC junction box. When VCM recognizes a quick charge start, VCM activates the F/S CHG relay to make the quick

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< SYSTEM DESCRIPTION >

charge relay operable. During driving, F/S CHG relay remains OFF so that the quick charge relay is not activated.

SSOFF Relay

The SSOFF (self shutoff) relay supplies power to VCM and the coil of the A/C relay. The SSOFF relay is controlled by VCM so that VCM can shut off VCM power (self shutoff).

A/C Relay

The A/C (air conditioner) relay supplies power to the air conditioner system. VCM activates the A/C relay to supply power to the air conditioner system when the power is turned on or an air conditioner operation request signal is received.

System Main Relay 1

The system main relay 1 is integrated in the Li-ion battery and controlled by VCM. The system main relay 1 connects and disconnects the high-voltage circuit (+) side and Li-ion battery.

If the pre-charge to the inverter condenser is complete while high voltage power is supplied, VCM activates the system main relay 1 to supply power from the Li-ion battery to the EV system. Also when charging, VCM activates the system main relay 1 to supply power from an external charger to the Li-ion battery.

System Main Relay 2

The system main relay 2 is integrated in the Li-ion battery and controlled by VCM. The system main relay 2 connects and disconnects the high-voltage circuit (–) side and Li-ion battery. When high voltage power is supplied, VCM activates the system main relay 2 to supply power from the Li-ion battery to the EV system. When charging, power from an external charger is supplied from the system main relay 2 to the Li-ion battery.

Pre-charge Relay

The pre-charge relay is integrated in the Li-ion battery and controlled by VCM. When high voltage power is required, VCM activates the pre-charge relay before activating the system main relay to prevent abrupt application of high voltage.

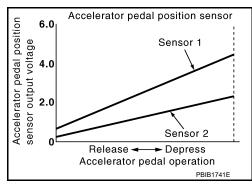
Reverse Lamp Relay

signal.

When VCM receives a reverse range information from the electric shift control module, VCM activates the reverse lamp relay to turn ON the reverse lamp.

Accelerator Pedal Position Sensor

The accelerator pedal sensor is integrated with the accelerator pedal. This sensor is a potentiometer that detects the acceleration pedal stroke, converts it to a voltage signal, and transmits the signal to VCM. The sensor transmits its signals through dual lines, providing a minimum driving function even if either line malfunctions. Upon a POWER ON cycle, VCM learns the fully closed position of the acceleration pedal from the accelerator pedal position sensor



Refrigerant Pressure Sensor

The refrigerant pressure sensor is installed to the liquid tank of the air conditioner system. The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. VCM calculates refrigerant

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< SYSTEM DESCRIPTION >

pressure based on the voltage and sends a refrigerant pressure signal to the A/C auto amp. Furthermore, VCM uses the voltage signal to the cooling fan control.

Ambient temperature 25°C (77°F)

4.16

Signal processing portion (electric circuit)

Pressure detecting portion

Pressure

Ambient temperature 25°C (77°F)

1.10

0.20

0.20

(Refrigerant pressure)

kPa (bar, kg/cm², psi) Gauge pressure

PBIB2657E

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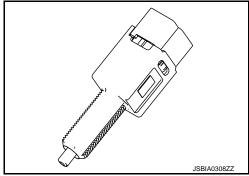
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Stop Lamp Switch

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The stop lamp switch is installed to the brake pedal bracket. The switch detects the state of the brake pedal and transmits an ON/OFF signal to VCM.

The contact of the stop lamp switch is usually open. When the brake pedal is depressed, it closes and the stop lamp switch signal is transmitted as a voltage signal.



ASCD Steering Switch

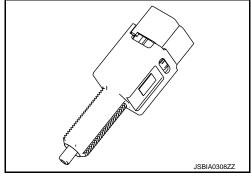
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ASCD steering switch has various values of electrical resistance for each button. VCM reads voltage variation of switch, and determines which button is operated.

ASCD Brake Switch

The ASCD brake switch is installed to the brake pedal bracket. The switch detects the state of the brake pedal and transmits an ON/OFF signal to VCM.

The contact of the ASCD brake switch is usually closed. When the brake pedal is depressed, it opens to disconnect the circuit, and shut off the output voltage. This constitutes an ASCD brake switch signal.



DC/DC Junction Box

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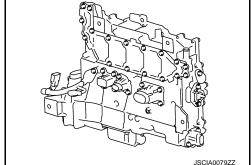
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The DC/DC junction box integrates a DC/DC converter to supply electric power to the 12 V power system and charge the 12V battery in addition to distributing high voltage power from the Li-ion battery to systems.

The DC/DC junction box has a normal charge relay and a quick charge relay so that the circuits are changed over according to the charge mode.

The DC/DC junction box has an internal cooling fin used to cool the DC/DC converter by water cooling.



DC/DC CONVERTER

Revision: 2014 June EVC-21 2011 LEAF

< SYSTEM DESCRIPTION >

The DC/DC converter steps down the high voltage DC current of the Li-ion battery to a 12 V DC current, which is used to supply power to the 12 V electrical system and charge the 12V battery. In addition, the DC/DC converter changes the output voltage according to VCM signals so that appropriate voltage is supplied depending on the vehicle condition.

Battery Current Sensor (With Battery Temperature Sensor)

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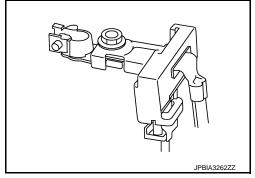
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BATTERY CURRENT SENSOR

The battery current sensor is installed to the negative cable of the battery. The battery current sensor detects the battery charge/discharge current and transmits signals to VCM. VCM judges the battery load based on these signals and controls the power generation by converting the target generation voltage to a power generation command signal and transmitting it to the DC/DC converter.

CAUTION:

Never connect the electrical component or the ground wire directly to the battery terminal. The connection causes the malfunction of the power voltage variable control, and may cause the battery to discharge.



BATTERY TEMPERATURE SENSOR

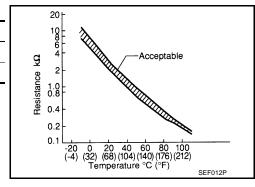
Battery temperature sensor is integrated in battery current sensor.

The sensor measures temperature around the battery.

This sensor uses a thermistor and its electrical resistance varies as the temperature varies. VCM detects a voltage change caused by the change in electrical resistance.

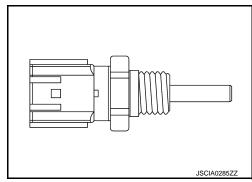
<Reference data>

	Temperature [°C (°F)]	Voltage (V)	Resistance ($k\Omega$)
-	25 (77)	3.333	1.9 - 2.1
	90 (194)	0.969	0.222 - 0.258



Coolant Temperature Sensor

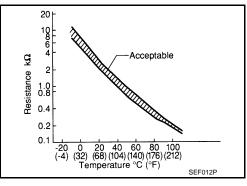
The coolant temperature sensor is detects the coolant temperature. This sensor uses a thermistor that changes its electrical resistance according to the temperature. VCM detects a voltage change according to electrical resistance change.



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< SYSTEM DESCRIPTION >

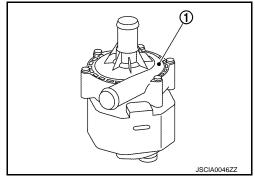
<reference value=""></reference>			
Coolant temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)	
-10 (14)	4.4	7.0 - 11.4	
20 (68)	3.5	2.35 - 2.73	
50 (122)	2.2	0.68 - 1.00	
90 (194)	0.9	0.236 - 0.260	



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Electric Water Pump

The electric water pump (1) feeds coolant by pressure, which circulates in the high voltage system cooling circuit. The high voltage system cooling circuit includes two cooling pumps. They are controlled by VCM independently so that the amount of pressure feed is adjusted according to the vehicle speed and water temperature. The electric water pump also integrates an interface circuit that monitors the pump function for any malfunction, and it transmits a malfunction signal to VCM if necessary.



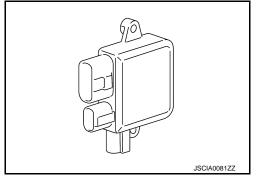
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Cooling Fan Control Module

Combination Meter

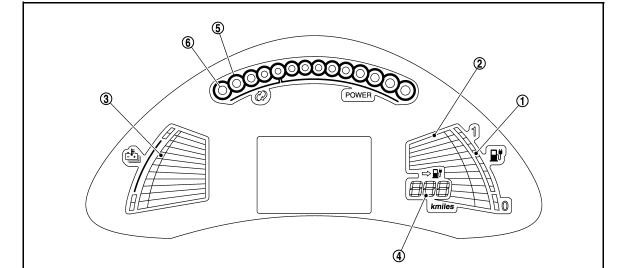
The cooling fan control module is mounted on the cooling fan and drives the cooling fan motor.

The cooling fan control module conducts communication between VCM via the PWM communication. The cooling fan control module drives the cooling fan motor so that the cooling fan speed is controlled in accordance with the control signal from VCM.



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EVC-23 Revision: 2014 June 2011 LEAF

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< SYSTEM DESCRIPTION >

VCM controls the following items on the combination meter in addition to the warning lamps and indicator lamps.

LI-ION BATTERY INFORMATION

Li-ion Battery Capacity Level Gauge (1)

VCM receives the Li-ion battery capacity signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the maximum capacity of the Li-ion battery. When the capacity of the Li-ion battery decreases with age and usage, the level of the gauge is also decreased.

Li-ion Battery Available Charge Gauge (2)

VCM receives the Li-ion battery available charge signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the available Li-ion battery charge to run the vehicle.

Li-ion Battery Temperature Gauge (3)

VCM receives the Li-ion battery temperature signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the Li-ion battery temperature.

Distance Range (4)

The driving range (km or miles) provides an estimated distance that the vehicle can be driven before recharging is necessary. The driving range is constantly being calculated, based on the amount of available Li-ion battery charge and the actual power consumption average.

VCM calculates average electricity consumption at a specified travel distance, according to total power consumption of the vehicle. Based on the average electricity consumption and the Li-ion battery available charge signal received from the Li-ion battery, VCM calculates driving range and transmits a driving range signal to the combination meter.

POWER METER

Maximum Power (5)

VCM receives a maximum motor output power signal from the traction motor inverter and a maximum regenerative power signal from the Li-ion battery controller. VCM transmits these signals to the combination meter and displays the upper limit of available output power and regenerative electric power.

Current Motor Power (6)

VCM receives the current motor power signal from the traction motor inverter, and VCM transmits the signal to the combination meter to display the power currently being output.

Warning/Indicator Lamp

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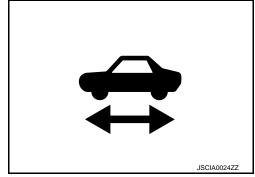
VCM controls the following warning lamps and indicator lamps.

READY TO DRIVE INDICATOR LAMP

The READY to drive indicator lamp indicates that the vehicle is in a state allowing vehicle travel. VCM transmits a READY to drive indicator lamp request signal to the combination meter via CAN communication to turn ON the READY to drive indicator lamp.

The READY to drive indicator lamp operates as follows.

Condition	Illumination status
A few seconds after operation of POWER ON to READY.	Blink
READY	ON
Except above	OFF



EV SYSTEM WARNING LAMP

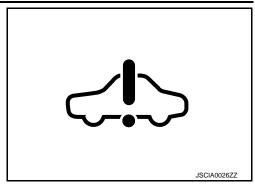
< SYSTEM DESCRIPTION >

The EV system warning lamp turns ON if a malfunction occurs with the EV system.

If VCM detects a malfunction or receives an EV system warning lamp request signal from any other ECUs, VCM transmits an EV system warning lamp request signal to the combination meter via CAN communication.

The EV system warning lamp operates as follows.

Condition	Illumination status
2 seconds after turn power switch ON	ON (bulb check)
If malfunction is present in EV system *1	ON
POWER ON just after occurrence of malfunction in EV system during charging (POWER OFF) *2	ON
Except above	OFF



*1: When the EV system warning lamp turns ON, it remains ON until the power switch is turned OFF. (Depending on diagnosis, the EV system warning lamp may turns OFF soon after the system returns to normal.)

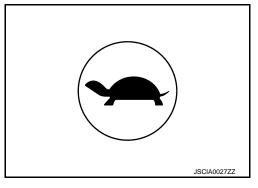
POWER LIMITATION INDICATOR LAMP

The output limit indicator turns ON when the traction motor output is limited.

When the traction motor output is limited, VCM sends an output limit indicator ON request signal to the combination meter via CAN communication.

The power limitation indicator lamp operates as follows.

Condition	Illumination status
2 seconds after POWER ON	ON (bulb check)
When vehicle power is lowered	ON
Except above	OFF



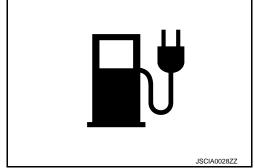
For output limit conditions, refer to EVC-38, "MOTOR POWER CONTROL: System Description".

LOW BATTERY CHARGE WARNING LAMP

The low battery charge warning lamp turns ON when the Li-ion battery remaining energy is lowered. When VCM detects that Li-ion battery remaining energy is approximately 4kWh or less, VCM transmits a low battery charge warning lamp request signal to the combination meter via CAN communication.

The low battery charge warning lamp operates as follows.

Condition	Illumination status
When Li-ion battery remaining energy is Approx. 4kWh or less.	ON
When Li-ion battery remaining energy recovers to 4.5 kWh or more while warning lamp is ON.	$ON \Rightarrow OFF$
Except above	OFF



PLUG IN INDICATOR LAMP

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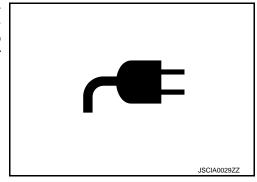
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^{*2:} Because the EV system warning lamp cannot turn ON during charging (POWER OFF), it turns ON at a next POWER ON cycle.

< SYSTEM DESCRIPTION >

The plug in indicator lamp turns ON when a charge connector is connected to the normal charge port or the quick charge port. VCM supplies power to the plug in indicator lamp in the combination meter to turn on the lamp when VCM receives the EVSE connecting signal or the quick charger connecting signal from the on-board charger. The plug in indicator lamp operates as follows.

Condition	Illumination status
2 seconds after POWER ON	ON (bulb check)
When charge connector is connected	ON
Charging	Blink
Except above	OFF



NOTE:

When EVSE is connected, the indicator lamp turns ON immediately. The indicator lamp turns OFF after the 10 seconds passes in non-operating state.

12V BATTERY CHARGE WARNING LAMP

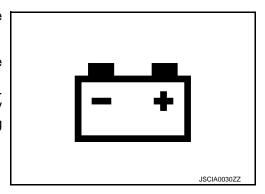
When DC/DC converter is malfunctioning, the 12V battery charge warning lamp turns ON.

NOTE:

- If the 12V battery voltage lowers during READY, the READY state is also cancelled.
- If VCM judges that the vehicle is running (transmission in a position except P range and parking brake released) when the 12V battery voltage lowers, it turns ON the 12V battery charge warning lamp and alerts the driver by sounding a buzzer.

The 12V battery charge warning lamp operates as follows.

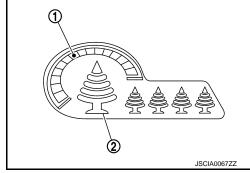
Condition	Illumination status
When power switch is turned ON	ON (bulb check)⇒OFF⇒ON
When 12V battery voltage lowers	ON
Except above	OFF



ECO Indicator

The ECO indicator shows the instantaneous ECO drivability in the instant ECO indicator (1), and shows the cumulative ECO drivability, during 1 trip in the ECO tree (2).

For information regarding control, refer to <u>EVC-51</u>, "<u>ECO INDICA-TOR CONTROL</u>: System Description".



Information Display

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Information necessary to control the information display is transmitted from each relevant control unit and entered into the combination meter. Based on this information, warning or other information appears on the information display. VCM displays the following items.

< SYSTEM DESCRIPTION >

Display item	Display content
Cruise set indicator	Displays the setting status of ASCD and set speed.
Shift position indicator	Displays the current shift position.
Remove charge connector warning	This warning is displayed when the power switch is turned from OFF to ON/READY with the charging connector connected.
DC/DC converter warning	Displays when the voltage of the 12V battery is low.
Timer setting status	Displays the setting status of timer charge/timer air conditioner stored in VCM.
Charging time	Displays the expected time till the target charge level is achieved in VCM timer.
Charging timer setting confirmation	This shows the next scheduled time when timer charging will be conducted.
A/C heater timer (Climate Ctrl. Timer) setting confirmation	This shows the next scheduled timer air conditioner time.
SHIFT "P" warning*	This shows the next scheduled timer air conditioner time.

^{*:} Apply to VCM other than those in Group A. For VCM groups, refer to EVC-8, "How to Check VCM Group".

Approaching Vehicle Sound for Pedestrians (VSP)

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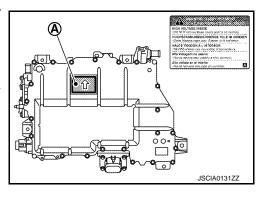
VSP informs the user of various information by electronic sounds. In the following cases, VCM transmits a operation signal to VSP.

Condition	Operation status		
EVSE is connected to the normal charge port	Short beep (once)		
When normal charging starts	Short beeps in sequence (twice)		

High Voltage Warning Label

INFOID:0000000007539084

- The high voltage warning label is affixed to the rear side (A) of DC/DC-J/B.
 - : Direction of the label
- When replacing DC/DC-J/B, make sure to affix the label in the original position.



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Revision: 2014 June EVC-27 2011 LEAF

SYSTEM

ELECTRIC POWER TRAIN SYSTEM

ELECTRIC POWER TRAIN SYSTEM: System Description

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CONTROL OUTLINE

EV requires electric power for the operation of all its systems.

The power stored in the Li-ion battery is supplied as high-voltage direct current to the high-voltage system while also being converted to 13-15 V by the DC/DC converter and supplied to the 12 V power system. VCM judges the vehicle status from various information and performs various EV system controls in a comprehensive manner.

Main Control Contents of EV

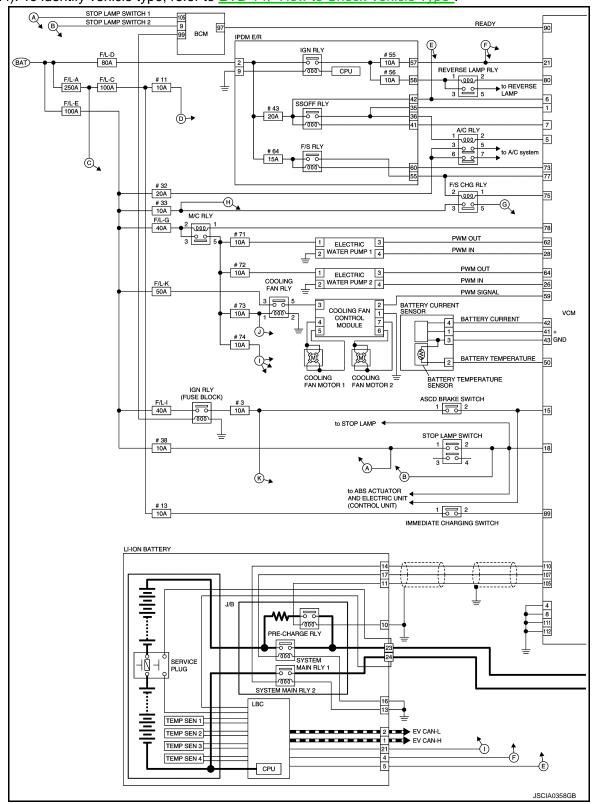
Control	Reference		
EV system start-up control	EVC-34, "EV SYSTEM START UP CONTROL : System Description"		
High voltage power supply control	EVC-37, "HIGH VOLTAGE POWER SUPPLY CONTROL: System Description"		
Motor power control	EVC-38, "MOTOR POWER CONTROL : System Description"		
Motor regeneration control	EVC-39, "MOTOR REGENERATION CONTROL : System Description"		
Li-ion battery charge control	EVC-39, "LI-ION BATTERY CHARGE CONTROL : System Description"		
Cooperative Regenerative brake control	BR-13, "System Description"		
High voltage system cooling control	EVC-43, "HIGH VOLTAGE SYSTEM COOLING CONTROL : System Description"		
Air conditioner control	EVC-46. "AIR CONDITIONER CONTROL: System Description"		
Power voltage variable control	EVC-48, "POWER VOLTAGE VARIABLE CONTROL SYSTEM: System Description"		
Automatic 12V battery charge control	EVC-48, "AUTOMATIC 12V BATTERY CHARGE CONTROL : System Description"		
Power cut off control	EVC-49. "POWER CUT OFF CONTROL : System Description"		
ASCD (automatic speed control device)	EVC-50, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"		
ECO indicator control	EVC-51, "ECO INDICATOR CONTROL : System Description"		

ELECTRIC POWER TRAIN SYSTEM : Circuit Diagram

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NOTE:

For Li-ion battery heater circuit, refer to <u>EVB-250</u>, <u>"Circuit Diagram"</u> (TYPE 2), <u>EVB-716</u>, <u>"Circuit Diagram"</u> (TYPE4). To identify vehicle type, refer to <u>EVB-14</u>, <u>"How to Check Vehicle Type"</u>.



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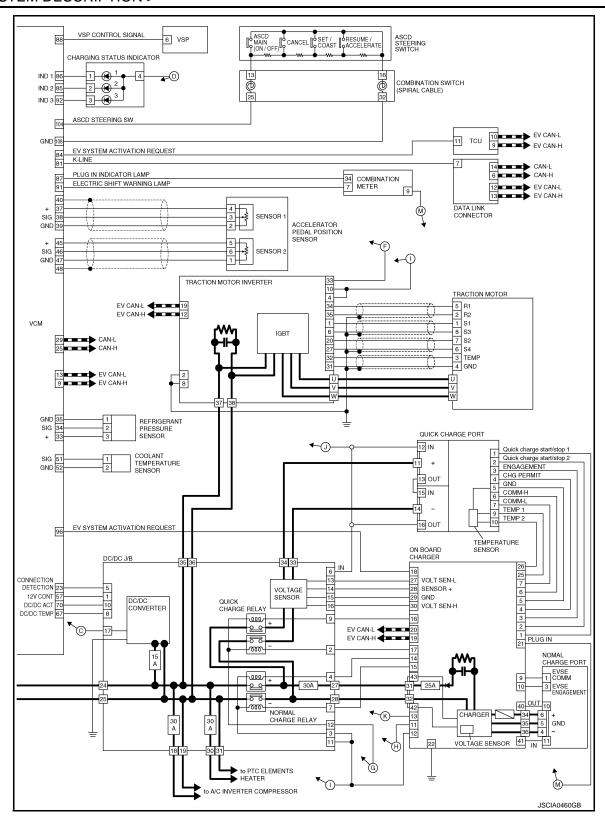
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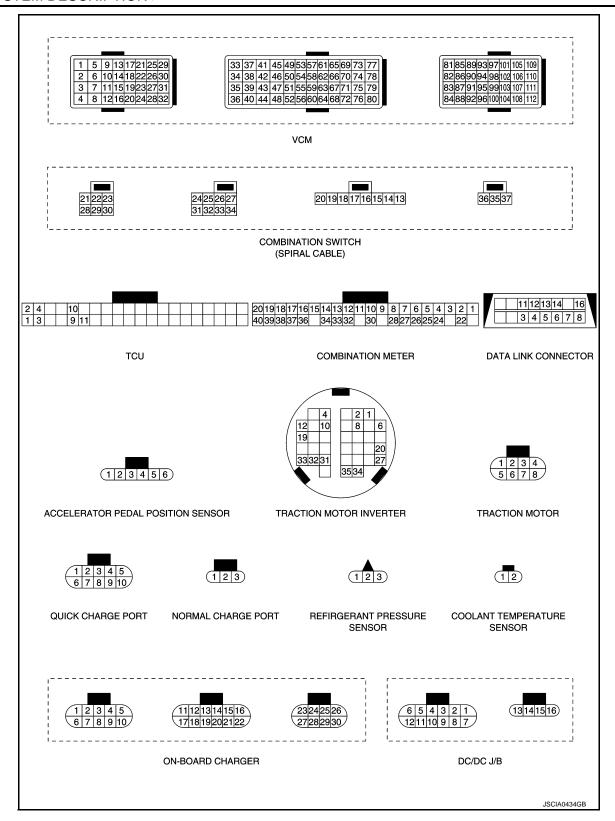
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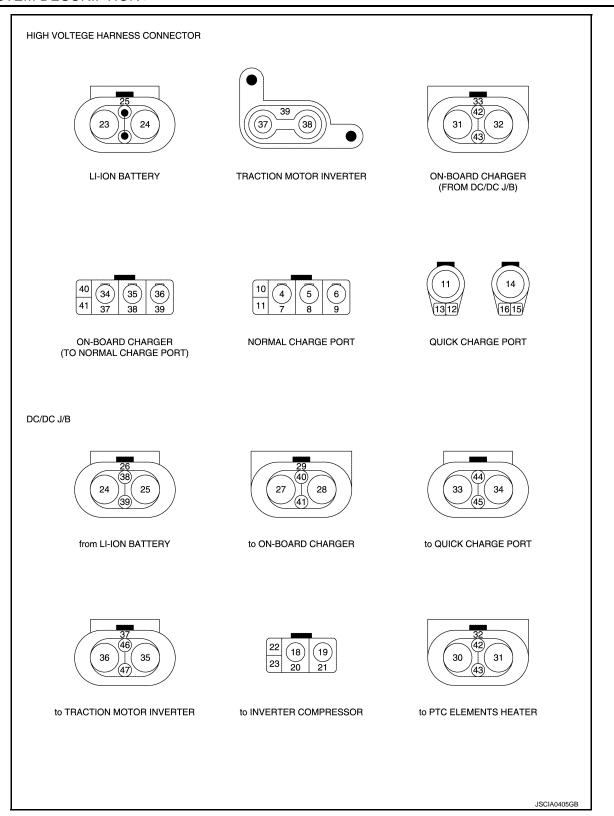


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EV SYSTEM START UP CONTROL

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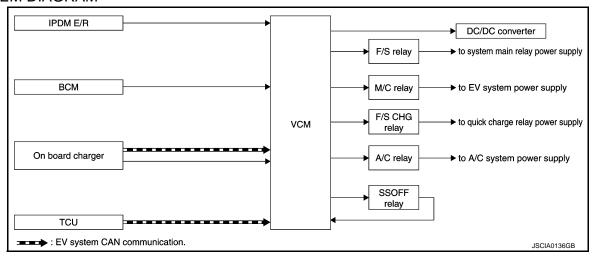
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EV SYSTEM START UP CONTROL: System Description

INFOID:0000000007539087

SYSTEM DIAGRAM



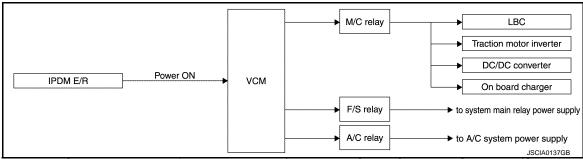
INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form	
IPDM E/R	Power ON		Voltage	
BCM	READY signal			
On-board charger	Quick charger connecting signal	VCM	EV aviatom CAN	
	EVSE connecting signal	VOIVI	EV system CAN	
	EV system activation request signal		Voltage	
TCU	EV system activation request signal		voitage	
VCM	DC/DC converter activation request	DC/DC converter	PWM	

EV SYSTEM START UP CONTROL

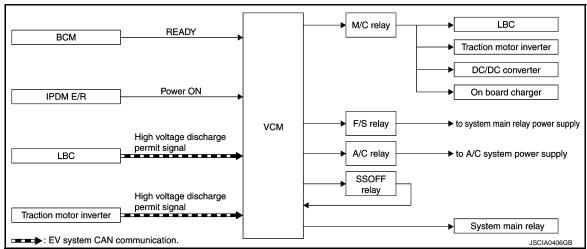
VCM judges the operation mode from signals sent by various sensors, switches and ECUs, and controls the start/stop of the EV system by activating the relays accordingly. VCM also activates the SSOFF relay so that it can shut off VCM power when VCM stops (self shutoff).

Power switch ON



When the power ON power supply from the IPDM E/R enters VCM, VCM turns ON the M/C relay to supply power to each ECU in the EV system.

READY



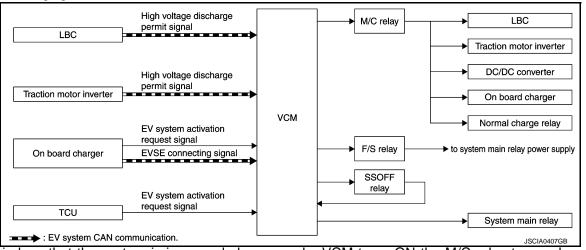
When the driver operates the POWER switch while depressing the brake pedal, VCM turns ON the M/C relay to supply power to each ECU in the EV system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

NOTE:

VCM inhibits the vehicle is set to READY in following conditions:

- · Charge connector is connected
- Li-ion battery remaining energy is too low.
- Li-ion battery temperature is too low. [Approximately -25°C (-13°F)]

In Normal Charging



If VCM judges that the system is in normal charge mode, VCM turns ON the M/C relay to supply power to each ECU in the EV system and to the normal charge relay in the DC/DC junction box. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

NOTE:

Normal charging does not start with the power switch ON.

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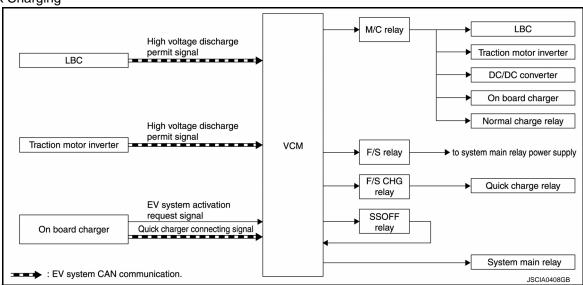
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In Quick Charging



When VCM judges that the system is in quick charge mode, VCM turns ON the M/C relay to supply power to each ECU in the EV system. VCM also activates the F/S CHG relay to supply power to the quick charge relay inside DC/DC J/B. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

When Air Conditioner Is Operating (Power OFF)

When VCM receives an air conditioner operation command, VCM turns ON the M/C relay to start the EV system. VCM also activates the A/C relay to supply power to the air conditioner system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

When Automatic 12V Battery Charge Control is Operating

When VCM judges that the 12V battery requires automatic charging, VCM turns ON the M/C relay to start the EV system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

Relay Activation Matrix

POWER ON

Relay	Condition					
	POWER ON	READY	Charging		When 12V bat-	Timer A/C
		KLADI	Normal charge	Quick charge	tery is charged	Timer A/C
F/S relay	ON	ON	ON	ON	ON	ON
M/C relay	ON	ON	ON	ON	ON	ON
A/C relay	ON	ON	ON	ON	ON	ON
F/S CHG relay	OFF	OFF	OFF	ON	OFF	OFF

POWER OFF

Relay	Condition					
	Charging		When 12V battery	Timer A/C	Remote A/C	
	Normal charge	Quick charge	is charged	Timer A/C	Remote A/C	
F/S relay	ON	ON	ON	ON	ON	
M/C relay	ON	ON	ON	ON	ON	
A/C relay	OFF	OFF	OFF	ON	ON	
F/S CHG relay	OFF	ON	OFF	OFF	ON*	

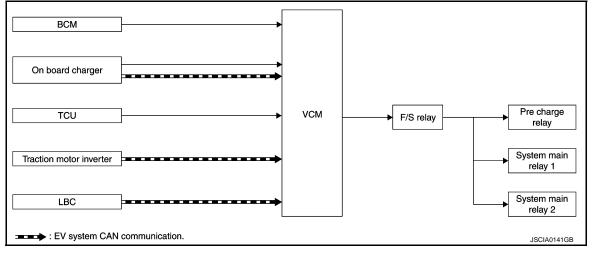
^{*:} Only during quick charging

HIGH VOLTAGE POWER SUPPLY CONTROL

HIGH VOLTAGE POWER SUPPLY CONTROL: System Description

INFOID:0000000007539088

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form	
BCM	Power switch operation		Voltage	
	Quick charger connecting signal		FV system CAN	
On-board charger	EVSE connecting signal		EV system CAN	
	EV system activation request signal		Voltage	
TCU	EV system activation request signal VCM		vollage	
Traction Motor Inverter	High voltage power supply preparation completion signal		EV system CAN	
	High voltage discharge permit signal			
Li-ion battery controller High voltage discharge permit signal				

DESCRIPTION

VCM activates system main relay 1, system main relay 2, and the pre-charge relay inside the Li-ion battery to connect the high voltage circuit to the Li-ion battery in response to the READY operation, a driver operation, like connecting the charge cable to the charging port, or VCM timer function.

Moreover, the high voltage circuit of the EV system has a pre-charge circuit to protect the high voltage circuit from sudden application of high voltage current.

CONTROL FLOW

To connect the high voltage circuit, VCM first activates the system main relay 2 and pre-charge relay. As a result, the high voltage power is supplied to the respective systems via the pre-charge resistor in the pre-charge circuit. When the condenser inside the traction motor inverter is fully charged by the applied power, the traction motor inverter transmits a high voltage power supply preparation completion signal to VCM. Receiving the signal, VCM activates the system main relay 1 and deactivates the pre-charge relay. Then, normal power is supplied to the respective systems.

MOTOR POWER CONTROL

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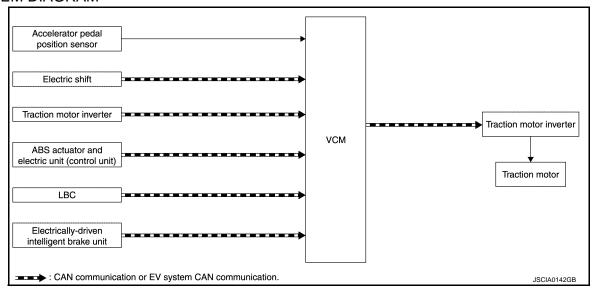
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MOTOR POWER CONTROL: System Description

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SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form	
Accelerator pedal position sensor	Accelerator pedal position		Voltage	
Electric shift	Shift position signal			
Traction Motor Inverter	Motor speed signal		EV system CAN	
Traction Motor inverter	Motor torque limit signal			
	ABS operation signal	VCM		
ABS actuator and electric unit (control unit)	VDC operation signal			
	TCS operation signal			
Electrically-driven intelli- gent brake unit	Target braking force signal			
VCM	Target motor torque signal	Traction Motor Inverter		

DESCRIPTION

The EV system generates traction force by converting the direct current from the Li-ion battery to an alternating current by the traction motor inverter and operating the traction motor with the alternating current.

VCM calculates target traction force, based on an accelerator pedal position, vehicle speed, and shift position. After this, VCM adds creep force to the calculated target traction force.

Subsequently, VCM adds torque limitations to the calculated driving force, based on torque down signals received from each system, to decide a motor torque request signal.

This motor torque request signal is transmitted to the traction motor inverter via EV system CAN communication.

For the operation principle of the motor, refer to TMS-15, "OPERATION DESCRIPTION".

OUTPUT LIMIT AND OUTPUT STOP REQUEST LIST

Request ECU	Output limit cause	Power limitation indicator lamp	Condition
	Traction motor temperature high	ON	When the traction motor or traction motor inverter reaches an abnormally high temperature
Traction Motor Inverter	Input power low	ON	When the high voltage power input to the traction motor inverter is 240 V or less
1	DTC detected	OFF	Refer to TMS-32, "Fail-Safe".

SYSTEM

< SYSTEM DESCRIPTION >

Request ECU	Output limit cause	Power limitation indicator lamp	Condition
	Li-ion battery remained energy low	ON	When the Li-ion battery cell voltage is low
Li ion battany	Li-ion battery tempera- ture high	ON	When the Li-ion battery reaches an abnormally high temperature (Reference value: Approx. 55°C)
Li-ion battery controller Li-ion battery tempera- ture low	ON	When the Li-ion battery reaches an abnormally low temperature. (Reference value: Approx. –10°C)	
DTC detected		OFF	Refer to EVB-45, "Fail-safe" (TYPE 1), EVB-263, "Fail-safe" (TYPE 2), EVB-497, "Fail-safe" (TYPE 3) or VC-26, "Fail-Safe" (TYPE 4).
	Acceleration/brake signal plausibility error	OFF	When the accelerator pedal position sensor signal and stop lamp switch signal are input at the same time
VCM	Power train system protection function	OFF	_
	DTC detected	OFF	Refer to EVC-79, "Fail-Safe".

MOTOR REGENERATION CONTROL

MOTOR REGENERATION CONTROL: System Description

INFOID:0000000007539090

DESCRIPTION

The regenerative brake system is a function that operates the traction motor as a generator during deceleration, not for generating traction force as in normal driving, and converts the kinetic energy from the vehicle wheels to electric energy that is used to charge the Li-ion battery. At the same time, it utilizes the rotational resistance from the power generation as a part of the braking force.

For the operation principle, refer to TMS-15, "OPERATION DESCRIPTION".

REGENERATIVE BRAKE CONTROL

When the driver depresses the brake pedal during driving, Electrically-driven Intelligent Brake Unit transmits a target braking force signal to VCM. VCM calculates a target regenerative torque based on the signal and transmits a target motor torque signal to the traction motor inverter. Moreover, VCM transmits the current regenerative torque signal to Electrically-driven Intelligent Brake Unit so that the Electrically-driven Intelligent Brake Unit can control the overall braking force.

For information on the Electrically-driven Intelligent Brake collaborative control, refer to BR-13, "System Description".

REGENERATION CHARGE CONTROL

VCM determines the regenerative charging amount from the Li-ion battery maximum chargeable power signal sent from the Li-ion battery. Moreover, VCM determines the energy recovery amount while performing a collaborative control with the electrically-driven intelligent brake system so that a suitable braking force is provided according to the brake pedal operation amount.

After determining the energy recovery amount, VCM transmits a target motor torque signal to the traction motor inverter and starts regeneration charge.

If the Li-ion battery remaining energy is sufficient, VCM stops the regeneration charge control.

VCM performs the regenerative charge control constantly at deceleration. However, when the Li-ion battery is in the fully charged state, VCM stops the regenerative charge control. Accordingly, deceleration may be felt weak when the accelerator pedal is released during driving.

LI-ION BATTERY CHARGE CONTROL

LI-ION BATTERY CHARGE CONTROL: System Description

INFOID:0000000007539091

CONTROL OUTLINE

VCM activates the EV system by connecting the charging connector, performing remote control, or using the built-in timer to start charging to the Li-ion battery. The following charge modes are available.

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Me	thods of charging	Description
	Immediate charge	
	Timer charge	VC-14, "System Description"
	Remote charge	VC-14, System Description
Quick charge		
Regeneration charge		EVC-39, "MOTOR REGENERATION CONTROL: System Description"

CAUTION:

The cooling fan may operate while charging even when the power switch is OFF, so keep your hands away from the cooling fan.

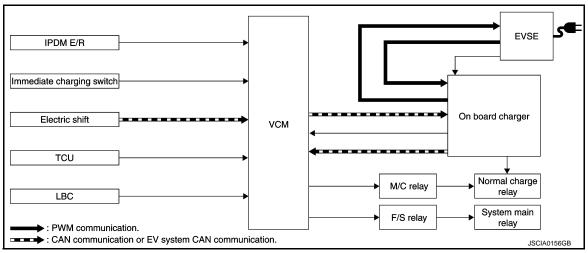
NOTE:

- Li-ion battery charge does not start when the power switch is ON. When it is required to charge with the power switch ON, start charging before turning ON the power switch.
- When the charging connector is connected to the charge port in the READY state, READY is turned OFF, the power switch is turned ON, and the shift position is changed to N position.
- VCM group*: except for A
 When the charging connector is connected to the charge port, the shift position remains in P position even
 when the selector lever knob is operated with the power switch ON.
- *: For VCM groups, refer to EVC-8, "How to Check VCM Group".

LI-ION BATTERY CHARGE CONTROL: Normal Charge Control

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SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL TABLE

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Output sensor/ECU	Signal name	Input ECU/actuator	Signal form	
IPDM E/R	Power ON		Voltage	
Immediate charging switch	Immediate charging switch signal			
TCU	EV system activation request signal			
Electric shift	Shift position signal			
Li-ion battery controller	Li-ion battery chargeable power signal			
Li-ion battery controller	Li-ion battery charge completion signal	VCM		
	On-board charger chargeable power signal		EV system CAN	
	EVSE connecting signal			
On-board charger	AC input type signal			
	EV system activation request signal		Voltage	
	Charge current request signal	EVSE	PWM communication	
EVSE	Maximum input current signal		- P VVIVI COMMUNICATION	
EVSE	EVSE connector lock	On-board charger	Voltage	
VCM Maximum charge power signal			EV system CAN	

BASIC CONTROL

When EVSE is connected under the power switch OFF condition, VCM judges that the system is in a charge mode and activates the F/S relay and M/C relay to allow charging operation.

Then, VCM determines the charge power based on the Li-ion battery chargeable power signal received from the Li-ion battery controller and the on-board charger chargeable power signal received from the on-board charger. VCM then sends the maximum charge power signal to the on-board charger.

The on-board charger determines a charge power based on the maximum charge power signal and the maximum input current signal sent by the EVSE control box.

Concurrently, the on-board charger activates the normal charge relay and VCM activates the system main relay 1 and system main relay 2. Consequently, Li-ion battery charge starts.

NOTE:

- Li-ion battery charge does not start when the power switch is ON. When it is required to charge with the power switch ON, start charging before turning ON the power switch.
- VCM group*: except for A
 When the charging connector is connected to the charge port, the shift position remains in P position even
 when the selector lever knob is operated with the power switch ON.
- VCM group*: except for A
 When the charging connector is connected to the charge port in the READY state, READY is turned OFF,
 the power switch is turned ON, and the shift position is changed to N position.
- *: For VCM groups, refer to EVC-8, "How to Check VCM Group".

IMMEDIATE CHARGE MODE

When EVSE is connected to the normal charge port, the on-board charger transmits an EV system activation signal to VCM. Li-ion battery charge then starts immediately.

When the timer charge is set, Li-ion battery charge does not start just after the on-board charger transmits an EV system activation signal to VCM. When VCM detects an ON signal from the immediate charging switch in that state, VCM judges that the immediate charge mode is selected and starts charging.

When the charge is finished and VCM receives a Li-ion battery charge completion signal from Li-ion battery controller, VCM stops the charge control.

TIMER CHARGE MODE

VCM starts up automatically and starts charging at the set time.

When VCM receives a Li-ion battery charge completion signal from Li-ion battery controller or at a set timer charge finish time, VCM stops the charge control.

NOTE:

When timer charge and the timer air conditioner operate simultaneously, VCM distributes power to the air conditioner system and the charge system according to the priority set on the navigation screen.

REMOTE CHARGE MODE

< SYSTEM DESCRIPTION >

When TCU transmits an EV system activation signal to VCM, VCM judges that the remote charge mode is selected and starts charge control.

When VCM receives a Li-ion battery charge completion signal from Li-ion battery controller, VCM stops the charge control.

CANCEL CONDITIONS

VCM stops the normal charging when VCM detects the EVSE is disconnected.

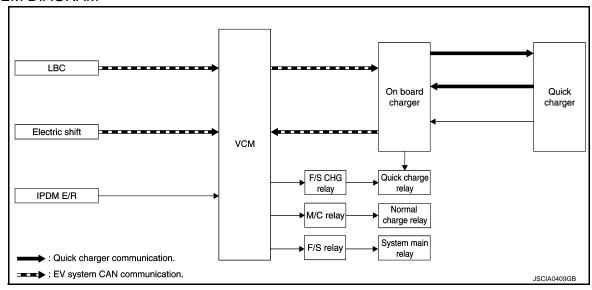
In addition, under the following conditions, VCM temporarily stops the normal charging and enters standby status

- When the AC voltage and PWM communication from the EVSE are interrupted.
- When the EVSE connector release switch is pressed.
- When the Li-ion battery temperature reaches 60°C (140°F) or higher.

LI-ION BATTERY CHARGE CONTROL: Quick Charge Control

INFOID:0000000007539093

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL TABLE

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form	
IPDM E/R	Power ON		Voltage	
Electric shift	Shift position signal			
Li ian hattary controller	Li-ion battery chargeable power signal			
Li-ion battery controller	Li-ion battery charge completion signal	VCM	EV system CAN	
	On-board charger chargeable power signal		2 v oyotom e. m	
	Quick charger connecting signal			
On-board charger	EV system activation request signal		Voltage	
	Charge current request signal	Quick charger	Quick charger communica-	
	Quick charge permit signal	- Quick charger		
	Diagnosis information signal			
Quick charger	Charge start switch	On hoord shares	Veltage	
	Isolation check	On-board charger	Voltage	
VCM	Maximum charge power signal		EV system CAN	

BASIC CONTROL

When the quick charge connector is connected to the quick charge port and the start switch of quick charger is pressed, the on-board charger transmits an EV system activation request signal to VCM. VCM then activates the F/S relay, M/C relay, and F/S CHG relay.

< SYSTEM DESCRIPTION >

Next, VCM determines the target charge power based on the Li-ion battery chargeable power signal received from the Li-ion battery controller and the on-board charger chargeable power signal received from the on-board charger. VCM then sends the maximum charge power signal to the on-board charger.

The on-board charger converts the Maximum charge power signal to a charge current request signal and transmits it to the quick charger.

Simultaneously, the on-board charger activates the normal charge relay and the quick charge relay, and VCM activates system main relay 1 and system main relay 2. Consequently, the quick charge starts.

When the charge amount reaches the prescribed amount and VCM receives the Li-ion battery charge completion signal from the Li-ion battery controller, VCM stops the charging.

NOTE:

- Even if the Li-ion battery remaining energy does not reach the predetermined level, VCM may stop the charge control after a certain period of time.
- When the Li-ion battery temperature reaches 60°C (140°F) or higher, VCM temporarily stops quick charging and enters standby status.

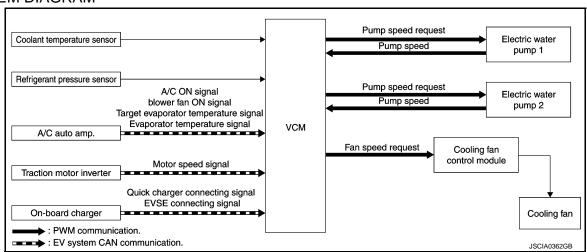
HIGH VOLTAGE SYSTEM COOLING CONTROL

HIGH VOLTAGE SYSTEM COOLING CONTROL: System Description

INFOID:0000000007539094

VCM controls water pump 1, water pump 2, and cooling fan according to information from various sensors and ECUs.

SYSTEM DIAGRAM



WATER PUMP CONTROL

Control Description

The cooling system includes two pumps. By driving these two pumps individually, VCM controls the coolant flow rate according to the coolant temperature and vehicle speed. In addition, if one of the pumps malfunctions, VCM increases the rotation speed of the other to prevent a decrease in the coolant flow rate. VCM controls the water pump as per the following.

Condition	Control status	Pump 1 control duty (%)	Pump 2 control duty (%)
During normal driving	Normal control	73	66
At low vehicle speed	Low vehicle speed and low tem- perature coolant flow rate control	43	38
Charging	Charge mode control	39	44

NOTE:

- VCM performs the low vehicle speed and low temperature coolant flow control at approximately 30 km/h (19 MPH) or less. The low vehicle speed and low temperature coolant flow control is switched to the normal control when vehicle speed becomes approximately 35 km/h (22 MPH) or more.
- VCM performs the low vehicle speed and low temperature coolant flow control when coolant temperature is less than 30°C (86°F). The low vehicle speed and low temperature coolant flow control is switched to normal control when coolant temperature is 30°C (86°F) or more.

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SYSTEM

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If either water pump malfunctions, VCM controls the water pumps as per the following.

Feedback to VCM (Feedback duty)		Control status
Low pump speed (4 – 6 %)	Only one pump mal- functions	 Continues normal control for the malfunctioning pump. For the normally functioning pump, controls the duty to 80 % during driving or 60 % during charging.
(4 – 6 %)	Both pumps mal- function	Continues normal control.
High pump speed (84 – 90 %)	Only one pump mal- functions	 For the relevant pump, controls the duty to 10 % (stop command). For the normally functioning pump, controls the duty to 80 % during driving or 60 % during charging.
	Both pumps mal- function	For the relevant pump, controls the duty to 10% (stop command).
Pump speed does not match	Only one pump mal- functions	Continues normal control.
VCM command	Both pumps mal- function	Continues normal control.
Input signal error or no input (diagnosis on pump side)	Only one pump mal- functions	Operates the pump at the maximum speed (maximum output control triggered
	Both pumps mal- function	by pump self-diagnosis)

COOLING FAN CONTROL

Control Description

VCM calculates the required cooling fan speed from the operation status of the air conditioner, coolant temperature, refrigerant pressure, and vehicle speed. VCM transmits the PWM signal to the cooling fan control module according to the calculated value.

During normal driving or Li-ion battery charging, VCM determines a cooling fan speed by selecting the highest value from a coolant temperature request value and the sum of an air conditioner request value and an evaporator temperature correction value, as shown in the following table.

Coolant temperature request

Unit: %

Coolant temperature	Vehicle speed (km/h)			
Coolant temperature	0 – 20	20 – 50	50 – 80	80 or more
60.5°C or more	100	100	100	100
57°C or more and less than 60.5°C	40 – 85	40 – 85	40 – 85	0
Less than 57 °C	0	0	0	0

Air conditioner request (MIN)

Unit: %

Refrigerant pressure	Vehicle speed (km/h)				
Remgerant pressure	0 – 20	20 – 50	50 – 80	80 or more	
1.68 MPa or more	85	100	100	100	
1.38 MPa or more and less than 1.68 MPa	65	55	55	0	
1.00 MPa or more and less than 1.38 MPa	65	40	40	0	
Less than 1.38 MPa	65	0	0	0	

Air conditioner request (MAX)

SYSTEM

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				Unit: %
Refrigerant pressure	Vehicle speed (km/h)			
	0 – 20	20 – 50	50 – 80	80 or more
1.68 MPa or more	85	100	100	100
1.38 MPa or more and less than 1.68 MPa	85	85	85	0
1.00 MPa or more and less than 1.38 MPa	65	70	70	0
Less than 1.38 MPa	65	70	70	0

Evaporator temperature correction

Target - actual evaporator tempera- ture difference	Correction duty (%)
Less than 2°C	0
2°C or more and less than 5°C	15
5°C or more and less than 8°C	35
8°C or more	100

During timer A/C mode or remote A/C mode, VCM determines a cooling fan speed by selecting the highest value from a coolant temperature request value and the sum of an air conditioner request value and an evaporator temperature correction value, as shown in the following table.

Coolant temperature request

Coolant temperature	Fan duty (%)
62°C or more	100
60.5°C or more and less than 62°C	40 – 100
Less than 60.5°C	0

Air conditioner request (MIN)

Refrigerant pressure	Fan duty (%)
2.40 MPa or more	75
2.00 MPa or more and less than 2.40 MPa	55
1.38 MPa or more and less than 2.00 MPa	40
1.00 MPa or more and less than 1.38 MPa	40
Less than 1.00 MPa	40

Air conditioner request (MAX)

Refrigerant pressure	Fan duty (%)
2.40 MPa or more	75
2.00 MPa or more and less than 2.40 MPa	55
1.38 MPa or more and less than 2.00 MPa	55
1.00 MPa or more and less than 1.38 MPa	55
Less than 1.00 MPa	55

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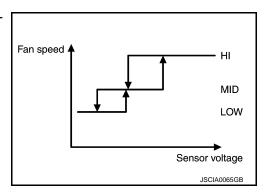
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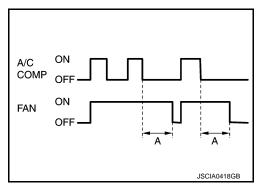
Evaporator temperature correction

Target - actual evaporator tempera- ture difference	Correction duty (%)
Less than 2°C	0
2°C or more and less than 5°C	15
5°C or more and less than 8°C	15
8°C or more	15

The cooling fan speed control reduces the cooling fan speed fluctuation by having a range for the operating conditions.



When the vehicle speed is 10km/h or less, VCM reduces the frequency of ON/OFF cycles by setting a period of time (A) in which the cooling fan continuously operates after the A/C compressor is turned OFF.

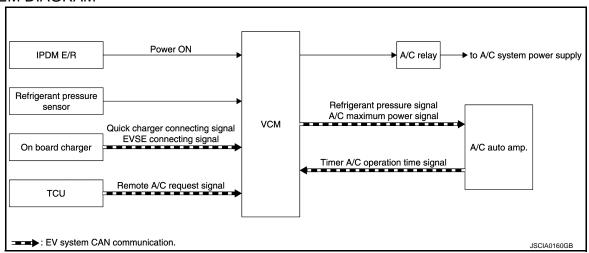


AIR CONDITIONER CONTROL

AIR CONDITIONER CONTROL: System Description

INFOID:0000000007539095

SYSTEM DIAGRAM



DESCRIPTION

In EV, VCM controls the A/C relay so that the air conditioner can operate even in the POWER OFF state. The remote air conditioner and timer air conditioner functions are enabled by this control. When VCM judges a need of air conditioner activation in response to driver operation, timer air conditioner function, or remote air

SYSTEM

< SYSTEM DESCRIPTION >

conditioner function, VCM activates M/C relay to start the EV system. VCM also activates the A/C relay to supply power to the A/C system.

In addition, VCM calculates the power that can be used by the air conditioning system based on the Li-ion battery status and vehicle status and sends it to the A/C auto amp.

When ECO mode is selected, VCM sends the ECO mode signal to the A/C auto amp. to control the air conditioner at a lower rate than normal.

For an overview of air conditioner types, refer to <u>HAC-15</u>, "AUTOMATIC AIR CONDITIONING SYSTEM: System Description".

CONTROL DESCRIPTION

Air Conditioner Control During Charging (For Group A and Group B)

VCM allows the air conditioner to be used during charging. In this case, the air conditioner stops when charging is completed.

NOTE:

If the Li-ion battery available charge gauge level is lower than Level 2, the A/C does not operate during battery charge.

Cooling/heating Function Control During Power Supply Position ON (Except for Group A and Group B)

When the power supply position is ON, VCM allows the operation of cooling/heating function control in the status that EVSE is connected. However, start of cooling/heating function is allowed only while charging is in progress. Refer to HAC-28, "Description" for details of cooling/heating function control during power supply position ON.

NOTE:

If the Li-ion battery available charge gauge level is lower than Level 2, the A/C does not operate during battery charge.

Timer Air Conditioning Control

When all of the following conditions are satisfied, VCM activates the timer air conditioner so that the room temperature reaches 25°C (77°F) before the scheduled departure time.

- Timer air conditioner timer is ON
- There is AC power input during charging (or in a state where AC power input is possible).

VCM activates the EV system 2 hours before the scheduled departure time. The A/C auto amp. judges the necessary operating time of timer air conditioner within the range between 0 and 2 hours according to the ambient temperature and interior temperature and sends the data to VCM. VCM calculates and judges the operating time required for activating the timer air conditioner, according to the scheduled departure time and the received data.

NOTE:

- When turning ON the power switch during timer air conditioning, the air conditioning control switches to normal
- When timer charge and the timer air conditioner operate simultaneously, VCM distributes power to the air conditioner system and the charge system according to the priority set on the navigation screen.

Remote Air Conditioning Control

When VCM receives the remote air conditioning request signal from the TCU, the air conditioning is operated. Remote air-conditioning operates as follows.

Condition	Operating time (min)
Charge connector is not connected.	15
When connecting EVSE (with AC input)	15 – 120
During quick charge	15 – 120

NOTE:

When the power is turned ON during remote air conditioning, the remote air conditioning is ended.

POWER VOLTAGE VARIABLE CONTROL SYSTEM

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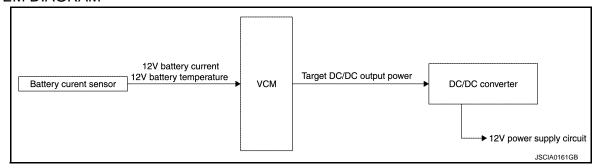
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POWER VOLTAGE VARIABLE CONTROL SYSTEM: System Description INFOID:000000007539096

SYSTEM DIAGRAM



DESCRIPTION

The power voltage variable control system reduces the electric power consumption from the Li-ion battery by varying the DC/DC converter output in a range from 13 V to 15 V according to the use status of electric equipment and the 12V battery status.

CONTROL DESCRIPTION

The battery current sensor (with battery temperature sensor) measures the battery charge/discharge current and the battery ambient temperature.

VCM judges the battery status and the use status of electric equipment based on those signals, determines a target output voltage, and transmits a target DC/DC output power signal to the DC/DC converter.

The DC/DC converter adjusts the output voltage to the target power generation voltage based on the received target DC/DC output power signal.

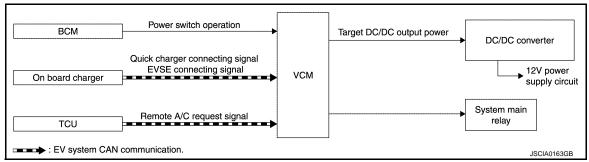
In addition, when there is no power voltage signal or when some error is occurs in the variable voltage control system, the DC/DC converter outputs 14 V.

AUTOMATIC 12V BATTERY CHARGE CONTROL

AUTOMATIC 12V BATTERY CHARGE CONTROL: System Description

INFOID:0000000007539097

SYSTEM DIAGRAM



DESCRIPTION

The automatic 12V battery charge control is a control to reduce the frequency of battery discharge by automatically charging the 12V battery in case the 12V battery voltage is low when the key switch is turned to ON or the vehicle is left unattended for a long time.

When VCM judges a need for automatic charge, VCM controls the DC/DC converter and the system main relay and charges the 12V battery using the Li-ion battery power.

For 12V battery charge control during READY condition, refer to EVC-48, "POWER VOLTAGE VARIABLE CONTROL SYSTEM: System Description".

Vehicle state	12V battery charge	Shift position
READY	Always charged.	Any position
Normal charge ON		
Quick charge ON		
Timer A/C or remote A/C ON		"P" position only
Power switch ON	Automatically started when 12V battery voltage is low.	
Power switch OFF	Charge for 5 minutes when the vehicle is not used for a long time.	

NOTE:

When any of the following operations is performed, the 12V battery automatic charge control is canceled: 1) Vehicle to the READY state, 2) Normal charge, 3) Quick charge, 4) Timer/remote A/C ON.

CONTROL DESCRIPTION

Power ON

VCM monitors the 12V battery voltage during POWER ON cycle and immediately starts charging when VCM judges that the voltage is lowered.

NOTE:

VCM does not perform the automatic 12V battery charge control when the shift position is in a range other than "P" range.

When Vehicle is Not Used for A Long Time

- VCM group^{*}: A and B
 - VCM measures the time of no operation using its internal timer. If the time of no operation reaches 120 hours, VCM performs automatic charge for 5 minutes.
- VCM group*: except for A and B
 - VCM measures the time of no operation using its internal timer. If the time of no operation reaches 24 hours, VCM performs automatic charge for 4 minutes.
- *: For VCM groups, refer to EVC-8, "How to Check VCM Group".

VCM resets the no operation status continuous time when the vehicle satisfies one of the following conditions.

- READY continues for more than 5 minutes.
- Normal charge continues for more than 5 minutes.
- Quick charge continues for more than 5 minutes.
- Timer air conditioning or remote air conditioning continues for more than 5 minutes.

NOTE:

- During automatic 12V battery charge, the charging status indicator blinks.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

POWER CUT OFF CONTROL

POWER CUT OFF CONTROL: System Description

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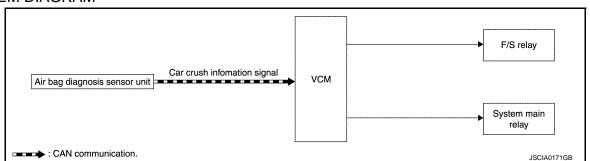
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SYSTEM DIAGRAM



DESCRIPTION

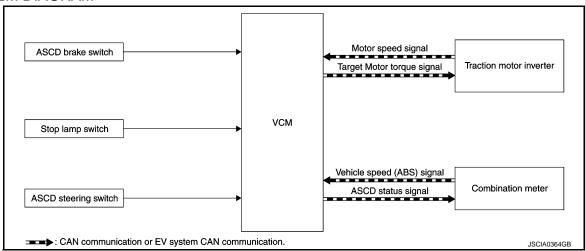
Because EV uses high voltage power, there is a risk of electric shock if the high voltage circuit is shorted to a body ground during a collision. To avoid such risks, if VCM detects a car crush information signal, VCM deactivates the system main relay to cut off the Li-ion battery from the high voltage circuit so that the risk of electric shock is reduced.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD): System Description

INFOID:0000000007539099

SYSTEM DIAGRAM



BASIC ASCD SYSTEM

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at a predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 143 km/h (89 MPH).

VCM controls the traction motor to regulate vehicle speed.

Operation status of ASCD is indicated on the information display in the combination meter. If any malfunction occurs in ASCD system, it automatically deactivates control.

For the switch function, Refer to <u>EVC-53</u>, "AUTOMATIC SPEED CONTROL DEVICE (ASCD): Switch Name and Function".

CAUTION:

Always drive vehicle in a safe manner according to traffic conditions and obey all traffic laws.

CANCEL OPERATION

When any of following conditions exist, cruise operation is cancelled.

- CANCEL switch is pressed
- More than two switches on ASCD steering switch are pressed at the same time (Set speed is cleared)
- Brake pedal is depressed
- Selector lever position is N, P or R position
- TCS system is operated

When VCM detects malfunction for some self-diagnoses regarding ASCD system, VCM cancels the cruise operation and informs the driver by blinking SET indicator lamp quickly.

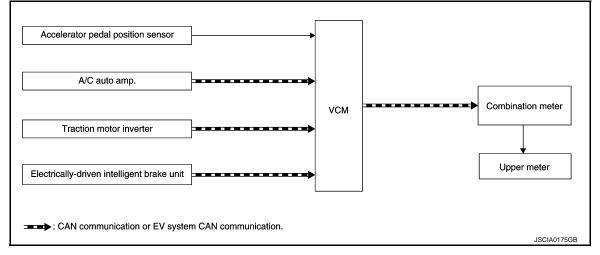
If ASCD MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations are cancelled and vehicle speed memory is erased.

ECO INDICATOR CONTROL

ECO INDICATOR CONTROL: System Description

INFOID:0000000007539101

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form
Accelerator pedal position sensor	Accelerator pedal position		Voltage
	Ambient temperature signal		
A/C auto amp	Air conditioner ON signal		
A/C auto amp.	A/C maximum power signal	VCM	EV system CAN
	PTC maximum power signal	- VCM	
Traction motor inverter	Motor speed signal		
	Regeneration brake torque signal	-	
Electrically-driven intelligent brake unit	Target brake force signal		
VCM	ECO indicator signal	Combination meter	CAN
VCIVI	ECO tree signal	Combination meter	

DESCRIPTION

VCM calculates the instantaneous ECO operability based on the driver accelerator operation, brake operation, vehicle idle time, and air conditioner operation status and displays this in the instant ECO indicator.

Furthermore, VCM samples the instantaneous ECO operability every second and compares it to the map stored by VCM to calculate the cumulative ECO drivability, and if this value exceeds the set value, then the ECO tree segment is illuminates.

NOTE:

Once the ECO tree segment is illuminated, it does not turn OFF (dim) during the current trip.

NOTICE:

The idle time is the status when not driving in the READY state.

For details regarding the ECO indicator functions, refer to MWI-29. "ECO INDICATOR: System Description".

CAN COMMUNICATION

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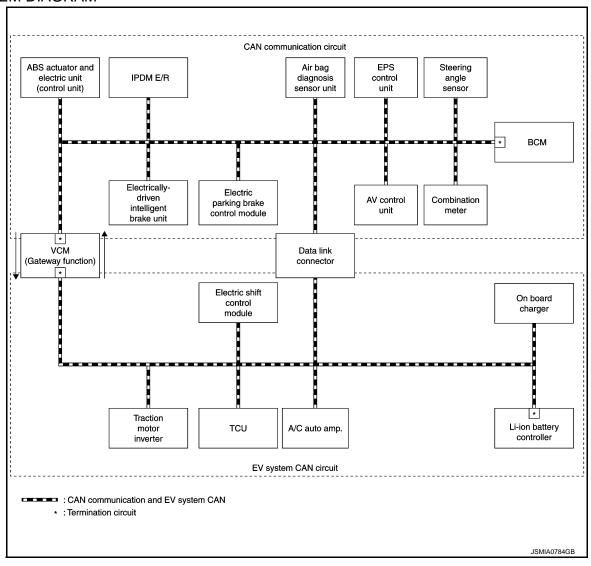
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CAN COMMUNICATION: System Description

INFOID:0000000007539102

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.

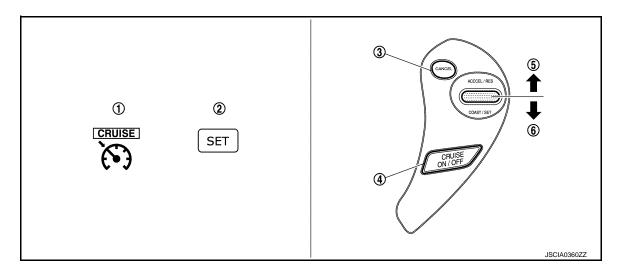
OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD): Switch Name and Function

FOID:0000000007539103

SWITCHES AND DISPLAYS



- 1. Cruise indicator
- 4. ASCD MAIN switch
- A. Information display
- 2. SET indicator
- 5. SET/COAST switch
- B. On the steering wheel
- CANCEL switch
- 6. RESUME/ACCEL switch

SWITCH OPERATION

Name	Function Turns the ASCD ON/OFF.	
ASCD MAIN switch		
RESUME/ACCEL switch	 When the switch is pressed after the cruise control is cancelled in any method other than main switch operation, the vehicle speed is reset to the previous speed setting before the cancellation*. When the switch is pressed during cruise control, the setting speed is increased and the vehicle speed increases. 	
SET/COAST switch	 When the switch is pressed at the preferred vehicle speed, the cruise control starts to operate. When the switch is pressed during cruise control, the set speed is reduced and the vehicle speed reduces. 	
CANCEL switch	When the switch is pressed, the ASCD control is cancelled.	

^{*:} To reset vehicle speed, the vehicle condition must be as follows:

- · Brake pedal is released
- · Selector lever position is D or ECO.
- $\bullet~$ Vehicle speed is greater than 40 km/h (25 MPH) and 130 km/h (80 MPH)

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

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ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

This system is an on-board diagnostic system that detects a malfunction automatically. A malfunction is stored in ECU memory as a DTC. The diagnostic information can be obtained with CONSULT.

Counter System

In this system, "Power switch is turned OFF \Rightarrow ON" is defined as 1 trip. VCM detects malfunctions while saving the DTC and freeze frame data and continues saving this data for a maximum of 40 trips. In addition, if a DTC that is the same as the saved DTC is detected again, the counter is reset and the count up starts from "0" again.

DTC and Freeze Frame Data

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VCM can save multiple DTC but can only save 1 freeze frame data record.

When VCM detects a certain malfunction, if it detects a different malfunction after saving the DTC and freeze frame data, multiple DTC can be confirmed, but only the freeze frame data that is saved first can be confirmed. The DTC and freeze frame data are deleted when the self-diagnostic is deleted.

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (VCM)

CONSULT Function

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FUNCTION

Diagnostic test mode	Function
ECU Identification	VCM part number can be read.
Self-diagnostic result*1	Self-diagnostic results and freeze frame data can be read and erased quickly.*2
Data monitor	Input/Output data in VCM can be read.
Active test	Diagnostic Test Mode in which CONSULT drives some actuators apart from VCM and also shifts some parameters in a specified range.
Work support	This mode enables a technician to adjust some devices faster and more accurately by following the indications on the CONSULT.
Load battery ID	Refer to "Li-ion Battery ID Registration Operation Manual".

^{*1:} For VCM other than those in Group A or Group B, DTC P0AA1 is not cleared even when "Self-diagnostic Result" is cleared. To clear DTC P0AA1, perform "SPECIFIC DTC CLEAR" in "WORK SUPPORT". For VCM groups, refer to EVC-8, "How to Check VCM Group".

WORK SUPPORT MODE

Work Item

WORK ITEM	CONDITION	USAGE
SAVE DATA FOR CPU REPLACE	In this mode, the data saved in VCM is stored in CONSULT.	When VCM is replaced.
WRITE DATA AFTER REPLACE CPU	In this mode, write data stored by "SAVE DATA FOR CPU REPLACE" in work support mode to VCM.	When VCM is replaced.
BATTERY GRADUAL CAP LOSS DATA CLEAR	Li-ion Battery deterioration data stored in VCM is cleared.	Always perform after Li-ion Battery controller is replaced as new one.
HV BATT J/B DATA CLEAR	System Main Relay cutoff count stored in VCM is cleared.	Always perform after Li-ion Battery Junction Box is replaced as new one.
WRITE VIN DATA	VIN is registered in VCM.	When registering VIN in VCM.
SPECIFIC DTC CLEAR*	Self-diagnosis results of DTC P0AA1 and Freeze Frame Data are cleared.	When DTC P0AA1 is detected.

^{*:} When this is performed, all self-diagnosis results in VCM and Freeze Frame Data are cleared. This function is not displayed for VCMs in Group A or Group B. For VCM Groups, refer to <u>EVC-8</u>, "<u>How to Check VCM Group</u>".

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC, refer to EVC-84, "DTC Index".

How to Erase DTC

- If power is continuously in the ON position after a DTC is detected, turn power switch OFF for at least 20 seconds before turning power switch to the ON position again, and then erase DTC.
- Check the all self-diagnostic screen to confirm there are no DTCs in other ECUs.

CAUTION:

For VCM other than those in Group A and Group B, DTC P0AA1 is not cleared even when "Self-diagnostic Result" is cleared. To clear DTC P0AA1, perform "SPECIFIC DTC CLEAR" in "WORK SUP-PORT". For VCM groups, refer to EVC-8, "How to Check VCM Group".

Freeze Frame Data

The Freeze Frame Data shows the state of the vehicle at the time a DTC is detected and is useful in re-creating the circumstances that caused the malfunction.

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^{*2:} The following diagnosis information is cleared when the VCM memory is erased.

[·] Diagnostic trouble codes

[·] Freeze frame data

< SYSTEM DESCRIPTION >

Freeze Frame Data Item L	ior
Freeze frame data item	Description
DTC	Displays a DTC.
VCM MODE	Displays VCM status. O-7: During VCM starts-up 10: Power switch is ON and the charge connector is not connected. 11-29: Mode changing to READY 30: READY 31-68: During system shutdown 109, 110: Power switch is ON and the charge connector is not connected. 111-129: Mode changing to charge mode. 130: During charging 131-144: During system shutdown 211-229: Mode changing to automatic 12V battery charging or remote charging mode without charging connector connection. 230: During automatic 12V battery charging or remote charging mode without charging connector.
VCM ACTIVAT TRIG	Displays the cause of VCM start-up.
CHG PORT CON- NECT	Displays the connection status of the charge connector 1: Quick charge connector is connected. 2: Normal charge connector is connected
VEHICLE SPEED [km/h] or [mph]	Displays the vehicle speed that is calculated from the motor speed.
SHIFT POSITION	Displays the shift position.
COOLANT TEMP [degC]	Displays the coolant temperature.
MOTOR SPEED [rpm]	Displays the traction motor speed.
ACCEL OPEN AN- GLE [deg]	Displays the accelerator pedal openness.
TRG TORQ [Nm]	Displays the target motor torque.
TRG POWER [N]	Displays the target motor output.
TRG REGE TORQ [Nm]	Displays the target motor regeneration torque.
HV BATT VOLT [V]	Displays the Li-ion battery voltage.
HV BATT CURRENT [A]	Displays the Li-ion battery current.
HV BATT TEMP [degC]	Displays the Li-ion battery temperature.
REGENERABLE PWR [kW]	Displays the Li-ion battery regenerable power.
CHARGEABLE PWR MAX [kW]	Displays the Li-ion battery chargeable power.
AVAILABLE HV BAT PWR [kW]	Displays the Li-ion battery available discharge power.
ERROR TYPE [Ah]	The item is indicated, but not used.

DATA MONITOR MODE

Monitored Item

		Monitor Iter	m Selection	X: Applicable	
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
POWER LIMIT CAUSE	B/T-LOW B/T-HI B LEV B CAP MOT-V MOT-T ##			When the motor power is limited, this shows the reason the power is being limited. B/T-LOW: Li-ion battery temperature is too low. B/T-HI: Li-ion battery temperature is too high. B LEV: The Li-ion battery remaining energy is low. B CAP: The Li-ion battery capacity is low. MOT-V: The input voltage to the traction motor or traction motor inverter is low. MOT-T: Traction motor temperature or traction motor inverter temperature is too high. ##: No torque limitation.	
VEHICLE SPEED	km/h or mph	X	Х	The vehicle speed computed by the motor speed signal sent from the traction motor inverter is displayed.	
12V BATTERY VOLTAGE	V	Х	Х	The 12 V power supply voltage of VCM is displayed.	
WATER PUMP 1 TRG DUTY	%	X		Displays the water pump 1 target rotation command duty.	
W/P 1 CRNT SPD DUTY	%		Χ	Displays the water pump 1 actual rotation duty.	
WATER PUMP 2 TRG DUTY	%	Х		Displays the water pump 2 target rotation command duty.	
W/P 2 CRNT SPD DUTY	%		Χ	Displays the water pump 2 actual rotation duty.	
VCM POWER SUPPLY (ACT)	V	Х		Displays the 12 V power supply voltage of VCM wh VCM is started.	
DC/DC CONV TEMP	μsec			Displays the DC/DC converter temperature status signal duty.	
DC/DC CONV TEMP STATUS	0/1/2/3/7			Displays the DC/DC converter temperature status. 0: The DC/DC converter power is being limited. 1: The DC/DC converter is at a high temperature. 2: The DC/DC converter is at an intermediate temperature. 3: The DC/DC converter is at a low temperature. 7: The DC/DC converter system is malfunctioning.	
F/S RELAY VOLT	V	Х		Displays the voltage on the F/S relay contact side that is being input to VCM.	
COOLANT TEMP	degC	Х	Х	The coolant temperature (determined by the signal voltage of the coolant temperature sensor) is displayed.	
VCM MODE			X	 Displays VCM status. 0-7: During VCM starts-up 10: Power switch is ON and the charge connector is not connected. 11-29: Mode changing to READY 30: READY 31-68: During system shutdown 109, 110: Power switch is ON and the charge connector is not connected. 111-129: Mode changing to charge mode. 130: During charging 131-144: During system shutdown 211-229: Mode changing to automatic 12V battery charging or remote charging mode without charging connector connection. 230: During automatic 12V battery charging or remote charging mode without charging connector connection. 231-246: During system shutdown 	

		Monitor Ite	m Selection	
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description
TRG MOTOR TORQ 1	N·m		Х	Displays the motor torque demand value VCM is requesting of the traction motor inverter.
VCM ACTIVATION	On/READY			Displays that VCM has the EV system READY. On: Other than READY READY: READY control in progress
NEXT GEAR POSITION	• R • N/P • D			Displays the position of the selected selector lever. R: When R range is selected N/P: When N or P range is selected D: When D or ECO range is selected
GEAR POSITION	• R • N/P • D			Displays the position of the currently selected selector lever. R: R range N/P: N or P range D: D or ECO range
READY LAMP SIGNAL	On/BLINK/ Off		Х	Displays the READY to drive indicator lamp operation request status. On: This causes the READY to drive indicator lamp to light up. BLINK: This causes the READY to drive indicator lamp to flash. Off: No operation request
CHARGE LAMP SIGNAL	On/BLINK/ Off		Х	Displays the 12V battery charge warning lamp operation request status. On: The causes the 12V battery charge warning lamp to light up. BLINK: The causes the 12V battery charge warning lamp to flash. Off: No operation request
EV SYSTEM W/L SIGNAL	On/BLINK/ Off		Х	This displays the EV system warning lamp operation request status. On: This causes the EV system warning lamp to light up BLINK: This causes the EV system warning lamp to flash. Off: No operation request
AVAILABLE MOT OUTPUT MAX	kW			Displays the maximum value that can currently be ou put by the traction motor.
MOTOR REGE PWR MAX	kW			Displays the maximum value that is currently regene able by the traction motor.
POWER CONSUM (MOTOR)	kW			Displays the traction motor estimated power consumption calculated by VCM from the traction motor torque and vehicle speed.
CHARGE MODE	100V/200V/ QUICK/NG/ Off			Displays the charging status. 100V: Charging using AC 100-120 V 200V: Charging using AC 200-240 V QUICK: During quick charge NG: When in a state where charging is not possible. Off: Except above
ECO INDICATOR	_			Displays the number of segments indicated by the ir stant ECO indicator.
ECO TREE	_			Displays the number of segments indicated by the ECO tree.
POWER CONSUMPTION (A/C)	kW			Displays the power consumption of the air conditione system.
POWER CONSUM (AUXS)	kW			Displays the power consumption of the auxiliaries.

< SYSTEM DESCRIPTION >

		Monitor Ite	m Selection		
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
GEAR POSITION DISPLAY	P/R/N/D/B	х	х	Displays the in-meter gear display request status. P: When there is a P display request R: When there is an R display request N: When there is an N display request D: When there is a D display request B: When there is an ECO display request	
AMBIENT TEMP	degC	Х		Displays the outside air temperature received from the A/C auto amp.	
DC/DC CONV STATUS	1/2/3			Displays the status of the DC/DC operation signal being used for communication between VCM and the DC/DC converter. 1: When normal operation 2: VCM is detecting a DC/DC converter error. 3: VCM is prohibiting DC/DC converter operation.	
DC/DC CONV REQ VOLT	V			Displays the power generation request voltage being requested to the DC/DC converter.	
COOLING FAN REQ DUTY	%		Х	Displays the cooling fan operation request duty.	
ACCEL OPEN ANGLE	deg			The accelerator pedal opening angle (determined by the signal voltage of the accelerator pedal position sensor) is displayed.	
12V BATTERY TEMP	degC	Х		The 12V battery temperature (determined by the signal voltage of the battery temperature sensor) is displayed.	
12V BATTERY CURRENT AVG	Α	Х	Х	Displays the average current of 12V battery.	
READY COUNT*	count			Displays the cumulative READY count from the time the vehicle is new.	
INTEG READY TIME*	sec			Displays the cumulative READY time from the time the vehicle is new.	
QUICK CHG COUNT*	count			Displays the cumulative quick charge count from the time the vehicle is new.	
INTEG Q/CHG TIME*	sec			Displays the cumulative quick charge time from the time the vehicle is new.	
NORMAL CHG COUNT*	count			Displays the cumulative normal charge count from the time the vehicle is new.	
INTEG N/CHG TIME*	sec			Displays the cumulative normal charge time from the time the vehicle is new.	
ACCEL SENSOR 1 VOLT	V	Х	Х	Accelerator pedal position sensor 1 signal voltage is displayed.	
ACCEL SENSOR 2 VOLT	V	Х	Х	Accelerator pedal position sensor 2 signal voltage is displayed.	
HI SPEC VEHICLE SPEED	km/h or mph			Displays the high accuracy vehicle speed from "VEHI-CLE SPEED"	
REFRIGERANT PRESS	MPa	X		The refrigerant pressure (determined by the signal voltage of the refrigerant pressure sensor) is displayed.	
ASCD SET VEHICLE SPEED*1	km/h or mph			The preset ASCD vehicle speed is displayed	
N/CHG PORT CONNECTION	On/HALF/ Off	х	х	Displays the normal charge connector engagement state. On: The normal charge connector is connected correctly. HALF: The normal charge connector is semi-engaged. Off: The normal charge connector is not connected.	

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		Monitor Ite	m Selection		
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
ENABLE OBC OUT PWR	kW			Displays the power that can be output by the on-board charger.	
OBC OUT PWR	kW	Х	Х	Displays the power being output by the on-board charger.	
AC POWER TYPE	100V/200V/ NONE			Displays the type of AC power supply that is connected to the normal charge port. 100V: A 100-120 V power supply is connected. 200V: A 200-240 V power supply is connected. NONE: An AC power supply is not connected.	
HV BATT LEVEL (%)	%	х	х	The Li-ion battery remained energy rate is displayed. NOTE: Battery power indication method of VCM differs from that of quick charger. A value displayed for this item may not agree with a value displayed by quick charger.	
HV BATT VOLT	V		Х	Displays the Li-ion battery voltage received from the Li-ion battery controller.	
HV BATT CURRENT	A			Displays the Li-ion battery current received from the Li-ion battery controller.	
HV BATTERY TEMP	°C or °F		Х	Displays the Li-ion battery temperature received fr the Li-ion battery controller.	
HV BATT LEVEL	kWh	Х	Х	The Li-ion battery remained energy is displayed	
IR SENSOR SIGNAL P-P	mV			Displays the peak to peak of the signal sent from on-board isolation resistance monitoring system.	
INVERTER DC INPUT VOLT	V			Displays the high-voltage power supply voltage being input to the traction motor inverter.	
MOTOR PWR LIMIT REQ (INV)	%			Displays the traction motor output limit value received from the traction motor inverter.	
CURRENT MOTOR TORQ	N⋅m			Displays the traction motor actual output value (estimated value) received from the traction motor inverte	
MOTOR SPEED	rpm	Х	Х	Displays the traction motor revolution received from the traction motor inverter.	
ESTMT PWR CNSM (A/C CMP)	kW	Х		Displays the A/C compressor estimated power consumption.	
ESTMT PWR CNSM (PTC HTR)	kW	х		Displays the PTC elements heater estimated power consumption.	
FRONT WIPER	LOW/HIGH/ Off/INVALID			Displays the front wiper operation status received from the IPDM E/R • LOW: Front wiper is operating at low speed • HIGH: Front wiper is operating at high speed • Off: Front wiper is not operating • INVALID: IPDM E/R cannot detect front wiper status.	
CLASH DETECT INFO	• MID • HEAVY • ##	Х		Displays the car crush information received from the air bag diagnosis sensor unit. • MID: A non-serious impact was detected. • HEAVY: A serious impact was detected. • ##: When the impact is not detected	
POWER SW	On/Off	х		Displays the POWER switch operation status. On: When the POWER switch is operated Off: On: When the POWER switch is not operated	
START SIGNAL	On/Off	Х	Х	Displays the BCM start signal status. On: Start signal input. Off: Start signal does not input.	

		Monitor Ite	m Selection		
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
EV SYS ACT REQ (OBC)	On/Off	Х		Displays the status of the EV system activation request signal received from the on-board charger. On: When a signal is received Off: When a signal is not received	
IMMEDIATE CHG SW	On/Off	Х		Displays the operation status of the immediate charg ing switch. On: When the switch is operated Off: When the switch is not operated	
EV SYS ACT REQ (TCU)	On/Off	Х		Displays the status of the EV system activation request signal received from the TCU. On: When a signal is received. Off: When a signal is not received	
HV INTERLOCK (DC/DC)	On/Off			Displays the connection status of the high voltage connector connected to the DC/DC junction box. On: The high voltage connector is connected correctly. Off: Except above.	
F/S RELAY	On/Off		Х	Displays the F/S relay operation status. On: F/S relay is ON Off: F/S relay is OFF	
M/C RELAY	On/Off		Х	Displays the M/C relay operation status. On: M/C relay is ON Off: M/C relay is OFF	
F/S CHG RELAY	On/Off		Х	Displays the F/S CHG relay operation status. On: F/S CHG relay is ON Off: F/S CHG relay is OFF	
REVERSE LAMP RELAY	On/Off	Х		Displays the reverse lamp relay operation status. On: Reverse lamp relay is ON Off: Reverse lamp relay is OFF	
REVERSE LAMP RELAY MONI	On/Off			Displays the status that VCM is operating the reverse lamp relay. On: Operation voltage is being output by VCM. Off: Operation voltage is not being output by VCM.	
A/C RELAY	On/Off		Х	Displays the A/C relay operation status. On: A/C relay is ON Off: A/C relay is OFF	
HV P MAIN RLY ACTIV	On/Off		Х	Displays the system main relay (+) operation status. On: System main relay (+) is ON Off: System main relay (+) is OFF	
HV P MAIN RLY ACTIV MONI	On/Off	Х		Displays the status that VCM is operating the system main relay (+). On: Operation voltage is being output by VCM. Off: Operation voltage is not being output by VCM.	
HV N MAIN RLY ACTIV	On/Off		Х	Displays the system main relay (-) operation status. On: System main relay (-) is ON Off: System main relay (-) is OFF	
HV N MAIN RLY ACTIV MONI	On/Off	Х		Displays the status that VCM is operating the system main relay (-). On: Operation voltage is being output by VCM. Off: Operation voltage is not being output by VCM.	
HV PRE CHG RLY ACTIV	On/Off		Х	Displays the pre-charge relay operation status. On: pre-charge relay is ON Off: pre-charge relay is OFF	

		Monitor Ite	m Selection		
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
HV PRE CHG RLY ACTIV MONI	On/Off	Х		Displays the status that VCM is operating the precharge relay. On: Operation voltage is being output by VCM. Off: Operation voltage is not being output by VCM.	
PLUG IN INDI LAMP	On/Off		Х	Displays the plug in indicator lamp operation request status. On: The plug in indicator lamp is lit. Off: No operation request	
CHARGE STAT INDI 1	On/Off		Х	Displays the charging status indicator 1 operation request status. On: The charging status indicator 1 is lit. Off: No operation request	
CHARGE STAT INDI 2	On/Off		Х	Displays the charging status indicator 2 operation request status. On: The charging status indicator 2 is lit. Off: No operation request	
CHARGE STAT INDI 3	On/Off		Х	Displays the charging status indicator 3 operation request status. On: The charging status indicator 3 is lit. Off: No operation request	
ASCD MAIN SW	On/Off	Х		Displays the ASCD MAIN switch operation status On: When the ASCD MAIN switch is operated Off: When the ASCD MAIN switch is not operated	
ASCD CANCEL SW	On/Off	х		Displays the CANCEL switch operation status. On: When the CANCEL switch is operated Off: When the CANCEL switch is not operated	
RESUME/ACC SW	On/Off	X		Displays the RESUME/ACCELERATE switch operation status. On: When the RESUME/ACCELERATE switch is operated Off: When the RESUME/ACCELERATE switch is not operated	
ASCD SET SW	On/Off	Х		Displays the SET/COAST switch operation status. On: When the SET/COAST switch is operated Off: When the SET/COAST switch is not operated	
ASCD BRAKE SW	On/Off	Х		Displays the ASCD brake switch operation status. On: The brake pedal is not depressed. Off: The brake pedal is depressed.	
STOP LAMP SW	On/Off	Х		Displays the operation status of the stop lamp switch. On: The brake pedal is depressed. Off: The brake pedal is not depressed.	
ASCD SET LAMP	On/Off			Displays the SET indicator operation request status. On: The SET indicator is lit. Off: No operation request	
ASCD CRUISE LAMP	On/Off			Indicates [ON/OFF] condition of CRUISE lamp determined by the VCM according to the input signals.	
ASCD CANCEL (LOW SPEED)	NON/CUT			Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD set speed. CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.	

		Monitor Ite	m Selection		
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description	
ASCD CANCEL (SPEED DIFF)	NON/CUT			Indicates the vehicle cruise condition. NON: Vehicle speed is maintained at the ASCD se speed. CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD of eration is cut off.	
DC/DC CONV STAT	On/STOP			Displays the status of the operation request sent by VCM to the DC/DC converter. On: When there is a DC/DC converter operation request Off: No operation request	
VARIABLE V/CONT PERMIT	On/Off			Displays the power voltage variable control authorization status of VCM. On: Authorized Off: Prohibited	
KICK DOWN	On/Off			Displays Kick Down decision state. On: Accelerator pedal is depressed. Off: Accelerator pedal is fully released	
TRG HV BATT CHG LEVEL	100%/80%			Displays the selected Li-ion battery charging level.	
REAR DEFOGGER	On/Off			Displays the rear window defogger operation status received from the IPDM E/R. On: When the rear window defogger is operating Off: When the rear window defogger is not operating	
PWR LIMIT INDICAT LAMP	On/Off		Х	Displays the power limit indicator lamp operation request status. On: The power limit indicator lamp is lit. Off: No operation request	
A/C SW	On/Off	Х	Х	Displays the A/C switch operation status received from the A/C auto amp. On: When the A/C switch is operating Off: When the A/C switch is not operating	
EVSE COMM	COMM/ NO COM			Displays the communication status between VCM an the EVSE.	
Q/CHG INTERLOCK	On/Off	х	Х	Displays the quick charger connector engagement status. On: The quick charger connector is connected correctly. Off: The quick charger connector is not connected.	
Q/CHG RELAY	On/Off			Displays the quick charge relay operation status. On: Quick charge relay is ON Off: Quick charge relay is OFF	
HV CNCTR INTRLCK (OBC)	On/Off	х		Displays the connection status of the high voltage connector connected to the on-board charger. On: The high voltage connector is connected correctly. Off: Except above.	
BLOWER FAN ACTIV	On/Off			Displays the operation status of the blower fan received from the A/C auto amp. On: When the blower fan is operating Off: When the blower fan is not operating	
HEAD LAMP LOW SIG	On/Off			Displays the operation status of the headlamp received from the IPDM E/R. On: When the low beam is operating Off: When the low beam is not operating	

< SYSTEM DESCRIPTION >

		Monitor Ite	m Selection	
MONITOR ITEM	Unit	ECU INPUT SIGNALS	MAIN SIG- NALS	Description
HEAD LAMP HI SIG	On/Off			Displays the operation status of the headlamp received from the IPDM E/R. On: When the high beam is operating Off: When the high beam is not operating
HV CNCTR INTRLCK (HV BAT)	On/Off	X		Displays the connection status of the high voltage connector connected to the Li-ion battery pack. On: The high voltage connector is connected correctly. Off: Except above.
HV BATT EMPTY	OK/EMPTY	Displays that the Li-ion battery rel low. OK: Normal EMPTY: When low		OK: Normal
PRTCTN CNT OPERAT HIST 0/1/2/3		The operation history of the Charge Insulation Resistance Loss Protection Control is indicated. For details of the protection control, refer to EVC-368 . "Description". 1-3: Operation history exists. (The number of operations is indicated.) 0: No operation history NOTE: This history can be cleared by "Self-diagnostic Result-Clear".		

^{*1:} Not applicable where VCM number identified by "ECU Identification" of CONSULT is "237D0 3NA0B".

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
PLUG IN INDICA- TOR	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	VCM Combination meter CAN communication
CHARGE STAT INDICATOR 1	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	Harness and connectors Bulb and LED VCM
CHARGE STAT INDICATOR 2	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	Harness and connectors Bulb and LED VCM
CHARGE STAT INDICATOR 3	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	Harness and connectors Bulb and LED VCM
F/S CHG RLY*	POWER ON This turns ON and OFF the F/S CHG relay used by the ACTIVE TEST.	Check that the F/S CHG relay makes the operating sound.	Harness and connectors F/S CHG relay VCM
REVERSE LAMP RLY	POWER ON This turns ON and OFF the reverse lamp relay used by the ACTIVE TEST.	 Check that the reverse lamp relay makes the operating sound. Check that the reverse lamp is turned ON. 	Harness and connectors Bulb and LED Reverse lamp relay VCM
DC/DC CONV DUTY	POWER ON This changes the duty ratio used by the ACTIVE TEST.	Check that the 12V battery power supply voltage changes.	Harness and connectors DC/DC converter VCM
VOLTAGE CONTROL	POWER ON This changes the voltage used by the ACTIVE TEST.	Check that the 12V battery power supply voltage changes.	Harness and connectors DC/DC converter VCM

^{*2:} Not Displayed for VCM Group A and Group B. For VCM groups, refer to EVC-8, "How to Check VCM Group".

< SYSTEM DESCRIPTION >

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)	Δ.
READY INDICA- TOR	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	VCM Combination meter CAN communication	- A
POWER LIMITA- TION INDICA- TOR	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	VCM Combination meter CAN communication	В
EV SYSTEM W/L	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	VCM Combination meter CAN communication	EV
12V BATTERY CHARGE W/L	POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/ OFF.	Harness and connectors VCM Combination meter	D
ECO INDICATOR	POWER ON This changes the display value used by the ACTIVE TEST.	Confirm that the ECO indicator display in the upper meter changes.	VCM Combination meter Upper meter CAN communication	Е
ECO TREE	POWER ON This changes the display value used by the ACTIVE TEST.	Confirm that the ECO tree display in the upper meter changes.	VCM Combination meter Upper meter CAN communication	F
WATER PUMP 1	POWER ON This turns changes the duty ratio used by the ACTIVE TEST.	Check that the water pump 1 operation speed changes.	Harness and connectors Water pump 1 VCM	- G
WATER PUMP 2	POWER ON This turns changes the duty ratio used by the ACTIVE TEST.	Check that the water pump 2 operation speed changes.	Harness and connectors Water pump 2 VCM	Н
COOLING FAN	POWER ON This turns changes the duty ratio used by the ACTIVE TEST.	Check that the cooling fan operation speed changes.	Harness and connectors Cooling fan system VCM	I

^{*:} Not applicable where VCM number identified by "ECU Identification" of CONSULT is "237D0 3NA0B".

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ECU DIAGNOSIS INFORMATION

VCM

Reference Value

VALUES ON THE DIAGNOSIS TOOL

NOTE:

- Specification data are reference values.
- The displayed data may differ from an actual signal/value/operation, as some of them are calculated by VCM, based on signals transmitted from VCM-related sensors to VCM.
- Li-ion battery charge does not start when the power switch is ON. When it is required to charge with the power switch ON, start charging before turning ON the power switch.

MONITOR ITEM	CONE	DITION	Values/Status
		Li-ion battery temperature is too low.	B/T-LOW
		Li-ion battery temperature is too high.	В/Т-НІ
		When the Li-ion battery remaining energy is low	B LEV
POWER LIMIT CAUSE	Output being limited	When the Li-ion battery capacity is low	В САР
		When the voltage input to the traction motor or traction motor inverter is low	MOT-V
		Traction motor temperature or traction motor inverter temperature is too high.	МОТ-Т
	No torque limitation	##	
VEHICLE SPEED	Turn drive wheels and compare C eter indication.	ONSULT value with the speedom-	Almost the same speed as the speedometer indication.
42\/ BATTEDY \/OLTAGE	Power ON (not READY)	11 – 15 V	
12V BATTERY VOLTAGE	READY	13 – 15 V	
WATER PUMP 1 TRG DUTY	Power ON	Pump is stopped	10%
WATER FOWE TING DOTT	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
W/P 1 CRNT SPD DUTY	Power ON	Pump is stopped	10%
W/I TORRESTOR	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
WATER PUMP 2 TRG DUTY	Power ON	Pump is stopped	10%
WATERTOWN 2 TRO DOTT	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
W/P 2 CRNT SPD DUTY	Power ON	Pump is stopped	10%
W/I Z OKKI OI D DOTT	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
VCM POWER SUPPLY (ACT)	Power ON		11 – 15 V
		When output over current is limited	1800 – 2200 μsec
DC/DC CONV TEMP		DC/DC converter temperature: High	2400 – 3000 μsec
	Power ON	DC/DC converter temperature: Middle	3600 – 4400 μsec
		DC/DC converter temperature: Low	7300 – 8900 μsec
		When the signal circuit is open or shorted	##

MONITOR ITEM		CONDITION	Values/Status	
		When output over current is limited	0	
		DC/DC converter temperature: High	1	
DC/DC CONV STATUS	Power ON	DC/DC converter temperature: Middle	2	
		DC/DC converter temperature: Low	3	
		When the signal circuit is open or shorted	7	
F/S RELAY VOLT	Power ON	·	11 – 15 V	
F/S RELAT VOLI	READY		12 – 15 V	
COOLANT TEMP	After 2 minutes have expired	After 2 minutes have expired since READY		
	Power ON	Charge connector is not connected	10	
VCM MODE		110		
	READY		30	
	Charging		130	
TRG MOTOR TORQ 1	READY	0 – 280 N·m (Depending on accelerator pedal opening angle)		
) (OM A OTI) (ATION)	READY		READY	
VCM ACTIVATION	Except READY		On	
		Selector lever: R	R	
NEXT GEAR POSITION	Power ON	Selector lever: N or P	N/P	
		Selector lever: D or ECO	D position	
		Selector lever: R	R	
GEAR POSITION	Power ON	Selector lever: N or P	N/P	
		Selector lever: D or ECO	D position	
	READY		On	
READY LAMP SIGNAL	When READY is started		Blinks	
	Except above		Off	
CHARGE LAMP SIGNAL	Power ON		On	
OTTAINGE LAWIT SIGNAL	READY		Off	
EV SYSTEM W/L SIGNAL	Power ON	When VCM has detected an error.	On	
		Except above	Off	
AVAILABLE MOT OUTPUT MAX	READY		0 – 90 kW	
MOTOR REGE PWR MAX	READY		0 – 51 kW	
POWER CONSUM (MOTOR)	READY		0 – 90 kW	

MONITOR ITEM	CONI	Values/Status	
CHARGE MODE	Charging using AC 100-120 V		100V
	Charging using AC 200-240 V		200V
	During quick charge		QUICK
	When in a state where charging i	s not possible	NG
	Except above		Off
ECO INDICATOR	Displays the same value as in the	e instant ECO indicator.	
ECO TREE	Displays the same value as in the	e ECO tree.	
POWER CONSUMPTION (A/C)	READYWhen the air conditioner is use	ed	0 – 5 kW
	Power ON		0 – 0.6 V
POWER CONSUM (AUXS)	READY		0.2 – 0.8 V
	Charging		0.1 – 0.7 V
		Selector lever: P Range	Р
		Selector lever: R range	R
GEAR POSITION DISPLAY	READY	Selector lever: N Range	N
		Selector lever: D range	D position
		Selector lever: ECO range	В
AMBIENT TEMP	Power: ON		Indicates depending on ambient temperature.
		When normal operation	1
DC/DC CONV STATUS	Power ON	When VCM detects a DC/DC converter error	2
		When VCM prohibits the DC/DC converter operation	3
DO/DO CONIVERSO VOLT	Power ON		14,000 mV
DC/DC CONV REQ VOLT	READY		13000 – 15,000 mV
COOLING FAN REQ DUTY	READY		15 – 85%
ACCEL OPEN ANGLE	Down ON	Accelerator pedal: Fully depressed	80 – 90 deg
	Power ON	Accelerator pedal: Fully re- leased	0 – 5 deg
12V BATTERY TEMP	Power ON		Indicates depending on mo- tor room air temperature.
12V BATTERY CURRENT AVG	 READY (at idle*1) Li-ion battery remained energy: Full Selector lever: P or N A/C switch: OFF Electrical load: No load 		0 – 50 A
READY COUNT*2	Power ON		This shows the READY cu- mulative count
INTEG READY TIME*2	Power ON		This shows the READY cu- mulative operation time
QUICK CHG COUNT*2	Power ON		This shows the quick charge cumulative count
INTEG Q/CHG TIME*2	Power ON		This shows the quick charge cumulative operation time
NORMAL CHG COUNT*2	Power ON		This shows the normal charge cumulative count

MONITOR ITEM	CONDITION		Values/Status	Λ
INTEG N/CHG TIME*2	Power ON		This shows the normal charge cumulative operation time	А
ACCEL SENSOR 1 VOLT	Power ON	Accelerator pedal: Fully depressed	4.0 – 4.8 V	В
	Power ON	Accelerator pedal: Fully re- leased	0.6 – 0.9 V	ΕV
ACCEL SENSOR 2 VOLT	Power ON	Accelerator pedal: Fully depressed	3.9 – 4.8 V	
		Accelerator pedal: Fully released	0.6 – 0.9 V	D
HI SPEC VEHICLE SPEED	Turn drive wheels and compare C eter indication.	ONSULT value with the speedom-	Almost the same speed as the speedometer indication.	Е
REFRIGERANT PRESS	 READY Both the A/C switch and blower fan switch are ON (A/C compressor is operating) 		0.6 – 2.6 MPa	F
ASCD SET VEHICLE SPEED*2	ASCD: Operating		The preset vehicle speed is displayed	
	Normal charge connector is conne	ected.	On	G
N/CHG PORT CONNECTION	Normal charge connector is half-e	engaged	HALF	
	Except above		Off	
ENABLE OBC OUT PWR	Power ON		0 – 3.3 kW	-
OBC OUT PWR	In Normal Charging		0 – 3.3 kW	
OBC OUT PWK	In Quick Charging		0 – 50 kW	1
	When an AC power supply is not	connected	OFF	
AC POWER TYPE	When an AC 100-120 V power supply is connected		100V	
	When an AC 200-240 V power su	/hen an AC 200-240 V power supply is connected 2		J
HV BATT LEVEL (%)	Depending on Li-ion battery remained energy.		0 – 100%	
HV BATT VOLT	Power ON		200 – 403 V	L
HV BATT CURRENT	READY (at idle*1) Electrical load: No load		0 – 10 A	K
HV BATTERY TEMP	Power ON		Between the outside air temperature and 60°C (140°F)	L
HV BATT LEVEL	Power ON		0 – 24 kWh	
IR SENSOR SIGNAL P-P	Power ON		3150 mV or more	N
INVERTER DC INPUT VOLT	Power ON		200 – 403 V	
MOTOR DWR LIMIT REQ (INIV)	Normal		100%	
MOTOR PWR LIMIT REQ (INV)	When output is limited		0 – 99%	
CURRENT MOTOR TORQ	READY	0 – 280 N·m (Depending on accelerator pedal opening angle)	C	
	When vehicle speed is 0 km/h	en vehicle speed is 0 km/h		
MOTOR SPEED	When vehicle speed is 60 km/h		4200 rpm (Approx.)	F
SL TARGET VEHICLE SPEED	Speed limiter: Operating		The preset vehicle speed is displayed	
ESTMT PWR CNSM (A/C CMP)	READY A/C switch: ON	0 – 5 kW		
ESTMT PWR CNSM (PTC HTR)	When the air conditioner is ope Set temperature: HOT side max	0 – 10 kW		

MONITOR ITEM	CONE	Values/Status	
		Front wiper operation status Low	LOW
FRONT WIPER	Power ON	Front wiper operation status High	HIGH
		Front wiper operation status Not operation	OFF
	When a non-serious collision is de	etected	MID
CLASH DETECT INFO	When a serious collision is detect	ed	HEAVY
	No collision is detected		##
POWER SW	Power switch operation: ON⇒OF	F⇒ON	On⇒Off⇒On
START SIGNAL	Power switch operation: ON⇒STA	ART⇒ON	Off⇒On⇒On
EV SVS ACT DEO (ODC)	When the charge gun is inserted/power supply plug is inserted		On⇒Off
EV SYS ACT REQ (OBC)	Except above.		Off
IMMEDIATE OLIO OW	Davis ON	Immediate charging switch: Pressed	On
IMMEDIATE CHG SW	Power ON	Immediate charging switch: Released	Off
EV SYS ACT REQ (TCU)	Power switch operation: OFF⇒OI	N	Off⇒On⇒Off
HV INTERLOCK (DC/DC)	When the DC/DC converter's high voltage connector is engaged correctly		On
, ,	Except above		Off
F/S RELAY	Power ON		On
M/C RELAY	Power ON		On
E/O OLIO DEL AV	During quick charge		On
F/S CHG RELAY	Except above		Off
DEVEDOE LAMB DELAY	Davis ON	Selector lever: R range	On
REVERSE LAMP RELAY	Power ON	Selector lever: Except R range	Off
REVERSE LAMP RELAY MONI	Power ON	Selector lever: R range	On
REVERSE LAWIP RELAT WON	Power ON	Selector lever: Except R range	Off
A/C DELAV	Power ON		On
A/C RELAY	Power OFF		Off
HV P MAIN RLY ACTIV	READY		On
TV P MAIN RLY ACTIV	Power ON		Off
HV P MAIN RLY ACTIV MONI	READY		On
HV P MAIN KLI ACTIV MONI	Power ON		Off
HV N MAIN RLY ACTIV	READY		On
TIV IV WAIN INEL ACTIV	Power ON		Off
HV N MAIN RLY ACTIV MONI	READY		On
RIWARTEL ACTIVINON	Power ON		Off
HV PRE CHG RLY ACTIV	Immediately after the power OFF⇒READY operation		Off⇒On⇒Off
HV PRE CHG RLY ACTIV MONI	Immediately after the power OFF⇒READY operation		Off⇒On⇒Off
PLUG IN INDI LAMP	Plug in indicator lamp: ON		On
. 230 11 11101 12/11/11	Plug in indicator lamp: OFF		Off
CHARGE STAT INDI 1	Charging status lamp 1: ON		On
OUTAINOL OTAI INDI I	Charging status lamp 1: OFF		Off
CHARGE STAT INDI 2	Charging status lamp 2: ON		On
CHARGE STAT INDI 2	Charging status lamp 2: OFF		Off

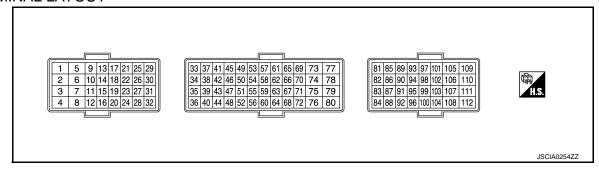
MONITOR ITEM	CONDITION		Values/Status	
CHARGE STATINGS	Charging status lamp 3: ON		On	
CHARGE STAT INDI 3	Charging status lamp 3: OFF		Off	
ASCD MAIN SW	Dawar ON	ASCD MAIN switch: Pressed	On	
	Power ON	ASCD MAIN switch: Released	Off	
ACCD CANCEL OW	Dawar ON	CANCEL switch: Pressed	On	
ASCD CANCEL SW	Power ON	CANCEL switch: Released	Off	E
PEO(1)45/400 004/	Power ON	RESUME/ACCELERATE switch: Pressed	On	
RESUME/ACC SW	rowel Oliv	RESUME/ACCELERATE switch: Released	Off	_ [
ASCD SET SW	Power ON	SET/COAST switch: Pressed	On	
AGOD GET GW	Fower ON	SET/COAST switch: Released	Off	
ACCD DDAKE OW	Dawar ON	Brake pedal: Fully released	On	
ASCD BRAKE SW	Power ON	Brake pedal: Depressed	Off	
OTOD LAMB OW	D ON	Brake pedal: Fully released	Off	_
STOP LAMP SW	Power ON	Brake pedal: Depressed	On	
ASCD SET LAMP	After the ASCD MAIN switch I	has been pressed once, press it again.	On⇒Off	_ (
ASCD CRUISE LAMP	Power ON	ASCD MAIN switch: Pressed at the 1st time → at the 2nd time	On⇒Off	_
ASCD CANCEL (LOW SPEED)	Power ON		NON	<u> </u>
ASCD CANCEL (SPEED DIFF)	Power ON		NON	
	READY		On	
DC/DC CONV STAT	Power ON		STOP	
VARIABLE V/CONT PERMIT	READY The 12V battery is sufficiently charged Wiper not operating		On	
	Except above.		Off	
		Accelerator pedal: Depressed	On	
KICK DOWN	Power ON	Accelerator pedal: Released	Off	
	Selected 100% charge		100%	_
TRG HV BATT CHG LEVEL	Selected 80% charge			
	Rear defogger: Operates		On	
REAR DEFOGGER	Rear defogger: Not operate		Off	
	Power limitation indicator lam	n· ON	On	
PWR LIMIT INDICAT LAMP	Power limitation indicator lamp: ON Power limitation indicator lamp: OFF		Off	_
	1 ower illilitation indicator lam	A/C switch: ON	On	-
A/C SW	Power ON	A/C switch: OFF	Off	
	M/h a n DM/M a a marro unication is			
EVSE COMM	When PWM communication is established between VCM and EVSE		COMM	
	Except above		NO COM	
Q/CHG INTERLOCK	Quick charger connector is connected.		On Orr	
	Except above		Off	
Q/CHG RELAY	Quick charging		On	
	Except above		Off	
HV CNCTR INTRLCK (OBC)	Power ON	When the on board charger's high voltage connector is connected correctly	On	
		Except above	Off	_

< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
DLOWED FAN ACTIV	Blower fan: Operates		On
BLOWER FAN ACTIV	Blower fan: Not operate		Off
LIEAD LAMB LOW CIC	When the combination switch's low beam was selected		On
HEAD LAMP LOW SIG	Except above		Off
LIEAD LAMB LILCIO	When the combination switch 's high beam was selected		On
HEAD LAMP HI SIG	Except above		Off
HV CNCTR INTRLCK (HV BAT)	Power ON	When the Li-ion battery's high voltage connector is connected correctly	On
		Except above	
HV BATT EMPTY	Power ON	The Li-ion battery remaining energy is sufficient.	ок
	Fower ON	The Li-ion battery remaining energy is low.	EMPTY
PRTCTN CNT OPERAT HIST	When the combination switch 's high beam was selected		On
1 ^{*3}	Except above		Off

^{*1:} Idle is the state when not driving in the READY state.

TERMINAL LAYOUT



PHYSICAL VALUES

NOTE

Specification data are reference values.

Terminal No. (Wire color)		Description		Condition	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
1 (G)	Ground	Power ON power supply	Input	Power switch: ON	12V BATTERY VOLTAGE (12 - 15 V)
4 (B/R)	_	VCM ground	_	_	_
5 (SB) Ground	A/C relay	Output	Power switch: ON	0 V (Approx.)	
			A few seconds after turning power switch OFF	11 – 14 V	
6 (R)	Ground	Battery power supply	Input	Always	12V BATTERY VOLTAGE (11 – 14 V)
7 (W) Ground	and SSOFF relay Out	Output	Power switch: ON	0 V	
			More than 20 seconds after turning power OFF.	12V BATTERY VOLTAGE (11 – 14 V)	

^{*2:} Not applicable where VCM number identified by "ECU Identification" of CONSULT is "237D0 3NA0B".

^{*3:} Not displayed for VCMs in Group A and Group B.

< ECU DIAGNOSIS INFORMATION >

	inal No. e color)	Description		Condition	Value	А
+	-	Signal name	Input/ Output	Condition	(Approx.)	
8 (B/R)	_	VCM ground	_	_	_	В
9 (L)	_	EV system CAN-H	Input/ Output	_	_	EV
13 (G)	_	EV system CAN-L	Input/ Output	_	_	
15	Ground	ASCD brake switch	Innut	Power switch: ON Brake pedal: depress	0 V	D
(O)	Ground	ASCD brake switch	Input	Power switch: ON Brake pedal: Fully released	12V BATTERY VOLTAGE (11 – 14 V)	Е
18	Ground	Step laws switch	lan.ut	Power switch: ON Brake pedal: depress	12V BATTERY VOLTAGE (11 – 14 V)	
(SB)	Ground	Stop lamp switch	Input	Power switch: ON Brake pedal: Fully released	0 V	F
21 (R)	Ground	Power ON power supply	Input	Power switch: ON	12V BATTERY VOLTAGE (11 – 14 V)	G
23	Ground	High voltage connector	lanut	When all the high voltage connectors are connected	12V BATTERY VOLTAGE (11 – 14 V)	
(P)	Ground	interlock	Input	When one of the high voltage connectors is disconnected	0 V	Н
25 (L)	_	CAN-H	Input/ Output	_	_	ı
26	4	Water pump 2 signal	Input	Power switch ONPump operation duty: 0%	250mSec/div	J
(Y)	(B/R)	vvater purrip 2 Signal	mput	 Power switch ON Pump operation duty: Approx. 70% 	250mSec/div = 2V/div JSCIA0324ZZ	L M

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	ninal No. e color)	Description		Condition	Value	
+	_	Signal name	Input/ Output	Condition	(Approx.)	
28	4	Water numn 1 signal	Input	Power switch ONPump operation duty: 0%	250mSec/div 2V/div JSCIA0325ZZ	
(W)			mpat	 Power switch ON Pump operation duty: Approx. 70% 	250mSec/div	
29 (P)	_	CAN-L	Input/ Output	_	_	
33 (L)	4 (B/R)	Sensor power supply (Refrigerant pressure sensor)	Output	Power switch: ON	5 V	
34 (B)	35 (BR)	Refrigerant pressure sensor	Input	A/C compressor operating.	1.0 – 4.0 V	
35 (BR)	_	Sensor ground (Refrigerant pressure sensor)	_	_	_	
37 (W)	39 (B)	Sensor power supply (Accelerator pedal position sensor 1)	Output	Power switch: ON	5 V (Approx.)	
38 (R)	39 (B)	Accelerator pedal position sensor 1	Input	 Power switch: ON Accelerator pedal: Fully released Power switch: ON Accelerator pedal: Fully depressed 	0.45 – 1.0 V 4.4 – 4.8 V	
39 (B)	_	Sensor ground (Accelerator pedal position sensor 1)	_	_	_	
40		Shield	_	_	_	
41 (R)	43 (L)	Sensor power supply (Battery current sensor)	Output	Power switch: ON	5 V (Approx.)	
42 (Y)	43 (L)	Battery current sensor	Input	READY 12V battery is fully charged	2.6 – 3.5 V	
43 (L)	_	Sensor ground (Battery current sensor)		_	_	
45 (W)	47 (B)	Sensor power supply (Accelerator pedal position sensor 2)	Output	Power switch: ON	5 V (Approx.)	
46	47	Accelerator pedal position		Power switch: ON Accelerator pedal: Fully released	0.22 – 0.5 V	
(R)	(B)	sensor 2	Input	Power switch: ON Accelerator pedal: Fully depressed	2.1 – 2.5 V	

< ECU DIAGNOSIS INFORMATION >

	ninal No. e color)	Description		Condition	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
47 (B)	_	Sensor ground (Accelerator pedal position sensor 2)	_	_	_
48	_	Shield	_	_	_
50 (L)	43 (L)	Battery temperature sensor	Input	READY	0 – 4.8 V Output voltage varies with motor room air temperature.
51 (O)	52 (W)	Coolant temperature sensor	Input	READY	0 – 4.8 V Output voltage varies with coolant temperature.
52 (W)	_	Sensor ground (Coolant temperature sensor)	_	_	_
57	4	Power voltage variable	Output	DC/DC converter output power: 13 V	50mSec/div
(LG)	(B/R)	control signal		DC/DC converter output power: 15 V	50mSec/div
					F . O (1)
59	4	Cooling for control signal	Outout	Fan duty: 40%	5mSec/div 5mSec/div 2V/div JscIA0329ZZ
(V)	(B/R)	Cooling fan control signal	Output	Fan duty: 100%	5mSec/div

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Term	ninal No. e color)	Description		Condition	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
62	62 4 Water pump 1 signal		Input	Pump operation duty: 0%	250mSec/div 250mSec/div 250mSec/div
(G)	(G) (B/R) Water pump 1 signal		Pump operation duty: Approx. 70%	250mSec/div = 250mSec/div 250mSec/div	
64	4	Water pump 2 signal	Input	Pump operation duty: 0%	250mSec/div 250mSec/div JSCIA0333ZZ
(R)	(B/R)			Pump operation duty: Approx. 70%	250mSec/div 250mSec/div 2V/div JSCIA0334ZZ
67	4	DC/DC converter temper-	Input -	DC/DC converter temperature: High	5mSec/div ====================================
(Y)	(B/R)	ature signal		DC/DC converter temperature: Low	5mSec/div

< ECU DIAGNOSIS INFORMATION >

	ninal No. e color)	Description		Condition	Value
+	_	Signal name	Input/ Output	Condition	(Approx.)
70	_			READY DC/DC converter is operating normally	5 V (Approx.)
70 (W)	4 (B/R)	DC/DC converter activa- tion signal	Output	READY When VCM has detected an error in the DC/DC converter	3 V (Approx.)
				Power switch: ON	Less than 1 V
73	Ground	F/S relay	Output	Power switch: OFF	12V BATTERY VOLTAGE (11 – 14 V)
(GR)	Ground	173 Telay	Output	Power switch: ON	0 V (Approx.)
75	0	F/0 0110	Outrout	During quick charge	0 V (Approx.)
(W)	Ground	F/S CHG relay	Output	Except above	12V BATTERY VOLTAGE (11 – 14 V)
				Power switch: OFF	0 V
77 (LG)	Ground	F/S relay power supply	Input	Power switch: ON	12V BATTERY VOLTAGE (11 – 14 V)
78		MO		Power switch: OFF	12V BATTERY VOLTAGE (11 – 14 V)
(G)	Ground	M/C relay	Output	Power switch: ON	0 V (Approx.)
80				Power ON Selector lever: R range	0 V (Approx.)
(SB)	Ground	Reverse lamp relay	Output	Power ON Selector lever: Except R range	12V BATTERY VOLTAGE (11 – 14 V)
81 (GR)	_	K-Line	_	_	_
84 (LG)	4 (B/R)	EV system activation request signal	Input	Power switch: OFF⇒ON NOTE: When turn power switch OFF to ON, TCU sends the voltage signal to check the system for approximately 1 second.	500mSec/div 500mSec/div 2V/div JSCIA0343ZZ
85	0	Charging status indicator	0	Charging status indicator 2: ON	0 V (Approx.)
(P)	Ground	2	Output	Charging status indicator 2: OFF	12V BATTERY VOLTAGE (11 – 14 V)
86	0	Charging status indicator	Out to	Charging status indicator 1: ON	0 V (Approx.)
(V)	Ground	1	Output	Charging status indicator 1: OFF	12V BATTERY VOLTAGE (11 – 14 V)
87	0	Di ciri i i ciri		Plug in indicator lamp: ON	0 V (Approx.)
(L)	Ground	Plug in indicator lamp	Output	Plug in indicator lamp: OFF	12V BATTERY VOLTAGE (11 – 14 V)

	ninal No. e color)	Description		Condition	Value	
+	_	Signal name	Input/ Output	Condition	(Approx.)	
88	4	VSP control signal	Output	EVSE is connected.	100mSec/div 5V/div JSCIA0336ZZ	
(Y)	(B/R)	vor control digital	Cutput	Charge start	100mSec/div	
89	Ground	Immediate charging	Input	Immediate charging switch: Pressed	12V BATTERY VOLTAGE (11 – 14 V)	
(V)		switch		Immediate charging switch: Released	0 V	
90 (W)		READY signal	Input	For Approx. 2 seconds after power switch ON under the following condition: Selector lever: P or N Brake pedal: Depressed	0 V (Approx.)	
				Except above	12V BATTERY VOLTAGE (11 – 14 V)	
91	Ground	Electric shift warning	Output	Immediately after the power OFF⇒READY operation	0 V (Approx.)	
(O)	Cround	lamp	Carpar	Except above (Power ON or READY)	12 V	
92	Ground	Charging status indicator	Output	Charging status indicator 3: ON	0 V (Approx.)	
(G)	Giodila	3	Output	Charging status indicator 3: OFF	12V BATTERY VOLTAGE (11 – 14 V)	
96 (GR)	4 (B/R)	EV system activation request signal	Input	When the charge gun is inserted/ power supply plug is inserted	500mSec/div	
				Power ON ASCD steering switch: All OFF	4 V (Approx.)	
104	4	ASCD steering switch	Input	Power ON RESUME/ACCELERATE switch: Pressed	3 V (Approx.)	
(SB)	(B/R)	_	input	Power ON SET/COAST switch: Pressed	2 V (Approx.)	
				Power ON CANCEL switch: Pressed	1 V (Approx.)	

	inal No. e color)	Description		Condition	Value
+	_		Input/ Output	Condition	(Approx.)
105 (L/O)	4 (B/R)	Pre-charge relay	Output	Immediately after the power OFF⇒READY operation	12V BATTERY VOLTAGE* (11 – 14 V)
(L/O)	(D/IX)			Except above	0 V
107 (W/L)	4 (B/R)	System main relay 1	Output	During READY or during charging	12V BATTERY VOLTAGE (11 – 14 V)
(VV/L)	(D/IX)			Except above	0 V
108 (BR)	_	ASCD steering switch ground	_	_	_
110 (L/Y)	4 (B/R)	System main relay 2	Output	During READY or during charging	12V BATTERY VOLTAGE (11 – 14 V)
(L/ 1)	(D/TX)			Except above	0 V
111 (B/R)	_	VCM ground	_	_	_
112 (B/R)		VCM ground	_	_	_

^{*:} This signal can be confirmed with oscilloscope.

Fail-Safe

FAIL-SAFE PATTERN

- Pattern A: Quick charge prohibited
- Pattern B: Normal charge prohibited
- Pattern C: READY OFF
- Pattern D: High-voltage power supply stop

FAIL-SAFE LIST

 $\times : Applicable$

Α

В

EVC

D

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F

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J

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Ν

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	тс		Pat	ttern		Others	
D	10	Α	В	С	D	Oulers	
U1010	TYPE 1			×			
01010	TYPE 2	×	×	×	×		
P0643				×			
P0A8D		×	×	×	×		
P0A8E		×	×	×	×		
P0AA0		×	×	×	×		
P0AA1		×	×	×	×		
P0AA2		×	×	×	×		
P0AA4		×	×	×	×		
P0AA5		×	×	×	×		
P0AA6						Doing READY again is prohibited.	
P1564						ASCD operation prohibited	
P1572						ASCD operation prohibited	
P1574						ASCD operation prohibited	
P1610						Start not possible	
P1611						Start not possible	
P1612						Start not possible	
P1613						Start not possible	

< ECU DIAGNOSIS INFORMATION >

	DTC		Pa	ttern		Others	
	210	A B C D			D	Outers	
P1614						Start not possible	
P1615						Start not possible	
P2122 P2123 P2127 P2128						Traction motor output is limited. Reduced responsiveness during accelerator operation	
	TYPE 1			×			
P2138	TYPE 2					Traction motor output is limited.Reduced responsiveness during accelerator operation	
P3100	·	×	×	×	×		
	TYPE 1			×			
P3101	TYPE 2	×	×	×	×		
	TYPE 3					No fail-safe.	
P3102						Traction motor output is limited.	
P3117						 VCM inhibits the operation of the electric compressor. VCM inhibits the operation of the PTC elements heater. 	
P312A		×	×	×	×		
P312B		×	×	×	×		
P312C		×	×	×	×		
P312D		×	×	×	×		
P312E		×	×	×	×	_	
P312F		×	×	×	×		
P3130		×	×	×	×		
P3131		×	×	×	×		
P3137		×	×	×	×		
P3141 [*]			×				
	TYPE 1		×				
P315C	TYPE 2	×	×				
P315C	TYPE 3	×	×	×	×		
	TYPE 4					No fail-safe.	
P316A	·			×			
P316F	TYPE 1	×	×	×	×		
. 5101	TYPE 2	×	×				
P3170		×	×				
	TYPE 1	×	×			Traction motor output is limited.	
	TYPE 2	×	×				
P3173	TYPE 3	×					
1 31/3	TYPE 4		×				
	TYPE 5	×	×	×			
	TYPE 6					No fail-safe.	
P3175	·			×			
P3176		×	×	×	×		
P3177		×	×	×	×		
P3178		×	×	×	×		
P3179							

	DTC		Pat	tern		Othors
510		А	В	С	D	Others
P317A				×		
P317B		×	×	×	×	
P317D				×		
P317E		×	×			
P3182		×	×	×	×	
P3183		×	×			
P3188				×		
P318B	TYPE 1			×		
3100	TYPE 2					Put the gear position in neutral.
P3191	TYPE 1			×		
-3191	TYPE 2					No fail-safe.
P3193	TYPE 1	×	×			Only driving in creep is possible.
	TYPE 2					No fail-safe.
P3196	TYPE 1	×				
-3190	TYPE 2	×	×			Traction motor output is limited.
P3197				×		
P319C				×		
P319E		×	×			Only driving in creep is possible.
P31A1	TYPE 1	×				
FSIAI	TYPE 2	×	×			Traction motor output is limited.
P31A2				×		
P31A7				×		
P31A9		×	×			Only driving in creep is possible.
P31AD				×		
P31AE	TYPE 1	×				
JIAL	TYPE 2	×	×			Traction motor output is limited.
	TYPE 1					VCM inhibits the timer charge.
P31B0	TYPE 2					VCM inhibits the timer charge and the pre-air conditioner.
	TYPE 3					No fail-safe.
P31B3	TYPE 1					When the power is turned on and the vehicle is charging, the cooling fan is operated at a constant speed.
	TYPE 2					No fail-safe.
	TYPE 1					VCM inhibits the timer charge.
P31B4	TYPE 2					VCM inhibits the pre-air conditioner.
	TYPE 3					No fail-safe.
P31B5	TYPE 1					ASCD operation prohibited NOTE: The ECO meter display value also becomes extremely poor.
	TYPE 2					No fail-safe.
P31B6						VCM sets the DC/DC converter output power to a constant 14 V.
P31C5						VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control.
P31C6						 VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control.

	DTC		Pat	tern		Others
		Α	В	С	D	- Others
P31C7						 VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control.
P31CA			×			
P31CB			×			
P31D4		×	×	×	×	
P31D5						Traction motor output is limited.Vehicle speed is limited. [Approx. 40 km/h (25 MPH)]
P31DB		×	×	×	×	
P31DC		×	×	×	×	
P31DE	TYPE 1					Traction motor output is limited.
PSIDE	TYPE 2	×	×	×	×	
D24E0	TYPE 1	×	×	×	×	
P31E0	TYPE 2					No fail-safe.
D24E4	TYPE 1	×	×	×	×	
P31E1	TYPE 2					No fail-safe.
D24E2	TYPE 1	×	×	×	×	
P31E2	TYPE 2					No fail-safe.
P31E7						Doing READY again is prohibited.
P31F2						VCM inhibits the timer charge and the pre-air conditioner.

^{*:} Not displayed for VCMs in Group A and Group B. For VCM groups, refer to EVC-8. "How to Check VCM Group".

DTC Inspection Priority Chart

INFOID:0000000007539111

If multiple DTC are displayed at the same time, check each of them one at a time in accordance with the following priority table.

Priority	DTC	Detection items
	U1000	CAN COMM CIRCUIT
	U1010	CONTROL UNIT (CAN)
	P0603	INTERNAL CONTROL MODULE
	P0616	STARTER RELAY
	P0643	SENSOR POWER SUPPLY
	P0A00	COOLANT TEMPERATURE SENSOR
	P0A08	DC/DC CONVERTER
	P1551, P1552	BATTERY CURRENT SENSOR
	P1556, P1557	BATTERY TEMPERATURE SENSOR
1	P2122, P2123	APP SENSOR D
	P2127, P2128	APP SENSOR E
	P3101	VCM
	P3137	CAR CRASH
	P3175	VCM
	P318D, P3191, P3193, P3194, P3195, P3196, P3197, P319C, P319E, P319F, P31A0, P31A1, P31A2, P31A7, P31A9, P31AA, P31AB, P31AD, P31AE, P31AF, P31B0, P31B3, P31B4, P31B5, P31B6, P31B7, P31B8, P31B9	COMMUNICATION ERROR
	P31C4	VCM TIMER
	P31C5, P31C6, P31C7	VCM

< ECU DIAGNOSIS INFORMATION >

riority	DTC	Detection items
	P0A0B	HV SYSTEM INTERLOCK ERROR
	P0A8D, P0A8E	14V POWER SUPPLY
	P0A94	DC/DC CONVERTER
	P0AA0, P0AA1, P0AA2	HYBRID BATT POSITIVE CONTACTOR
	P0AA4, P0AA5	HYBRID BATT NEGATIVE CONTACTOR
	P1550, P1554	BATTERY CURRENT SENSOR
	P155A	BATTERY TEMPERATURE SENSOR
	P1564	ASCD SWITCH
	P1572	ASCD BRAKE SWITCH
	P1574	ASCD VEHICLE SPEED SENSOR
	P1805	BRAKE SWITCH
	P2138	APP SENSOR
	P3102	INVALID BATTERY
	P315C	CHARGE RELAY
	P315E	VDC SYSTEM
	P316A	MOTOR SPEED
2	P3172, P3173	ON BOARD CHARGER SYSTEM
2	P317A, P317B, P317D	MOTOR SYSTEM
	P317E, P3180, P3182, P3183	HV BATTERY SYSTEM
	P3188	ELECTRIC SHIFT SYSTEM
	P318A, P318B	ELECTRIC SHIFT SYSTEM
	P31C0	ON BOARD CHARGER SYSTEM
	P31C1, P31C2	TCU
	P31C8, P31C9, P31CA, P31CB	ON BOARD CHARGER SYSTEM
	P31D4, P31D5	PRE CHARGE RELAY
	P31D6, P31D7	F/S RELAY
	P31DB	HV BATT MAIN RELAY +
	P31DC	HV BATT MAIN RELAY -
	P31DD	PRE CHARGE RELAY
	P31E8, P31E9, P31EC	WATER PUMP 1
	P31EA, P31EB, P31ED	WATER PUMP 2
	P31EE	REFRIGERANT PRESSURE SENSOR
	P31F0	DC/DC CONVERTER COMM LINE
	P31F2	AV SET INFORMATION

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Priority	DTC	Detection items
	P0A8F	14V POWER SUPPLY
	P0AA6	HYBRID BATT VOLT SYS ISOLATION
	P3100, P312A	COMMUNICATION ERROR
	P3117	A/C SYSTEM
	P311C	HIGH VOLTAGE SYSTEM
	P312B	RESTART ERROR
	P312C	INVERTER DISCHARGE ERROR
	P312D	QUICK CHARGE RELAY
	P312E	READY OFF ERROR
	P312F	CHARGE OFF ERROR
3	P3130	INVERTER DISCHARGE ERROR
	P3131	SYSTEM SHUTOFF TIMEOUT
	P3141 [*]	ON-BOARD CHARGER
	P3160	ELECTRICALLY- DRIVEN INTELLIGENT BRAKE SYSTEM
	P316F	ON BOARD CHARGER SYSTEM
	P3176	INVERTER CONDENSER
	P3177, P3178	ECU ACTIVATION ERROR
	P31DE	HV BATT MAIN RELAY
	P31E0, P31E1, P31E2	HV SYSTEM INTERLOCK ERROR
	P31E7	RESTART INHIBITION

^{*:} Not displayed for VCMs in Group A and Group B. For VCM groups, refer to EVC-8, "How to Check VCM Group".

DTC Index

 \times :Applicable —: Not applicable

				рисавіе —. Могарріісавіе
DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
U1000	CAN COMM CIRCUIT	_	1	EVC-115
U1010	CONTROL UNIT (CAN)	×	1	EVC-116
P0603	INTERNAL CONTROL MODULE	_	1	EVC-117
P0616	STARTER RELAY	_	1	EVC-119
P0643	SENSOR POWER SUPPLY	×	1	EVC-121
P0A00	COOLANT TEMPERATURE SENSOR	_	1	EVC-123
P0A08	DC/DC CONVERTER	_	1	EVC-126
P0A0B	HV SYSTEM INTERLOCK ERROR	×	1	EVC-128
P0A8D	14V POWER SUPPLY	×	1	EVC-132
P0A8E	14V POWER SUPPLY	×	1	EVC-134
P0A8F	14V POWER SUPPLY	×	1	EVC-136
P0A94	DC/DC CONVERTER	_	1	EVC-139
P0AA0	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-141
P0AA1*1*3	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-145
P0AA2	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-149
P0AA4	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-151
P0AA5	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-155
P0AA6	HYBRID BATT VOLT SYS ISOLATION	×	1	EVC-157

< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page	А
P1550	BATTERY CURRENT SENSOR	_	1	EVC-165	_
P1551	BATTERY CURRENT SENSOR	_	1	EVC-165	_
P1552	BATTERY CURRENT SENSOR	_	1	EVC-165	– B
P1554	BATTERY CURRENT SENSOR	_	1	EVC-169	
P1556	BATTERY TEMPERATURE SENSOR	_	1	EVC-173	EV
P1557	BATTERY TEMPERATURE SENSOR	_	1	EVC-173	
P155A	BATTERY TEMPERATURE SENSOR	_	1	EVC-175	
P1564	ASCD SWITCH	_	1	EVC-177	- D
P1572	ASCD BRAKE SWITCH	_	1	EVC-179	-
P1574	ASCD VEHICLE SPEED SENSOR	_	1	EVC-185	E
P1610	LOCK MODE	_	1	<u>SEC-58</u>	_
P1611	ID DISCORD, IMMU-VCM	_	1	<u>SEC-59</u>	_
P1612	CHAIN OF VCM-IMMU	_	1	<u>SEC-60</u>	F
P1805	BRAKE SWITCH	×	1	EVC-187	_
P2122	APP SENSOR D	×	1	EVC-190	G
P2123	APP SENSOR D	×	1	EVC-190	
P2127	APP SENSOR E	×	1	EVC-193	_
P2128	APP SENSOR E	×	1	EVC-193	Н
P2138	APP SENSOR	×	1	EVC-196	_
P3100	COMMUNICATION ERROR	×	1	EVC-198	_
P3101	VCM	× or —	1	EVC-200	- 1
P3102	INVALID BATTERY	×	1	EVC-201	_
P3117	A/C SYSTEM	_	1	EVC-203	J
P311C	HIGH VOLTAGE SYSTEM	_	1	EVC-205	_
P312A	COMMUNICATION ERROR	×	1	EVC-209	_
P312B	RESTART ERROR	×	1	EVC-212	- K
P312C	INVERTER DISCHARGE ERROR	×	1	EVC-214	_
P312D	QUICK CHARGE RELAY	×	1	EVC-216	L
P312E	READY OFF ERROR	×	1	EVC-217	_
P312F	CHARGE OFF ERROR	×	1	EVC-219	_
P3130	INVERTER DISCHARGE ERROR	×	1	EVC-214	IV
P3131	SYSTEM SHUTOFF TIMEOUT	×	1	EVC-221	_
P3137	CAR CRASH	×	1	EVC-224	- N
P3141*2*3	ON-BOARD CHARGER	×	1	EVC-225	`
P315C	CHARGE RELAY	×	1	EVC-231	=
P315E	VDC SYSTEM	_	1	EVC-232	0
P3160	E-DIB SYSTEM	_	1	EVC-233	_
P316A	MOTOR SPEED	×	1	EVC-234	- Р
P316F	ON BOARD CHARGER SYSTEM	×	1	EVC-235	_ 「
P3172	ON BOARD CHARGER SYSTEM	×	1	EVC-237	_
P3173	ON BOARD CHARGER SYSTEM	× or —	1	EVC-237	_
P3175	VCM	×	1	EVC-238	_
P3176	INVERTER CONDENSER	×	1	EVC-239	_

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P3177	ECU ACTIVATION ERROR	× (for VCM group A and B)*3 — (except for VCM group A and B)*3	1	EVC-243
P3178	ECU ACTIVATION ERROR	×	1	EVC-246
P3179	MOTOR SYSTEM	×	1	EVC-248
P317A	MOTOR SYSTEM	×	1	EVC-248
P317B	MOTOR SYSTEM	×	1	EVC-248
P317D	MOTOR SYSTEM	×	1	EVC-249
P317E	HV BATTERY SYSTEM	_	1	EVC-250
P3180	HV BATTERY SYSTEM	×	1	EVC-250
P3182	HV BATTERY SYSTEM	_	1	EVC-250
P3183	HV BATTERY SYSTEM	×	1	EVC-251
P3188	ELECTRIC SHIFT SYSTEM	×	1	EVC-252
P318A	ELECTRIC SHIFT SYSTEM	×	1	EVC-253
P318B	ELECTRIC SHIFT SYSTEM	×	1	EVC-255
P318D	COMMUNICATION ERROR	×	1	EVC-257
P3191	COMMUNICATION ERROR	× or —	1	EVC-258
P3193	COMMUNICATION ERROR	× or —	1	EVC-259
P3194	COMMUNICATION ERROR	_	1	EVC-260
P3195	COMMUNICATION ERROR	_	1	EVC-261
P3196	COMMUNICATION ERROR	×	1	EVC-262
P3197	COMMUNICATION ERROR	×	1	EVC-263
P319C	COMMUNICATION ERROR	×	1	EVC-258
P319E	COMMUNICATION ERROR	×	1	EVC-259
P319F	COMMUNICATION ERROR	_	1	EVC-260
P31A0	COMMUNICATION ERROR	_	1	EVC-261
P31A1	COMMUNICATION ERROR	×	1	EVC-262
P31A2	COMMUNICATION ERROR	×	1	EVC-263
P31A7	COMMUNICATION ERROR	×	1	EVC-258
P31A9	COMMUNICATION ERROR	×	1	EVC-259
P31AA	COMMUNICATION ERROR	_	1	EVC-260
P31AB	COMMUNICATION ERROR	_	1	EVC-261
P31AD	COMMUNICATION ERROR	×	1	EVC-263
P31AE	COMMUNICATION ERROR	×	1	EVC-262
P31AF	COMMUNICATION ERROR	×	1	EVC-264
P31B0	COMMUNICATION ERROR	_	1	EVC-265
P31B3	COMMUNICATION ERROR	× or —	1	EVC-264
P31B4	COMMUNICATION ERROR	_	1	EVC-265
P31B5	COMMUNICATION ERROR	_	1	EVC-266
P31B6	COMMUNICATION ERROR	_	1	EVC-267
P31B7	COMMUNICATION ERROR	×	1	EVC-268
P31B8	COMMUNICATION ERROR	_	1	EVC-269
P31B9	COMMUNICATION ERROR	_	1	EVC-271

< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P31C0	ON BOARD CHARGER SYSTEM	×	1	EVC-272
P31C1	TCU	×	1	EVC-274
P31C2	TCU	_	1	EVC-274
P31C4	VCM TIMER	×	1	EVC-276
P31C5	VCM	_	1	EVC-278
P31C6	VCM	_	1	EVC-278
P31C7	VCM	×	1	EVC-280
P31C8	ON BOARD CHARGER SYSTEM	×	1	EVC-282
P31C9	ON BOARD CHARGER SYSTEM	×	1	EVC-282
P31CA	ON BOARD CHARGER SYSTEM	×	1	EVC-284
P31CB	ON BOARD CHARGER SYSTEM	×	1	EVC-284
P31D4	PRE CHARGE RELAY	×	1	EVC-286
P31D5	PRE CHARGE RELAY	×	1	EVC-288
P31D6	F/S RELAY	×	1	EVC-292
P31D7	F/S RELAY	×	1	EVC-294
P31DB	HV BATT MAIN RELAY +	×	1	EVC-297
P31DC	HV BATT MAIN RELAY -	×	1	EVC-298
P31DD	PRE CHARGE RELAY	×	1	EVC-299
P31DE	HV BATT MAIN RELAY	×	1	EVC-300
P31E0	HV SYSTEM INTERLOCK ERROR	×	1	EVC-301
P31E1	HV SYSTEM INTERLOCK ERROR	×	1	EVC-306
P31E2	HV SYSTEM INTERLOCK ERROR	×	1	EVC-309
P31E7	RESTART INHIBITION	×	1	EVC-311
P31E8	WATER PUMP 1	×	1	EVC-312
P31E9	WATER PUMP 1	×	1	EVC-315
P31EA	WATER PUMP 2	×	1	EVC-317
P31EB	WATER PUMP 2	×	1	EVC-320
P31EC	WATER PUMP 1	_	1	EVC-322
P31ED	WATER PUMP 2	_	1	EVC-323
P31EE	REFRIGERANT PRESSURE SENSOR	_	1	EVC-324
P31F0	DC/DC CONVERTER COMM LINE	_	1	EVC-327
P31F2	AV SET INFORMATION	_	1	EVC-329

^{*1:} To clear DTC P0AA1, perform SPECIFIC DTC CLEAR in WORK SUPPORT of CONSULT. (For VCM other than those in Group A and Group B)

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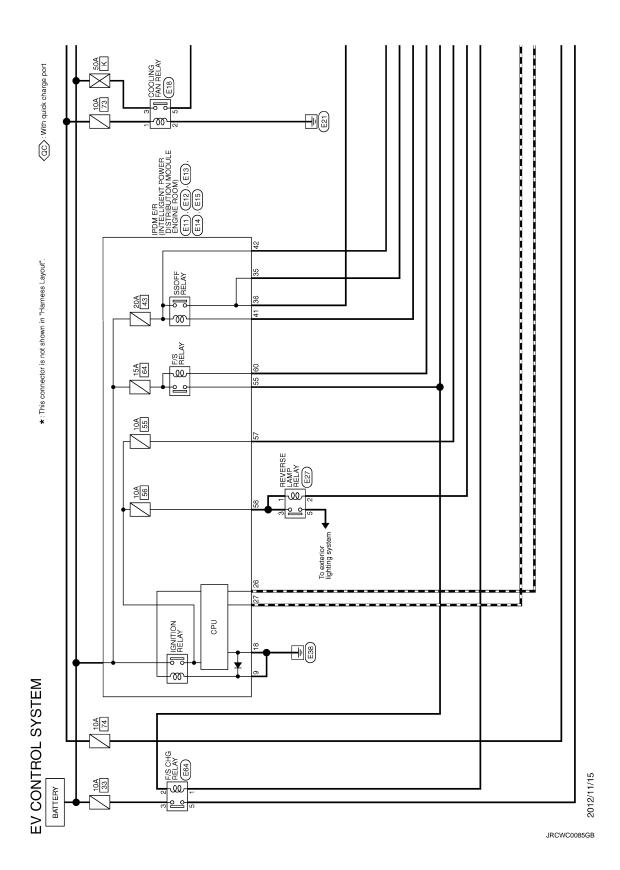
^{*2:} Not displayed for VCMs in Group A and Group B.

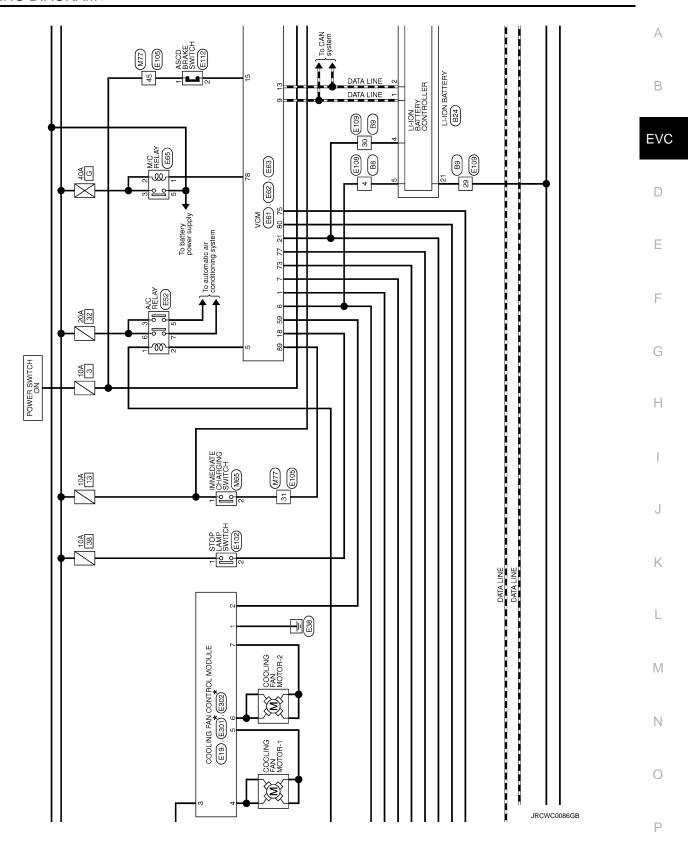
^{*3:} For VCM groups, refer to EVC-8, "How to Check VCM Group".

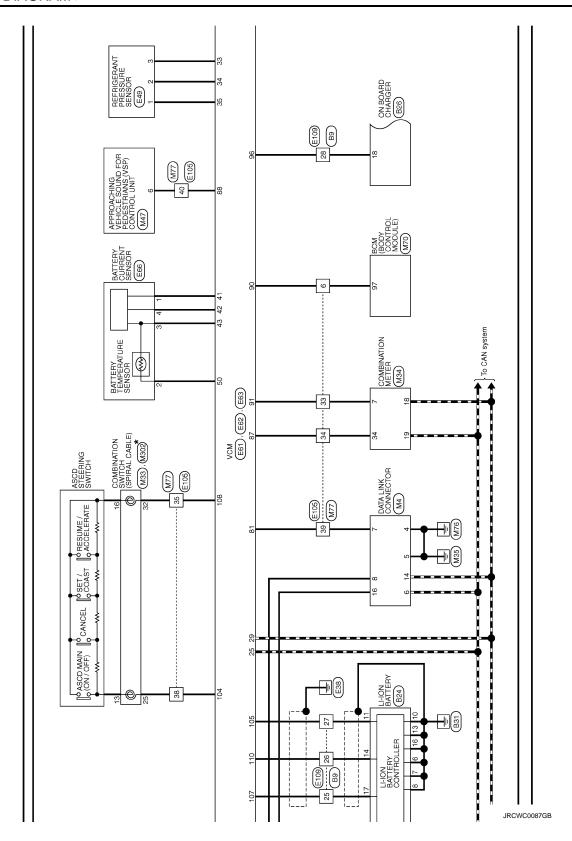
WIRING DIAGRAM

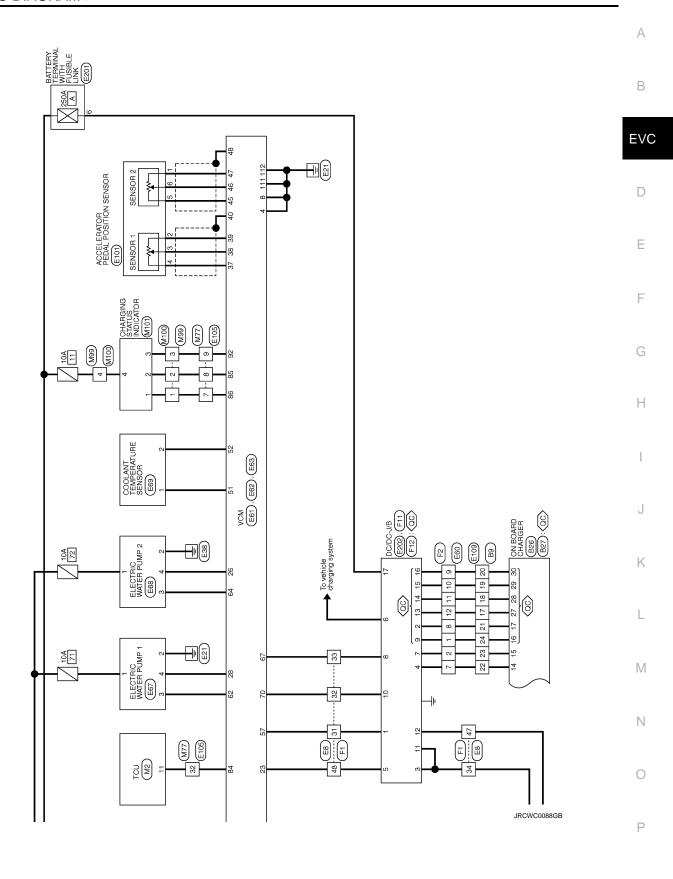
VCM

Wiring Diagram









2	e =	27 4 50	- B 9 +	80 5	n ≥ 12	12		+	13 3G	╀	18 FG	H	21 G =	23 B/R -	Н	27 P –	B/R	$^{+}$	30 B/R =	H	33 Y =	34 P	38	37	38	9 3	SIGNAL-H 42 SB -	43		Н			7							Γ	_
Terminal Golor Signal Name [Specification]	H	13 V POWER SUPPLY	۵	15 LG NORMAL CHARGE RELAY	17 SB QUICK CHARGE RELAY +	GR EV A	7	5	22 B GROIND	-		Connector No. B27	Connector Name ON BOARD CHARGER	Connector Type RH08FB	1	医		C3 24 25 26	OE 66 86 26			Terminal Color Signal Name [Specification]	t	GR	æ	> (29 G SENSOR GROUND GOLD CHARGE VOLLAGE SENSOR) 30 V OHICK CHARGE VOLTAGE SENSOR SIGNAL -H			Connector No. E8	Connector Name WIRE TO WIRE	Т	Connector Type SAA36MB-RS10-SJZ2	1	12 3 4 5 6 7 8 9	<u>'</u>	19 26 27 28 29 30 25	31323334363636333838	Op I so localica has Kerl Zel i a ha	rolog	Signal Name [Specification]
24 L = 25 Y = -	H	28 GR -	Н	30 R	1 10		Connector No. B24	Connector Name LI-ION BATTERY	Connector Type Yazaki 7283–8750–30	1	匮	HS	13 14 16 17	6 7 8 10 11)	Terminal Color Signal Name [Specification]	t	2 G EV CAN-H		5 R BAT	6 B GND3		8	9	13 B RLY2 GND	16 B RIVIGND	a >-	21 R CHG IGN		ſ	Connector No. B26	Connector Name ON BOARD CHARGER	Connector Type RH12FB	1	修	<u> </u>	11 110 12 14 15 16	17 18 10 00 01 00	2	
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Connector Name REVERSE LAMP RELAY	B EVO
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EVC-93 Revision: 2014 June 2011 LEAF

EV CONTROL SYSTEM Connector No. E52	Connector No. E61	40 SHELD -	108 BR ASCD STTERING SWICH GROUND
Connector Name A/C RELAY	Connector Name VCM	R SE	SYSTE
T	т	→	B/R
Connector Type M06FBR-R-LC	Connector Type RH24FGY-R28-R-RH	43 L SENSOR GROUND (BATTERY CURRENT SENSOR) 45 W sensore prove supply (Annel Franch Persal Position sensore 2)	112 B/R GROUND
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	18	В	Connector No. E64
¥;	10 14	48 SHIELD -	200000000000000000000000000000000000000
7 5	11 15	_	
6 3	4 8 12 16 20 24 28 32	0	Connector Type MS02FL-M2-LC
]		52 W SENSOR GROUND (COOLANT TEMPERATURE SENSOR)	
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No. of Wire Signal Name [Specification]	_	> 0	_
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2 SB -	4 B/R GROUND	67 Y DC/DC CONVERTER TEMPERATURE SIGNAL	2 X 1
3 R -	5 SB A/C RELAY	70 W DC/DC CONVERTER ACTIVATION SIGNAL	
	6 R BATTERY POWER SUPPLY	73 GR F/S RELAY	
- 22	7 W SSOFF RELAY	75 W F/S CHG RELAY	lal
7 W –	8 B/R GROUND	LG F/S REL	re
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I	9	80 SB REVERSE LAMP RELAY	7
Connector No. E60	O		+
Connector Name WIRE TO WIRE	SB	ſ	- ^ 6
т	۱ ۵	Connector No. E63	
Connector Type RH12MB	P HIGH VOLTAG	Connector Name VCM	San Andrew No.
Œ	25 L CAN-H	Connector Type BH34FB-B78-1 -BH	Т
	- *	1	Connector Name M/C RELAY
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	Connector No. E62	87	8
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	39 B SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)	107 W/L SYSTEM MAIN RELAY 1	

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Connector No. E102 Connector Name STOP LAMP SWITCH Connector Type ModFW-LC H.S.	Terminal Color Signal Name [Specification] No. of Wire No. No.				
Terminal Color Signal Name [Specification] No. of Wire Signal Name [Specification]	Connector Type EUPECY-RS LLS.	Terminal Color Signal Name [Specification] No. of Wire O	Connector No. E101 Connector Name ACCELEVATOR PEDAL POSTION SENSOR Connector Type RH06FB	HS (123456)	Terminal Color Signal Name [Specification]
EV CONTROL SYSTEM Connector No. E66 Connector Name BATTERY CURRENT SENSOR Connector Type SAZO4FGY H.S.	Terminal Color Signal Name [Specification] No. of Wire Signal Name [Specification]	Connector No. E67 Connector Type RSO4FG	#8. #8.	Color Signal Name Of Wire BR B/Y C C C C C C C C C	Connector No. EEB Connector Name ELECTRIC WATER PUMP 2 Connector Type RSSMFG ### A.

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EV CONTROL SYSTEM Gonnector No. E202 Connector Type	1.8. Color Signal Name [Specification] Color Color	

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EV CONTROL SYSTEM Gonnector No. M4 Connector Name DATA LINK CONNECTOR Connector Type BD16FW	Connector No. Connector Name Connector Type	M34 © COMBINATION METER TH40FW-1NH	Connector No. Connector Name Connector Type		M47 Personance verice sound for recentrame vise) Control, user THI GPW-NH	Connector No. Connector Name		M70 BCM (BODY CONTROL MODULE) TH40FW-NH	
H.S. (11)21314 16 (18)	11.S.	89.7 86 54 50 21 80 80 80 80 80 80 80 80 80 80 80 80 80	1.5	16 8	7 6 5 4 3 2 1 15 14 13 12 11 10	H.S.	71 72 73 74 77 91 92 93 94 99		
Terminal Color Signal Name [Specification]	Terminal Golor No. of Wire	or Signal Name [Specification]	Terminal No.	Color of Wire	Signal Name [Specification]	Terminal No.	Color of Wire	Signal Name [Specification]	
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+	+	POWER S	0 4	T	COMMUNICATION SIGNAL (VSP → METER)	79	L >	DRIVER DOOR ANT-	
7 GR –	5 B	GROUND	9	9	VSP OFF SWITCH SIGNAL	80	PT	PASS DOOR ANT+	
\dashv	9 9	\dashv	9	>	CHARGE PULSE SIGNAL	81	Υ	PASS DOOR ANT-	
+	^ >		۲ (- ?	VSP SPEAKER SIGNAL (-)	85	≽ ն	REAR BMPR ANT+	
13 -	> C	WASHER LEVEL SWITCH SIGNAL	∞ ⊆	ع -	VSP SPEAKER SIGNAL (+)	25 25	n e	ROOM ANT 1+	
	╁	COMMUNICA	=	S S	POWER SWITCH SUPPLY	82	<u></u>	ROOM ANT 1-	
-	11 P	Т	12	SB	STOP LAMP SWITCH SIGNAL	98	5	ROOM ANT 2+	
	12 V	П	13	7	BATTERY POWER SUPPLY	87	æ	ROOM ANT 2-	
- 1	13	LG ENTER SWITCH SIGNAL	14	Н	VSP OFF INDICATOR SIGNAL	88	^	LUGGAGE ROOM ANT+	
Connector No. M33	\dashv		15	┪	STRAT UP SOUND SPEAKER SIGNAL (-)	88	Ρ	LUGGAGE ROOM ANT-	
Connector Name COMBINATION SWITCH (SPIRAL CABLE)	+	+	16	*	STRAT UP SOUND SPEAKER SIGNAL (-)	90	*	POWER SW ILL PWR	
Т	7	ILLUMINATION CONTROL SWITCH SIGNAL				16	> 0	ACC / ON IND	
Connector Type TKU8FGY-TV	> C	†	· N	-10		28	n 5	FOWER SWILL GND CON!	
	0 0		Collinector	Т	0	28	5 8	ACC BELAY CONT	
	20	SEAT BELT BUCKLE SWITCH SIGNAL (PASSENGER SIDE)	Connector Name		IMMEDIATE CHARGING SWITCH	6	*	READY	
1080	H	П	Connector Type	П	TH08FGY-NH	98	5	IGN RELAY (IPDM E/R) CONT	
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26 B –	34 L	PLUG IN INDICATOR LAMP SIGNAL	lal	Color	Signal Name [Specification]				
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┪	7	G LED HEADLAMP (LH) WARNING SIGNAL	1	>	-				
ᇬ	40	SEAT BELT BUCKLE SWITCH SIGNAL (DRIVER SIDE)	2	SB ::					
34 G			εs 4	≥ α	ILLUMINATION +				

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Connector Name Conn	0
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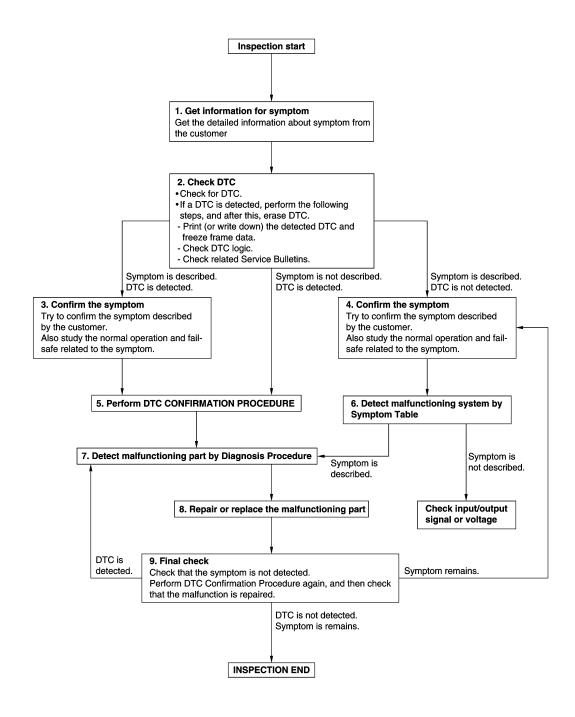
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BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

OVERALL SEQUENCE



JSCIA0443GB

< BASIC INSPECTION >

1.GET INFORMATION FOR SYMPTOM

Get the detailed information from the customer about the symptom (the condition and the environment when the incident/malfunction occurred) using the "Diagnostic Work Sheet". (Refer to EVC-102, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

- 1. Check DTC.
- 2. If a DTC is detected, perform the following steps, and after this, erase DTC.
- Print (or write down) the detected DTC and freeze frame data.
- Check DTC logic. Refer to EVC-84, "DTC Index".
- Check related Service Bulletins.
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Diagnosis is useful. Refer to EVC-355, "Symptom Index".)

Are any symptoms described and any DTCs detected?

Symptom is described, DTC is detected>>GO TO 3.

Symptom is described, DTC is not detected>>GO TO 4.

Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail-safe related to the symptom. Refer to EVC-355, "Symptom Index" and EVC-79, "Fail-Safe".

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 5.

4. CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.

Also study the normal operation and fail-safe related to the symptom. Refer to EVC-355, "Symptom Index" and EVC-79, "Fail-Safe".

Diagnosis Work Sheet is useful to verify the incident.

Verify relation between the symptom and the condition when the symptom is detected.

>> GO TO 6.

$oldsymbol{5}$.PERFORM DTC CONFIRMATION PROCEDURE

Perform DTC CONFIRMATION PROCEDURE for the displayed DTC, and then check that DTC is detected again.

If two or more DTCs are detected, refer to EVC-82, "DTC Inspection Priority Chart" and determine trouble diagnosis order.

NOTE:

- Freeze frame data is useful if the DTC is not detected.
- Perform Component Function Check if DTC CONFIRMATION PROCEDURE is not included on Service Manual. This simplified check procedure is an effective alternative though DTC cannot be detected during this check.

If the result of Component Function Check is NG, it is the same as the detection of DTC by DTC CONFIR-MATION PROCEDURE.

Is DTC detected?

YES >> GO TO 7.

NO >> Check according to GI-51, "Intermittent Incident".

O.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EVC-355, "Symptom Index" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

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< BASIC INSPECTION >

Is the symptom described?

YES >> GO TO 7.

NO >> Monitor input data from related sensors or check voltage of related VCM terminals using CON-SULT. Refer to EVC-66, "Reference Value".

7.DETECT MALFUNCTIONING PART BY DIAGNOSIS PROCEDURE

Inspect according to Diagnosis Procedure of the system.

Is a malfunctioning part detected?

YES >> GO TO 8.

NO >> Monitor input data from related sensors or check voltage of related VCM terminals using CON-SULT. Refer to EVC-66, "Reference Value".

8.repair or replace the malfunctioning part

- 1. Repair or replace the malfunctioning part.
- Reconnect parts or connectors disconnected during Diagnosis Procedure again after repair and replacement.
- 3. Check DTC. If DTC is displayed, erase it.

>> GO TO 9.

9. FINAL CHECK

When DTC was detected in step 3, perform DTC CONFIRMATION PROCEDURE or Component Function Check again, and then check that the malfunction have been completely repaired.

When symptom was described from the customer, refer to confirmed symptom in step 4 or 5, and check that the symptom is not detected.

Is DTC detected and does symptom remain?

YES-1 >> DTC is detected: GO TO 7.

YES-2 >> Symptom remains: GO TO 4.

NO >> Before returning the vehicle to the customer, always erase DTC.

Diagnostic Work Sheet

INFOID:0000000007539116

DESCRIPTION

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

KEY POINTS					
WHAT	Vehicle and parts				
WHEN	Date, Frequencies				
WHERE	Road conditions				
HOW	Operating conditions, Weather conditions, Symptoms				

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

Utilize the diagnostic worksheet in order to organize all the information for troubleshooting.

NOTE:

Some conditions may cause a DTC to be detected.

DIAGNOSTIC WORKSHEET

Diagnostic worksheet	
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Customer name			License plate No. Model			Date of first registration		
Acceptance Date			VIN			Mileage	km (mile)	
Que	stion	Group			Information fro	om the customer		
Vehicle conditio occurrence	n at malfunction	R/Q/N/O	□ READY (R)	□ Qı	uick charge (Q) □ N	ormal charge (N) □ Others (O)	
			☐ Driving imp	ossible eration	led □ Poor drivabilit □ Noise □ Poor s □ Low electricity cor □ Others	shifting 🗆 Poor	braking	
			Details of sym	ptom				
Symptom		R	Information dis	splay				
			Electricity contion	sump-			km (mile)/kW	
			Li-ion battery r	emain-	/			
		Q, N			☐ Charging disconting ☐ Poor remote ch		parging ediate charging unable	
			Details of sym	ptom			· · · · · · · · · · · · · · · · · · ·	
			Quick charger tor indication	moni-				
		0	☐ A/C inopera	ative D	□ Poor A/C □ Dead	12V battery)	
			Details of sym	ptom			,	
		R/O	□ Not applicable □ Ordinary road □ Highway □ Mountain pass □ Rough road □ Level road □ Uphill □ Downhill □ Left/right turn □ Others					
Land Care			()	
Location/status of occurrence	Q/N/O	☐ Start of charge ☐ During charging ☐ After the end of charging ☐ During standby of timer charging ☐ During timer charging ☐ At the end of timer charging ☐ During remote charging ☐ Others						
Driving condition		R	☐ At start ☐ ☐ During coas	During ting E	up □ During READ\ acceleration □ Dur □ During braking □ F FF operation □ A/C	ing driving with a Right before stop	a constant speed ping □ Right after stopping	
			Vehicle speed				km (MPH)	
			Accelerator pe		/	8		

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< BASIC INSPECTION >

Question	Group		Information from the customer					
		Quick charger maker	□ Not applicable □ Applicable ()				
	Q	Location						
Quick charger		Model number						
		Serial number						
		Setting						
		Others						
		☐ Not applicable ☐	Applicable					
Wall outlet		Location						
	N	Voltage	V					
		Breaker	A					
		Other information						
Li-ion battery remaining energy	Q/N/O	□ Not applicable □ Applicable (
Shift position/operation	R	\square P \square R \square N \square D \square ECO \square When operating (\Rightarrow)						
		□ Not applicable □ Applicable						
Weather condition		Weather						
		Temperature °C (or °F)						
Occurrence frequency	R/Q/N/O	☐ All the time ☐ Once ☐ Sometimes (times in the past) ☐ Others						
Timing of recovery from mal- function			Removal of 12V battery terminal	\				
		()				

ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMINAL

< BASIC INSPECTION >

ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMINAL

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Description INFOID:0000000007539117

When the 12V battery negative terminal is disconnected, the timer mounted in VCM cannot be controlled normally because timer information stored in VCM is erased. In such case, the timer must be reset to correct time. **NOTE:**

If timer charge setting is previously set to ON, the timer charge ON setting can be cancelled by disconnecting the 12 V battery negative terminal.

Work Procedure

1.PERFORM VCM TIMER ADJUSTMENT

Perform VCM timer adjustment. Refer to <u>AV-82, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL: Work Procedure".</u>

>> END

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ADDITIONAL SERVICE WHEN REPLACING VCM

< BASIC INSPECTION >

ADDITIONAL SERVICE WHEN REPLACING VCM

Description INFOID:0000000007539119

When replacing VCM, this procedure must be performed.

NOTE:

The necessary operation is different depending on the operation result of VCM data save or write. Always perform the operation according to procedures. Refer to <u>EVC-106</u>, "Work <u>Procedure</u>".

Work Procedure

1. SAVE VCM DATA

- 1. Turn off the power and wait at least 20 seconds.
- Turn power switch ON.
- 3. Select "SAVE DATA FOR CPU REPLACE" in "WORK SUPPORT" mode using CONSULT.
- 4. Follow the instruction of CONSULT display.

NOTE:

Necessary data in VCM is copied and saved to CONSULT.

Is operation completed successfully?

YES >> GO TO 2.

NO >> GO TO 5.

2.REPLACE VCM

- 1. Turn off the power and wait at least 20 seconds.
- 2. Replace VCM. Refer to EVC-377, "Removal and Installation".

>> GO TO 3.

3.PERFORM VCM KEY ID REGISTRATION

Refer to SEC-56, "VCM: Work Procedure".

>> GO TO 4.

4. WRITE VCM DATA

- 1. Select "WRITE DATA AFTER REPLACE CPU" in "WORK SUPPORT" mode using CONSULT.
- 2. Follow the instruction of CONSULT display.

NOTE:

The data saved by "SAVE DATA FOR CPU REPLACE" is written to VCM.

Is operation completed successfully?

YES >> GO TO 9.

NO >> GO TO 7.

5. REPLACE VCM

- 1. Turn off the power and wait at least 20 seconds.
- 2. Replace VCM. Refer to EVC-377, "Removal and Installation".

>> GO TO 6.

6. PERFORM VCM KEY ID REGISTRATION

Refer to SEC-56, "VCM: Work Procedure".

>> GO TO 7.

7. WRITE VIN DATA

Perform EVC-111, "Work Procedure".

>> GO TO 8.

ADDITIONAL SERVICE WHEN REPLACING VCM < BASIC INSPECTION > 8. LI-ION BATTERY ID REGISTRATION Refer to "Li-ion Battery Registration Operation Manual". >> GO TO 9. В 9. PERFORM ACCELERATE PEDAL CLOSED POSITION LEARNING Perform EVC-108, "Work Procedure". **EVC** >> GO TO 10. 10.SET VCM TIMER D Refer to AV-82, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL: Work Procedure". Е >> GO TO 11. 11. CHECK DTC F Turn off the power and wait at least 20 seconds. Turn power switch ON. Check DTC. If DTC is displayed, erase it. >> END Н K L M

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ACCELERATOR PEDAL RELEASED POSITION LEARNING

< BASIC INSPECTION >

ACCELERATOR PEDAL RELEASED POSITION LEARNING

Description INFOID:0000000007539121

Accelerator Pedal Closed Position Learning is a function of VCM to learn the fully released position of the accelerator pedal by monitoring the accelerator pedal position sensor output signal. This work must be performed each time the harness connector of the accelerator pedal position sensor or VCM harness connector is disconnected.

Work Procedure

1.START

- Check that accelerator pedal is fully released.
- 2. Turn power switch ON.and wait at least 2 seconds.
- 3. Turn power switch OFF and wait at least 20 seconds.
- 4. Repeat steps 2 and 3 for 4 times.
- 5. Turn power switch OFF and wait at least 20 seconds.

>> END

LI-ION BATTERY GRADUAL CAPACITY LOSS DATA CLEAR

< BASIC INSPECTION >

LI-ION BATTERY GRADUAL CAPACITY LOSS DATA CLEAR

Description INFOID:0000000007539123

Perform Li-ion Battery Gradual Capacity Loss Data Clear when the Li-ion battery or Li-ion battery controller is replaced with a new one. VCM saves the Li-ion battery deterioration information sent from the Li-ion battery controller and manages the Li-ion battery replacement timing. When the Li-ion battery or Li-ion battery controller is replaced with a new one, there is a difference between the Li-ion battery deterioration data stored in VCM and the actual Li-ion battery deterioration level. In this case, VCM will incorrectly manage the Li-ion battery replacement timing. So perform Li-ion Battery Deterioration Data Clear to clear the Li-ion battery deterioration data stored in VCM.

CAUTION:

Never perform Li-ion Battery Deterioration Data Clear when the Li-ion battery or Li-ion battery controller is not replaced as new one.

Work Procedure INFOID:0000000007539124

 ${f 1}$.LI-ION BATTERY GRADUAL CAPACITY LOSS DATA CLEAR

(P) With CONSULT

- 1. Turn power switch ON.
- On the CONSULT screen, select "EV/HEV" >> "WORK SUPPORT" >> "BATTERY GRADUAL CAP LOSS DATA CLEAR".
- Touch "START" and wait a few seconds.
- Make sure that "COMPLETE" is displayed on CONSULT screen.

>> END

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LI-ION BATTERY JUNCTION BOX DATA CLEAR

< BASIC INSPECTION >

LI-ION BATTERY JUNCTION BOX DATA CLEAR

Description INFOID:000000007539125

Perform Li-ion Battery Junction Box Data Clear when the Li-ion Battery Junction Box is replaced with a new one. VCM counts the times system main relay is turned off due to a large current and use this information to manage the system main relay deterioration status. As the system main relay deterioration status progresses, a DTC "P31DE" is detected and notification that the Li-ion battery junction box needs to be replaced is given. When the Li-ion Battery Junction Box is replaced with a new one, there is a difference between the System Main Relay cutoff count stored in VCM and the actual System Main Relay cutoff count. In this case, VCM will detect the DTC with incorrect timing. So perform Li-ion Battery Junction Box Data Clear to clear the System Main Relay cutoff count stored in VCM.

Work Procedure

1. LI-ION BATTERY JUNCTION BOX DATA CLEAR

(II) With CONSULT

- 1. Turn power switch ON.
- 2. On the CONSULT screen, select "EV/HEV" >> "WORK SUPPORT" >> "LI-ION BATTERY JUNCTION BOX DATA CLEAR".
- 3. Touch "START" and wait a few seconds.
- 4. Make sure that "COMPLETE" is displayed on CONSULT screen.

>> END

WRITE VEHICLE IDENTIFICATION NUMBER DATA

< BASIC INSPECTION >

WRITE VEHICLE IDENTIFICATION NUMBER DATA

DescriptionINFOID:0000000007539127

VIN Registration is an operation to register the VIN in VCM.

NOTE:

If there is an error in the VIN recorded in VCM, the telematics system may not operate correctly.

Work Procedure EVC

1. CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-22, "Information About Identification or Model Code".

>> GO TO 2.

2. PERFORM VIN REGISTRATION

(II) With CONSULT

- 1. Turn power switch ON (not READY).
- 2. On the CONSULT screen, select "EV/HEV" >> "WORK SUPPORT" >> "VIN REGISTRATION".
- Follow the instructions on the CONSULT display.

>> END

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LOAD BATTERY IDENTIFICATION DATA

< BASIC INSPECTION >

LOAD BATTERY IDENTIFICATION DATA

Description INFOID:0000000007539129

Load Battery Identification Data must be performed after the following operation.

- Li-ion battery is replaced.
- Li-ion battery controller is replaced.
- VCM is replaced.

NOTE:

If Load Battery Identification Data is not performed, VCM detects the DTC "P3102".

Work Procedure

Refer to "Li-ion Battery Registration Operation Manual".

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

VCM

VCM: Diagnosis Procedure

INFOID:0000000007539131

1.CHECK FUSE

Check that the following fuse is not fusing.

Power supply	Fuse No.	
Battery	43	
Power switch ON	55	

Is the fuse fusing?

>> Replace the fuse after repairing the applicable circuit.

NO >> GO TO 2.

2.CHECK VCM GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and ground.

+				
VCM		_	Continuity	
Connector	Terminal			
E61	4	Ground	Existed	
LOT	8			
E63	111	Giodila	Existed	
E03	112			

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK 12V BATTERY POWER SUPPLY

Check the voltage between VCM harness connector and ground.

+ VCM		_	Voltage
Connector	Terminal		
E61	6	Ground	12V battery power supply

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK BATTERY POWER SUPPLY CIRCUIT

1. Check the continuity between VCM harness connector and fuse terminal.

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POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

V	+ VCM		Continuity
Connector	Terminal		
E61	6	#43 fuse termi- nal	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check power supply circuit for battery power supply.

NO >> Repair or replace error-detected parts.

5. CHECK POWER ON POWER SUPPLY

- 1. Turn power switch ON.
- Check the voltage between VCM harness connector and ground.

_	+			Vales a
-	VCM		-	Voltage (Approx.)
	Connector Terminal			, , ,
	E61 21		Ground	11 – 14 V

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

6.CHECK POWER ON POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between VCM harness connector and IPDM E/R harness connector.

+		_		
V	VCM		IPDM E/R	
Connector	Terminal	Connector	Terminal	
E61	21	E15	57	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description INFOID:0000000007539132

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.

DTC Logic INFOID:0000000007539133

DTC DETECTION LOGIC

-	DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	
-	U1000	CAN COMM CIRCUIT (CAN communication line)	When VCM is not transmitting or receiving CAN communication signal or EV system CAN communication for 2 seconds or more.	CAN communication system EV system CAN communication system	F

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

- Turn power switch ON and wait at least 5 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-115, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

Perform the trouble diagnosis for CAN communication system. Refer to LAN-32, "CAN COMMUNICATION SYSTEM: CAN System Specification Chart".

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U1010 CONTROL MODULE (CAN)

< DTC/CIRCUIT DIAGNOSIS >

U1010 CONTROL MODULE (CAN)

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
U1010	CONTROL UNIT (CAN) (CAN communication line)	Detecting error during the initial diagnosis of CAN controller of VCM.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

(I) With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-116, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539136

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(I) With CONSULT

- 1. Turn power switch ON.
- 2. Erase self-diagnostic result.
- 3. Perform DTC confirmation procedure again. Refer to EVC-116, "DTC Logic".
- Check self-diagnostic result.

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

P0603 VCM

DTC Logic INFOID:0000000007539137

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0603	INTERNAL CONTROL MODULE (Internal control module RAM error)	VCM back-up RAM system does not function properly.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.perform dtc confirmation procedure

(P)With CONSULT

- Turn power switch ON and wait at least 10 seconds.
- 2. Turn power switch OFF and wait at least 20 seconds.
- 3. Turn power switch ON and wait at least 10 seconds.
- 4. Repeat steps 2 and 3 for 2 times.
- 5. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-117. "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1.INTERVIEW THE CUSTOMER

Interview the customer to see if there is a removal history of 12V battery terminals immediately after turning OFF the power switch.

NOTE:

DTC "P0603" may be detected when 12 V battery terminals are removed before VCM is shut off.

Is there a removal history of 12V battery terminals immediately after turning OFF the power switch?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK 12V BATTERY POWER SUPPLY

- Turn power switch OFF.
- Disconnect VCM harness connector. 2.
- Check the voltage between VCM harness connector and ground.

+			
V	CM	_	Voltage
Connector	Terminal		
E61	6	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

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P0603 VCM

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK 12V BATTERY POWER SUPPLY CIRCUIT

- 1. Pull out #43 fuse.
- 2. Check the continuity between VCM harness connector and fuse terminal.

	+		
V	CM	_	Continuity
Connector	Terminal		
E61	6	#43 fuse termi- nal	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

4. PERFORM CONFIRMATION PROCEDURE AGAIN

With CONSULT

- 1. Reconnect all harness connectors disconnected.
- 2. Turn power switch ON.
- 3. Erase DTC.
- 4. Perform DTC confirmation procedure again. Refer to EVC-117, "DTC Logic".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P0616 READY SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

P0616 READY SIGNAL

DTC Logic INFOID:0000000007539139

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0616	STARTER RELAY (Starter relay circuit low)	VCM receives READY signal during power switch is OFF.	Harness or connectors (READY signal circuit is shorted) BCM VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.perform dtc confirmation procedure

(P)With CONSULT

- Turn power switch ON.
- Turn power switch OFF and wait at least 20 seconds.
- 3. Turn power switch ON.
- 4. Check self-diagnostic result.

Is DTC detected?

>> Proceed to EVC-119, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK READY SIGNAL VOLTAGE-I

- Turn power switch OFF.
- Disconnect VCM harness connector. 2.
- Check the voltage between VCM harness connector and ground.

+			
VCM		_	Voltage
Connector	Terminal		
E63	90	Ground	0 V

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK READY SIGNAL VOLTAGE-II

- Disconnect BCM harness connector. 1.
- Check the voltage between VCM harness connector and ground.

+ VCM		_	Voltage
Connector	Terminal		
E63	90	Ground	0 V

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P0616 READY SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Replace BCM. Refer to BCS-77, "Removal and Installation".

NO >> GO TO 3.

3. CHECK READY SIGNAL CIRCUIT

1. Check the continuity between VCM harness connector and BCM harness connector.

-	+	_		
V	СМ	ВСМ		Continuity
Connector	Terminal	Connector	Terminal	
E63	90	M70	97	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

4. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0643 SENSOR POWER SUPPLY

DTC Logic INFOID:0000000007539141

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0643	SENSOR POWER SUP- PLY (Sensor reference voltage A circuit high)	VCM detects that a voltage of power source for sensor remains 5.6 V or more. VCM detects a voltage of power source for sensor remains less than 4.6 V.	Harness or connectors (Sensor power supply circuit is shorted.) Accelerator pedal position sensor Battery current sensor Refrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(I) With CONSULT

- Turn power switch ON.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-121, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK SENSOR POWER SUPPLY VOLTAGE

- Turn power switch OFF.
- Disconnect battery current sensor harness connector. 2.
- Turn power switch ON.
- Check the voltage between battery current sensor harness connector and ground.

+			17.16	
Battery current sensor		_	Voltage (Approx.)	
Connector	Terminal		(11 - 7	
E66	1	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK VCM POWER SUPPLY AND GROUND

Perform trouble diagnosis for VCM power supply and ground. Refer to EVC-113, "VCM: Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK SENSOR POWER SUPPLY ROUTING CIRCUIT

- Turn power switch OFF.
- Disconnect following sensor harness connector and check harness for short to ground and short to power.

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P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

VC	M		Sensor	
Connector	Terminal	Name	Connector	Terminal
	41	Battery current sensor	E66	1
E62	33	Refrigerant pressure sensor	E49	33
	37	Accelerator pedal position sensor	E101	4

Is the inspection result normal?

YES >> Check sensors for short to ground and short to power.

NO >> Repair or replace error-detected parts.

4. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P0A00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0A00 COOLANT TEMPERATURE SENSOR

DTC Logic INFOID:0000000007539143

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A00	COOLANT TEMPERA- TURE SENSOR (Coolant temperature sen- sor circuit)	 VCM detects that coolant temperature sensor voltage remains less than 0.1 V for 2.5 seconds. VCM detects coolant temperature sensor voltage remains more than 4.9 V for 2.5 seconds. 	Harness or connectors (The sensor circuit is open or shorted.) Coolant temperature sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-123, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-I

- Turn power switch OFF.
- 2. Disconnect coolant temperature sensor harness connector.
- Turn power switch ON.
- 4. Check the voltage between coolant temperature sensor harness connector terminals.

Coola	N/ 1/		
Connector	+	ı	Voltage (Approx.)
Connector	Terminal		(11 /
E69	1	2	5 V

Is the inspection result normal?

>> GO TO 7. YES

NO >> GO TO 2.

2.CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-II

Check the voltage between coolant temperature sensor harness connector and ground.

+ Coolant temperature sensor		_	Voltage (Approx.)	
Connector	Terminal		(приох.)	
E69 1		Ground	5 V	

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 5.

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P0A00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

${f 3.}$ CHECK COOLANT TEMPERATURE SENSOR GROUND CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and coolant temperature sensor harness connector.

+		-		
V	CM	Coolant temperature sensor		Continuity
Connector	Terminal	Connector Terminal		
E62	52	E69	2	Existed

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+				
Coolant temperature sensor		_	Continuity	
Connector Terminal				
E61	4			
LOT	8	Ground	Existed	
E63	111	Giodila		
	112			

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

5. CHECK SENSOR POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and coolant temperature sensor harness connector.

+		-		
V	СМ	Coolant temperature sensor		Continuity
Connector	Terminal	Connector Terminal		
E62	51	E69	1	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

$\mathsf{6}.$ CHECK VCM POWER SUPPLY CIRCUIT

Check VCM power supply circuit. Refer to EVC-113, "VCM: Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

7.CHECK COOLANT TEMPERATURE SENSOR

Check coolant temperature sensor. Refer to EVC-125, "Component Inspection".

Is the inspection result normal?

P0A00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace coolant temperature sensor. Refer to HCO-15, "Exploded View".

8. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

Component Inspection

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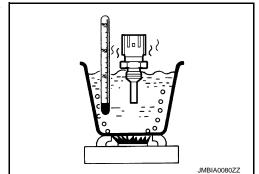
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1. CHECK COOLANT TEMPERATURE SENSOR

- 1. Turn power switch OFF.
- 2. Disconnect coolant temperature sensor harness connector.
- 3. Remove coolant temperature sensor.
- 4. Check resistance between coolant temperature sensor terminals by heating with hot water as shown in the figure.

Terminals	Condition		Resistance
1 and 2 Temperature [°C (°F)]		20 (68)	2.35 - 2.73 kΩ
	Temperature [°C (°F)]	50 (122)	0.68 - 1.00 kΩ
	90 (194)	0.236 - 0.260 kΩ	



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace coolant temperature sensor. Refer to <u>HCO-15</u>, "Exploded View".

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P0A08 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A08 DC/DC CONVERTER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A08	DC/DC CONVERTER (DC/DC converter status circuit)	VCM detects that coolant temperature sensor voltage remains less than 0.1 V for 2.5 seconds.	Harness or connectors (The sensor circuit is open or shorted.) DC/DC converter VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-126, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539147

1. CHECK DC/DC CONVERTER POWER SUPPLY

- Turn power switch OFF.
- 2. Disconnect DC/DC junction box harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between DC/DC junction box harness connector and ground.

+			
DC/DC J/B		_	Voltage
Connector	Terminal		
F11	10	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 2.

2.CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #74 fuse and check fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK DC/DC CONVERTER POWER SUPPLY CIRCUIT-I

1. Check the continuity between fuse terminal and DC/DC junction box harness connector.

P0A08 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

+	– DC/DC J/B		Continuity
	Connector	Terminal	
#74 fuse termi- nal	F11	10	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

f 4.CHECK DC/DC CONVERTER POWER SUPPLY CIRCUIT-II

- Remove M/C relay.
- Check the continuity between M/C relay harness connector and fuse terminal.

+			
M/C relay		_	Continuity
Connector	Terminal		
E65	5	#74 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

5.CHECK DC/DC CONVERTER ACTIVATION SIGNAL CIRCUIT

- Turn power switch OFF.
- Disconnect VCM harness connector. 2.
- Check the continuity between VCM harness connector and DC/DC junction box harness connector.

	+		_	
V	СМ	DC/DC J/B		Continuity
Connector	Terminal	Connector	Terminal	
E62	70	F11	10	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.REPLACE DC/DC JUNCTION BOX

- Replace DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- 2. Erase DTC.
- 3. Perform DTC confirmation procedure. Refer to EVC-126, "DTC Logic".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> INSPECTION END NO

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< DTC/CIRCUIT DIAGNOSIS >

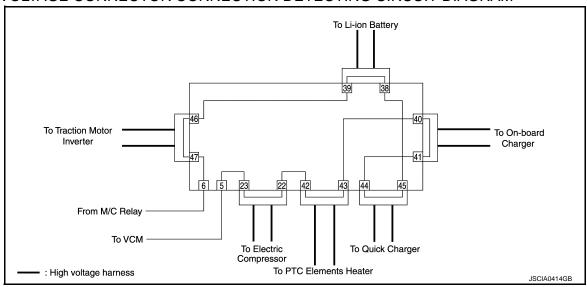
P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

Description INFOID:000000007539148

The high voltage connector connection detecting circuit is integrated into DC/DC junction box and detects the connection status of the high voltage harness connectors connected to DC/DC junction box.

The high voltage connector connection detecting circuit is designed so that the power from the M/C relay is supplied to VCM via all of the high voltage harness connectors connected to DC/DC-J/B. When all of the high voltage harness connectors are connected, this circuit is energized. If one of the high voltage harness connectors is disconnected, the high voltage connector connection detecting circuit becomes broken. VCM detects the connection status of the high voltage harness connectors, according to a voltage applied from this circuit.

HIGH VOLTAGE CONNECTOR CONNECTION DETECTING CIRCUIT DIAGRAM



DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A0B	HV SYSTEM INTERLOCK ERROR (High voltage system inter- lock circuit performance)	VCM detects that high voltage harness connector interlock circuit voltage remains excessively high for 0.5 seconds or more immediately before M/C relay turns ON.	 Harness or connectors VCM Quick charge port (With Quick charge port models) DC/DC-J/B

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(I) With CONSULT

- 1. Turn power switch ON.
- 2. Turn power switch OFF and wait at least 20 seconds.
- 3. Turn power switch ON and wait at least 5 seconds.
- 4. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-129, "Diagnosis Procedure".

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< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539150

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.

1.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

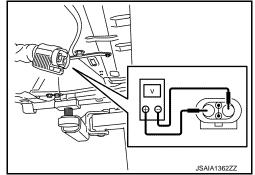
- 1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169. "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 2.

2.check high voltage harness connector connection detecting circuit power sup-PLY-I

- Reconnect 12V battery negative terminal.
- Disconnect VCM harness connector. 2.
- Check the voltage between VCM harness connector and ground.

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< DTC/CIRCUIT DIAGNOSIS >

+ VCM		_	Voltage
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 3.

3.check high voltage harness connector interlock detecting circuit power supply-II

- 1. Remove M/C relay.
- 2. Check the voltage between VCM harness connector and ground.

+			
VCM		_	Voltage
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335. "Diagnosis Procedure".

NO-1 (with quick charge port)>>GO TO 4.

NO-2 (without quick charge port)>>GO TO 5.

4. CHECK HIGH VOLTAGE HARNESS CONNECTOR INTERLOCK DETECTING CIRCUIT POWER SUPPLY-III

- 1. Disconnect quick charge port high voltage harness connector (H12).
- 2. Check the voltage between VCM harness connector and ground.

+			
VCM		_	Voltage
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

YES >> Check harness between M/C relay and quick charge port. If OK, check quick charge port for short to power.

NO >> GO TO 5.

5. CHECK HIGH VOLTAGE HARNESS CONNECTOR INTERLOCK DETECTING CIRCUIT POWER SUPPLY-IV

- 1. Disconnect DC/DC-J/B harness connector (F11).
- 2. Check the voltage between VCM harness connector and ground.

+			
VCM		_	Voltage
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> Check harness for short to power, between VCM harness connector and DC/DC-J/B harness connector.

6. CHECK HIGH VOLTAGE HARNESS CONNECTOR INTERLOCK DETECTING CIRCUIT POWER SUP-

< DTC/CIRCUIT DIAGNOSIS >

PLY-V

Check the voltage between DC/DC junction box harness connector and ground.

+			
VCM		_	Voltage
Connector	Terminal		
F11	6	Ground	0 V

Is the inspection result normal?

- YES >> Check DC/DC junction box for short to power.
- NO-1 (with quick charge port)>>Check harness for short to power, between DC/DC junction box harness connector and quick charge port harness connector.
- NO-2 (without quick charge port)>>Check harness for short to power, between DC/DC junction box harness connector and M/C relay harness connector.

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P0A8D 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0A8D 12V BATTERY POWER SUPPLY

DTC Logic INFOID:0000000007539151

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A8D	14V POWER SUPPLY (14 V power module system voltage low)	VCM detects that a voltage of 12V battery power supply remains less than 10 V for 10 seconds during READY state.	Harness or connectors (The sensor circuit is open or shorted.) DC/DC J/B

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 30 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-132, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539152

1. CHECK 12V BATTERY POWER SUPPLY-I

- Turn power switch OFF.
- Check the voltage between IPDM E/R harness connector and ground.

IPDN	+ // E/R	_	Voltage
Connector	Terminal		_
E14	42	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

2.CHECK 12V BATTERY POWER SUPPLY-II

- Disconnect IPDM E/R harness connector (E14).
- 2. Check the voltage between IPDM E/R connector and ground.

+		
IPDM E/R	_	Voltage
Terminal		
42	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 3.

P0A8D 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

3.CHECK IPDM E/R

1. Remove IPDM E/R.

Check the continuity between IPDM E/R connector terminals.

IPDI	Continuity	
+ -		
Teri		
2	42	Existed

Is the inspection result normal?

>> Check 12V battery power supply circuit.

NO >> GO TO 4.

4.CHECK FUSE

1. Pull out #43 fuse.

2. Check the fuse is not fusing.

Is the inspection result normal?

>> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Repair or replace error-detected parts.

${f 5}$.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

Disconnect VCM harness connector.

Check the harness for short to ground, between IPDM E/R harness connector and VCM harness connector.

	+		
IPDN	M E/R	_	Continuity
Connector Terminal			
E14	42	Ground	Not Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

6.DC/DC-J/B OUTPUT POWER CIRCUIT

- Disconnect DC/DC-J/B terminal (E202).
- 2. Disconnect F/L-A.
- Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

-				
		+		
	DC/DC-J/B		_	Continuity
	Connector Terminal			
	E202	17	F/L-A terminal	Existed

Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace DC/DC-J/B. Refer to EVC-369, "Removal and Installation".

NO >> Repair or replace error-detected parts. **EVC**

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Revision: 2014 June

P0A8E 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0A8E 12V BATTERY POWER SUPPLY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A8E	14V POWER SUPPLY (14 V power module system voltage high)	VCM detects that a voltage of 12V battery power supply remains more than 16 V for 25.5 seconds during READY state.	 12V battery Harness or connectors (The signal circuit is open or shorted.) DC/DC J/B

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 30 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-134, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539154

1. CHECK 12V BATTERY

Check that the correct 12V battery is installed.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace 12V battery with a correct one.

2.DC/DC CONVERTER POWER VOLTAGE VARIABLE CONTROL SIGNAL

(P)With CONSULT

- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "DC/DC CONV REQ VOLT".
- 2. Check that the value of "DC/DC CONV REQ VOLT" is less than 16 V.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace VCM. Refer to EVC-377, "Removal and Installation".

3.check DC/DC converter power voltage variable control signal circuit

- Turn power switch OFF.
- 2. Disconnect VCM harness connector and DC/DC junction box harness connector.
- 3. Check the continuity between VCM harness connector and DC/DC junction box harness connector.

+		-		
VCM		DC/DC-J/B		Continuity
Connector	Terminal	Connector	Terminal	
E62	57	F11	1	Existed

^{4.} Also check harness for short to power.

P0A8E 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Replace DC/DC junction box. Refer to EVC-369, "Removal and Installation".

NO >> Repair or replace error-detected parts.

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P0A8F 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0A8F 12V BATTERY POWER SUPPLY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A8F	14V POWER SUPPLY (14 V power module system performance)	When shift is except P range and parking brake is released, VCM detects that a voltage of 12V battery power supply remains less than 12 V for 10 seconds.	Harness or connectors (The sensor circuit is open or shorted.) DC/DC-J/B

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

1. Under the following conditions, and wait at least 30 seconds.

Power switch	READY
Shift position	Except P range
Parking brake	Released

2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-136, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539156

1.INTERVIEW THE CUSTOMER

Interview the customer to see if there is a history that all of the following conditions are satisfied for a long time.

Power switch	ON
Shift position	Except P range
Parking brake	Released

NOTE:

This DTC may be detected if the above state continues for a long time.

Is the inspection result normal?

YES >> Explain the customer that this is the normal operation.

NO >> GO TO 2.

2.CHECK 12V BATTERY POWER SUPPLY-I

- 1. Turn power switch OFF.
- Check the voltage between IPDM E/R harness connector and ground.

P0A8F 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

+ IPDM E/R		_	Voltage
Connector Terminal			
E14	42	Ground	12V battery voltage

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Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 3.

3.CHECK 12V BATTERY POWER SUPPLY-II

- 1. Disconnect IPDM E/R harness connector (E14).
- 2. Check the voltage between IPDM E/R connector and ground.

+		
IPDM E/R	_	Voltage
Terminal		
42	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 4.

4.CHECK IPDM E/R

- Remove IPDM E/R.
- Check the continuity between IPDM E/R connector terminals.

IPDM E/R		
+	_	Continuity
Terminal		
2	42	Existed

Is the inspection result normal?

YES >> Check 12V battery power supply circuit.

NO >> GO TO 5.

5. CHECK FUSE

- 1. Pull out #43 fuse.
- Check the fuse is not fusing.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Repair or replace error-detected parts.

6. CHECK 12V BATTERY POWER SUPPLY CIRCUIT

- Disconnect VCM harness connector.
- 2. Check the harness for short to ground, between IPDM E/R harness connector and VCM harness connector

+			
IPDM E/R		_	Continuity
Connector	Terminal		
E14	42	Ground	Not Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

P0A8F 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7.dc/dc-J/b output power circuit

- 1. Disconnect DC/DC-J/B terminal (E202).
- 2. Disconnect F/L-A.
- 3. Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

+				
DC/DC-J/B		_	Continuity	
Connector	Terminal			
E202	17	F/L-A terminal	Existed	

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace DC/DC-J/B. Refer to EVC-369, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P0A94 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A94 DC/DC CONVERTER

DTC Logic INFOID:0000000007539157

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	E
P0A94	DC/DC CONVERTER	During READY, the following state continues for 2.5 seconds or more: The VCM power supply voltage is less than 12.48 V and VCM detects a malfunction in the DC/DC converter.	DC/DC-J/B	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-139, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK VCM GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and ground.

+ VCM		_	Continuity
Connector	Terminal		
E61	4		Existed
E01	8	Ground	
E63 —	111		
	112		

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.dc/dc-j/b output power circuit

- Disconnect DC/DC-J/B terminal. 1.
- 2. Disconnect F/L-A.

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Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

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P0A94 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

+			
DC/DC-J/B		_	Continuity
Connector	Terminal		
E202	17	F/L-A terminal	Existed

^{4.} Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO3.

NO >> Repair or replace error-detected parts.

3. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace DC/DC-J/B. Refer to EVC-369, "Removal and Installation".

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

POAAO SYSTEM MAIN RELAY

DTC Logic INFOID:0000000007539159

DTC DETECTION LOGIC

NOTE:

If DTC P0AA0 is displayed with DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD, perform diagnosis for DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	
P0AA0	HYBRID BATT POSITIVE CONTACTOR (System main relay circuit stuck closed)	 A traction motor inverter input voltage is 240 V or more for 9 seconds or more while starting the EV system. A traction motor inverter input voltage is 190 V or more for 1 minute or more while starting the EV system. 	Harness or connectors Battery J/B Traction motor inverter VCM	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

CAUTION:

Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.perform dtc confirmation procedure

(P)With CONSULT

- Turn power switch ON and wait at least 90 seconds.
- Check self-diagnostic result.

Is DTC "P0AA0" detected?

>> Proceed to EVC-141, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 <u>EVC-11</u>, "<u>High Voltage Precautions</u>".

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.
- Erase DTC after the work is completed.

1. CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

Turn power switch ON.

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< DTC/CIRCUIT DIAGNOSIS >

- Disconnect Li-ion battery harness connector.
- Check the voltage between Li-ion battery harness connector and ground.

		+		
Relay	Li-ion battery		_	Voltage
	Connector	Terminal		
System main relay 1		17		
System main relay 2	B24	14	Ground	0 V
Pre-charge relay		11		

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check harness for short to power.

2. PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation". (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

- Disconnect electric compressor high voltage harness connector.
- 2. Check the short circuit between electric compressor terminals.

Electric compressor		
+	_	Resistance
Terminal		
7	8	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.

4. CHECK DC/DC JUNCTION BOX

Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".

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< DTC/CIRCUIT DIAGNOSIS >

2. Check the continuity between DC/DC junction box connector terminals.

DC/DC-J/B		
+	_	Continuity
Terminal		
18	24	Existed

Is the inspection result normal?

YES >> Replace electric compressor. Refer to <u>HA-46, "Removal and Installation"</u>. And then, GO TO 10.

NO >> Replace electric compressor and DC/DC junction box. And then, GO TO 10. Refer to HA-46. "Removal and Installation" (electric compressor), EVC-369. "Removal and Installation" (DC/DC-J/B).

5. CHECK PTC ELEMENTS HEATER

- Disconnect PTC elements heater high voltage harness connector.
- Check the short circuit between PTC elements heater terminals.

PTC elements heater		
+	_	Resistance
Terminal		
7	8	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK DC/DC JUNCTION BOX

- 1. Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- 2. Check the continuity between DC/DC junction box connector terminals.

DC/DC-J/B			
+	_	Continuity	
Teri			
30	24	Existed	

Is the inspection result normal?

YES >> Replace PTC elements heater. Refer to <u>HA-68, "Removal and Installation"</u>. And then, GO TO 10.

NO >> Replace PTC elements heater and DC/DC junction box. And then, GO TO 10. Refer to <u>HA-68</u>. <u>"Removal and Installation"</u> (PTC elements heater), <u>EVC-369</u>. "<u>Removal and Installation</u>" (DC/DC-J/B).

7. CHECK TRACTION MOTOR INVERTER

- 1. Disconnect DC/DC junction box high voltage harness connector (H15).
- 2. Check the short circuit between DC/DC junction box harness connector terminals.

DC/DC-J/B			
Connector	+	_	Resistance
	Terminal		
H15	35	36	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace traction motor inverter. Refer to <u>TMS-116, "Removal and Installation"</u>. And then, GO TO 10.

8.CHECK HIGH VOLTAGE HARNESS

< DTC/CIRCUIT DIAGNOSIS >

- 1. Remove DC/DC junction box.
- 2. Check the short circuit between high voltage harness terminals.

	DC/DC-J/B			
Connected to:	Connector	+	_	Resistance
		Terminal		
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3~\text{k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES-1 (with Li-ion battery heater)>>GO TO 9.

YES-2 (without Li-ion battery heater)>>GO TO 10.

NO >> Replace malfunctioning harness. And then, GO TO 10.

9. CHECK LI-ION BATTERY HEATER CIRCUIT

Check the short circuit between Li-ion battery terminals.

Li-ion battery			
+	_	Resistance	
Terr			
23	24	3 kΩ or more	

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check Li-ion battery heater system.

10. REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2), <u>EVB-648</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-888</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 4).

>> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

POAA1 SYSTEM MAIN RELAY +

DTC Logic

DTC DETECTION LOGIC

WARNING:

 When this DTC is detected, the implementation of the DTC confirmation procedure may damage other parts. To prevent damage from occurring, perform <u>EVC-145</u>, "<u>Diagnosis Procedure</u>" first. After repairing malfunctioning part, perform the DTC confirmation procedure.

• To erase DTC, always repair malfunctioning part first.

NOTE:

- To Clear DTC P0AA1, perform "SPECIFIC DTC CLEAR" in "WORK SUPPORT" of CONSULT. (For VCM other than those in Group A and Group B. For VCM groups, refer to EVC-8, "How to Check VCM Group".)
- If DTC P0AA1 is displayed with DTC P0AA2, P31D4, P31DB, or P31DD, perform diagnosis for DTC P0AA2, P31D4, P31DB, or P31DD.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA1	HYBRID BATT POSITIVE CONTACTOR (System main relay 1 circuit stuck closed)	The voltage of the traction motor inverter is 160 V or more and the voltage does not decreases 100 V or more even after a lapse of the specified time after starting diagnosis.	Harness or connectors Battery J/B Traction motor inverter VCM

DTC CONFIRMATION PROCEDURE

WARNING:

- When this DTC is detected, the implementation of the DTC confirmation procedure may damage other parts. To prevent damage from occurring, perform <u>EVC-145</u>, "<u>Diagnosis Procedure</u>" first. After repairing malfunctioning part, perform the DTC confirmation procedure.
- To erase DTC, always repair malfunctioning part first.

1.PRECONDITIONING

CAUTION:

Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Set the vehicle to READY and perform test drive.
- 2. Turn power switch OFF and wait at least 20 seconds.
- 3. Turn power switch ON.
- 4. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-145, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.

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< DTC/CIRCUIT DIAGNOSIS >

- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.

1. CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

- 1. Turn power switch ON.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check the voltage between Li-ion battery harness connector and ground.

	+			Voltage
Relay	Li-ion battery		_	
	Connector	Terminal		
System main relay 1		17		
System main relay 2	B24	14	Ground	0 V
Pre-charge relay		11		

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check harness for short to power.

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, "Removal and <u>Installation</u>" (TYPE 1), <u>EVB-395</u>, "Removal and <u>Installation</u>" (TYPE 2), <u>EVB-626</u>, "Removal and <u>Installation</u>" (TYPE 4).
- Measure voltage between high voltage harness connector terminals.

DANGER:

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



Standard : 5 V or less

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CAUTION:

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

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

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< DTC/CIRCUIT DIAGNOSIS >

1	Disconnect	Alactric	compressor	high	voltage	harnass	connector
Ι.	Disconnect	electric	Compressor	HIGH	vollage	namess	connector.

2. Check the short circuit between electric compressor terminals.

Electric c					
+	Resistance				
Terr					
7 8		$3 \text{ k}\Omega$ or more			

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK DC/DC JUNCTION BOX

Remove DC/DC junction box. Refer to <u>EVC-369</u>, "Removal and Installation".

2. Check the continuity between DC/DC junction box connector terminals.

DC/E	Continuity
+	
Terr	
18	Existed

Is the inspection result normal?

YES >> Replace electric compressor. Refer to <u>HA-46</u>, "Removal and Installation". And then, GO TO 10.

NO >> Replace electric compressor and DC/DC junction box. And then, GO TO 10. Refer to HA-46. "Removal and Installation" (electric compressor), EVC-369. "Removal and Installation (DC/DC-J/B).

5. CHECK PTC ELEMENTS HEATER

1. Disconnect PTC elements heater high voltage harness connector.

2. Check the short circuit between PTC elements heater terminals.

PTC elem		
+	Resistance	
Teri		
7	3 kΩ or more	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.CHECK DC/DC JUNCTION BOX

Remove DC/DC junction box. Refer to <u>EVC-369</u>, "Removal and Installation".

2. Check the continuity between DC/DC junction box connector terminals.

DC/D		
+	Continuity	
Terr		
30	24	Existed

Is the inspection result normal?

YES >> Replace PTC elements heater. Refer to <u>HA-68, "Removal and Installation"</u>. And then, GO TO 10.

NO >> Replace PTC elements heater and DC/DC junction box. And then, GO TO 10. Refer to <u>HA-68</u>. "Removal and Installation" (PTC elements heater), <u>EVC-369</u>, "Removal and Installation" (DC/DC-J/B)

7.CHECK TRACTION MOTOR INVERTER

< DTC/CIRCUIT DIAGNOSIS >

- 1. Disconnect DC/DC junction box high voltage harness connector (H15).
- 2. Check the short circuit between DC/DC junction box harness connector terminals.

Connector	+	_	Resistance
Connector	Terr	minal	
H15	35	36	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace traction motor inverter. Refer to <u>TMS-116, "Removal and Installation"</u>. And then, GO TO 10

8.CHECK HIGH VOLTAGE HARNESS

- Remove DC/DC junction box.
- 2. Check the short circuit between high voltage harness terminals.

Connected to:	Connector	+	_	Resistance
	Connector	Terminal		l
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3~\text{k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES-1 (with Li-ion battery heater)>>GO TO 9.

YES-2 (without Li-ion battery heater)>>GO TO 10.

NO >> Replace malfunctioning harness. And then, GO TO 10.

9. CHECK LI-ION BATTERY HEATER CIRCUIT

Check the short circuit between Li-ion battery terminals.

Li-ion	Resistance	
+ -		
Terr		
23	24	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check Li-ion battery heater system.

10.REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2), <u>EVB-648</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-888</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 4).

>> GO TO 11.

11. ERASE SELF-DIAGNOSTIC RESULT

(II) With CONSULT

- 1. Reconnect parts and harness connectors disconnected.
- 2. Turn power switch ON.
- 3. Erase the DTC. Refer to EVC-55, "CONSULT Function".

>> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

P0AA2 SYSTEM MAIN RELAY +

DTC Logic INFOID:0000000007539163

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	
P0AA2	HYBRID BATT POSITIVE CONTACTOR (System main relay 1 circuit stuck open)	VCM detects a break in the drive circuit of System main relay 1 or an extremely high resistance for 2.5 seconds or more.	Harness or connectors Battery J/B VCM	1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait a least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-149, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK SYSTEM MAIN RLY GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- Check the continuity between Li-ion battery harness connector and ground.

	+		
Li-ion	battery	_	Continuity
Connector	terminal		
B24	16	Ground	Existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK SYSTEM MAIN RLY CIRCUIT

Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		Continuity
16	17	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-176, "Exploded view" (TYPE 1), EVB-402, "Exploded view" (TYPE 2),

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< DTC/CIRCUIT DIAGNOSIS >

EVB-648, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 3) or EVB-888, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 4).

3. CHECK HARNESS

- 1. Disconnect VCM harness connector.
- 2. Check the continuity between VCM harness connector and Li-ion battery harness connector.

	+		_	
V	СМ	Li-ion	battery	Continuity
Connector	terminal	Connector	terminal	
E63	107	B24	17	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair harness or connector.

< DTC/CIRCUIT DIAGNOSIS >

POAA4 SYSTEM MAIN RELAY -

DTC Logic INFOID:0000000007539165

DTC DETECTION LOGIC

NOTE:

If DTC P0AA4 is displayed with DTC P0AA5 or P31DC, perform diagnosis for DTC P0AA5 or P31DC.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA4	HYBRID BATT POSITIVE CONTACTOR (System main relay 2 circuit stuck closed)	During the stop state from READY or charging state, the voltage of the traction monitor inverter is 100 V or more.	Harness or connectors Battery J/B Traction motor inverter VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

CAUTION:

Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Set the vehicle to READY.
- Turn power switch OFF and wait at least 60 seconds.
- Turn power switch ON.
- 4. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-151, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

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
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "High Voltage Precautions".

- 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.
- Erase DTC after the work is completed.

 ${f 1}$.CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

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< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn power switch ON.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check the voltage between Li-ion battery harness connector and ground.

	+				
Relay	Li-ion battery		-	Voltage	
	Connector	Terminal			
System main relay 1		17			
System main relay 2	B24	14	Ground	0 V	
Pre-charge relay		11			

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check harness for short to power.

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or <u>EVB-866</u>, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector terminals.

DANGER:

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



Standard : 5 V or less

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CAUTION:

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

>> GO TO 3.

3. CHECK ELECTRIC COMPRESSOR

- 1. Disconnect electric compressor high voltage harness connector.
- 2. Check the short circuit between electric compressor terminals.

Electric compressor		
+ -		Resistance
Terminal		
7	8	$3~\text{k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.

4. CHECK DC/DC JUNCTION BOX

< DTC/CIRCUIT DIAGNOSIS >

- Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- Check the continuity between DC/DC junction box connector terminals.

DC/DC-J/B Continuity Terminal 18 24 Existed

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Is the inspection result normal?

NO

>> Replace electric compressor. Refer to HA-46, "Removal and Installation". And then, GO TO 10.

>> Replace electric compressor and DC/DC junction box. And then, GO TO 10. Refer to HA-46, "Removal and Installation" (electric compressor), EVC-369, "Removal and Installation" (DC/DC-J/

5.CHECK PTC ELEMENTS HEATER

- Disconnect PTC elements heater high voltage harness connector.
- 2. Check the short circuit between PTC elements heater terminals.

PTC elements heater + Resistance Terminal $3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.CHECK DC/DC JUNCTION BOX

- Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- Check the continuity between DC/DC junction box connector terminals.

DC/DC-J/B		
+	_	Continuity
Teri		
30	24	Existed

Is the inspection result normal?

YES >> Replace PTC elements heater. Refer to <u>HA-68, "Removal and Installation"</u>. And then, GO TO 10. NO

>> Replace PTC elements heater and DC/DC junction box. And then, GO TO 10. Refer to HA-68. "Removal and Installation" (PTC elements heater), EVC-369, "Removal and Installation" (DC/DC-J/B).

.CHECK TRACTION MOTOR INVERTER

- Disconnect DC/DC junction box high voltage harness connector (H15).
- Check the short circuit between DC/DC junction box harness connector terminals.

DC/DC-J/B			
Connector	+	_	Resistance
Connector	Terr	minal	
H15	35	36	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation". And then, GO TO

8.CHECK HIGH VOLTAGE HARNESS

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< DTC/CIRCUIT DIAGNOSIS >

- 1. Remove DC/DC junction box.
- 2. Check the short circuit between high voltage harness terminals.

Connected to:	Connector	+	_	Resistance
	Terminal		l	
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3~\text{k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES-1 (with Li-ion battery heater)>>GO TO 9.

YES-2 (without Li-ion battery heater)>>GO TO 10.

NO >> Replace malfunctioning harness. And then, GO TO 10.

9. CHECK LI-ION BATTERY HEATER CIRCUIT

Check the short circuit between Li-ion battery terminals.

Li-ion battery		
+ -		Resistance
Terr		
23	24	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check Li-ion battery heater system.

10. REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2) <u>EVB-648</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-888</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 4).

>> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

POAA5 SYSTEM MAIN RELAY -

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	
P0AA5	HYBRID BATT NEGATIVE CONTACTOR (System main relay 2 circuit stuck open)	VCM detects a break in the drive circuit of the system main relay or an extremely high resistance for 2.5 seconds or more when the F/S relay is ON with the system main relay OFF.	Harness or connectors Battery J/B VCM	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON wait at least 10 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-155, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK SYSTEM MAIN RLY GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check the continuity between Li-ion battery harness connector and ground.

+			
Li-ion battery		_	Continuity
Connector	terminal		
B24	13	Ground	Existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK SYSTEM MAIN RLY CIRCUIT

Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		Continuity
13	14	Existed

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-176, "Exploded view" (TYPE 1), EVB-402, "Exploded view" (TYPE 2),

< DTC/CIRCUIT DIAGNOSIS >

EVB-648, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 3) or EVB-888, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 4).

3. CHECK HARNESS

- 1. Disconnect VCM harness connector.
- 2. Check the continuity between VCM harness connector and Li-ion battery harness connector.

+		_		
VCM		Li-ion battery		Continuity
Connector	terminal	Connector	terminal	
E63	110	B24	14	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair harness or connector.

< DTC/CIRCUIT DIAGNOSIS >

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

Description INFOID:0000000007539169

Li-ion battery is equipped with the IR (Insulation resistance) sensing system. VCM receives the IR sensor signal sent from Li-ion battery controller and monitors the insulation resistance of the high voltage circuit.

DTC Logic

DTC DETECTION LOGIC

NOTE:

DTC "P0AA6" is not detected when insulation resistance decreases between quick charge relay and quick charge port. In this case, insulation check performed by the quick charger becomes NG, resulting in no implementation of quick charge.

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA6	HYBRID BATT VOLT SYS ISOLATION (High voltage circuit insula- tion is low)	VCM detects a insulation resistance calculated based on IR sensor signal sent from Li-ion battery is 380 $k\Omega$ or less.	High voltage harness or connectors Electric compressor PTC elements heater Traction motor On-board charger Li-ion battery DC/DC J/B

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 80 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

1. Maintain the following conditions for at least 75 seconds.

Power switch	READY
Shift position	P range
A/C set temperature	Full cold

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-III

(P)With CONSULT

1. Maintain the following conditions for at least 75 seconds.

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Power switch	READY
Shift position	P range
A/C set temperature	Full hot

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-IV

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Perform normal charging (charge status indicator is ON) at least 50 seconds.
- 3. Turn power switch ON.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO-1(with Li-ion battery heater)>>GO TO 6.

NO-2 (without Li-ion battery heater)>>INSPECTION END

6.PERFORM DTC CONFIRMATION PROCEDURE-V

- Perform component function check of Li-ion battery heater. Refer to <u>EVC-158</u>, "Component Function <u>Check"</u>.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO >> INSPECTION END

Component Function Check

INFOID:0000000007539171

1. PERFORM LI-ION BATTERY HEATER CIRCUIT INSULATION CHECK

(P)With CONSULT

- 1. Turn power switch ON.
- 2. On the CONSULT screen, select "HV BAT" >> "ACTIVE TEST" >> "HEATER RELAY UNIT".
- Turn ON the heater relay unit and wait at least 35 seconds.
- Check self-diagnostic result in "EV/HEV".

Is DTC detected?

YES >> Proceed to EVC-158, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539172

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 <u>EVC-11</u>, "<u>High Voltage Precautions</u>".

< DTC/CIRCUIT DIAGNOSIS >

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.
- Erase DTC after the work is completed.

1.CHECK HIGH VOLTAGE PART

- Turn power switch OFF.
- Visually check that there is no damage in each high voltage part.

Is the inspection result normal?

YES >> GO TO 2

NO >> Repair or replace the error-detected part.

2.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-I

With CONSULT

- Turn power switch ON.
- Check "VCM MODE" of freeze frame data to identify the mode where "P0AA6" is detected.

At which mode is "P0AA6" detected?

Normal charge mode>>GO TO 3.

Other than normal charge mode>>GO TO 9.

3.perform dtc confirmation procedure again (normal charging)

- 1. Erase DTC.
- 2. Perform normal charging (charge status indicator is ON) at least 50 seconds.
- Turn power switch ON.
- Check DTC.

Is DTC "P0AA6" detected again?

YES >> GO TO 4.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

4.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169. "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPÈ 3) or EVB-866, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 5.

 ${f 5.}$ CHECK INSULATION RESISTANCE OF ON-BOARD CHARGER-I

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< DTC/CIRCUIT DIAGNOSIS >

Check insulation resistance of on-board charger. Refer to VC-102, "Component Insulation Resistance Check". CAUTION:

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 6.

6.CHECK INSULATION RESISTANCE OF ON-BOARD CHARGER-II

- 1. Disconnect on-board charger high voltage harness connector (H6).
- 2. Check insulation resistance of on-board charger. Refer to VC-102, "Component Insulation Resistance Check".

CAUTION:

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace on-board charger. Refer to <u>VC-112, "Removal and Installation"</u>.

7.CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS-I

- 1. Disconnect normal charge port high voltage harness connector (H8).
- Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester), between normal charge port and on-board charger.

WARNING:

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely.

CAUTION:

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

+			
On-board charger		_	Resistance
Connector	Terminal		
	34		
H6	35	Ground	∞ Ω
	36		

Is the inspection result normal?

YES >> Replace normal charge port. Refer to VC-122, "Removal and Installation".

NO >> Replace high voltage harness.

8.CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS-II

- 1. Disconnect DC/DC junction box high voltage harness connector (H7).
- 2. Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester), between DC/DC junction box and on-board charger.

WARNING:

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely.

CAUTION:

< DTC/CIRCUIT DIAGNOSIS >

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

+			
On-board charger		_	Resistance
Connector	Terminal		
H7	27	Ground	∞ Ω
П/	28	Giodila	ω 52

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Is the inspection result normal?

YES >> Replace normal charge port. Refer to <u>VC-122, "Removal and Installation"</u>.

NO >> Replace high voltage harness.

$oldsymbol{9}.$ IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-II

(P)With CONSULT

1. Maintain the following conditions for at least 75 seconds.

Power switch	READY
Shift position	P range
A/C switch	OFF

Check DTC.

Is DTC "POAA6" detected?

YES >> GO TO 10.

NO >> GO TO 17.

10.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-III

(P)With CONSULT

- Erase DTC.
- 2. Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON and wait at least 35 seconds.
- Check DTC.

Is DTC "POAA6" detected again?

>> Perform Li-ion battery insulation resistance loss check. Refer to EVB-154, "Component Inspection" (without Li-ion battery heater), EVB-377, "Component Inspection" (with Li-ion battery heater). NO-1 (with Li-ion battery heater)>>GO TO 11.

NO-2 (without Li-ion battery heater)>>GO TO 12.

11.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-IV

- Perform component function check of Li-ion battery heater. Refer to EVC-158, "Component Function Check".
- Check DTC.

Is DTC "POAA6" detected again?

YES >> Check Li-ion battery heater routing circuit. Refer to EVB-387, "Diagnosis Procedure" (TYPE 2) or EVB-858, "Diagnosis Procedure" (TYPE 4).

NO >> GO TO 12.

12. PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).

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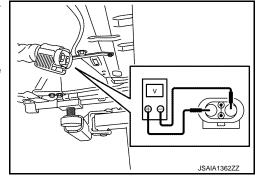
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 4).
- 3. Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 13.

13. CHECK INSULATION RESISTANCE OF ELECTRIC COMPRESSOR

Check insulation resistance of electric compressor. Refer to HAC-132, "Component Inspection". CAUTION:

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Replace electric compressor. Refer to HA-46, "Removal and Installation".

14.CHECK INSULATION RESISTANCE OF PTC ELEMENTS HEATER

Check insulation resistance of PTC elements heater. Refer to <u>HAC-134, "Component Inspection"</u>. **CAUTION:**

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 15.

NO >> Replace PTC elements heater. Refer to <u>HA-68</u>, "Removal and Installation".

15. CHECK INSULATION RESISTANCE OF TRACTION MOTOR INVERTER

Check insulation resistance of traction motor inverter. Refer to <u>TMS-113, "Component Inspection"</u>. CAUTION:

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 16.

NO >> Replace traction motor inverter. Refer to <u>TMS-116, "Removal and Installation"</u>.

16. CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS-III

- 1. Remove traction motor inverter. Refer to TMS-116, "Removal and Installation".
- 2. Remove DC/DC junction box.
- 3. Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester).

WARNING:

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is

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the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely.

CAUTION:

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

Connected to:		+		Resistance	E
Connected to.	Connector	Terminal	_	Nesistance	
Li ion hattan	H4	24			
Li-ion battery	П4	25			
Electric compressor	H2	18	Ground	$\infty \Omega$	
Electric compressor	П2	19	Ground	∞ 22	
PTC elements heater	H9	30			
	119	31			

Is the inspection result normal?

YES >> Replace DC/DC junction box. Refer to EVC-369, "Removal and Installation".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

17.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-V

(P)With CONSULT

Maintain the following conditions for at least 75 seconds.

Power switch	READY
Shift position	P range
A/C set temperature	Full cold

Check DTC.

Is DTC "P0AA6" detected?

YES >> GO TO 18.

NO >> GO TO 20.

18. CHECK REFRIGERANT GAS

Interview the customer and check maintenance records to see if there is the possibility that coolant a gas other than EV specific refrigerant gas is mixed in A/C refrigerant gas.

NOTE:

If A/C refrigerant gas other than EV specific refrigerant gas is used, insulation resistance may decrease.

Is the inspection result normal?

YES >> GO TO 19.

NO >> Change refrigerant gas and compressor oil.

19.perform dtc confirmation procedure again (electric compressor)

With CONSULT

- Erase DTC.
- Turn power switch OFF and wait at least 20 seconds.
- Maintain the following conditions for at least 75 seconds.

Power switch	READY
Shift position	P range
A/C set temperature	Full cold

Check DTC.

Is DTC "P0AA6" detected again?

YES >> Replace electric compressor. Refer to HA-46, "Removal and Installation".

>> Check intermittent incident. Refer to GI-51, "Intermittent Incident". NO

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20.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION-VI

(P)With CONSULT

1. Maintain the following conditions for at least 75 seconds.

Power switch	READY
Shift position	P range
A/C set temperature	Full hot

2. Check DTC.

Is DTC "P0AA6" detected?

YES >> Replace PTC elements heater. Refer to <u>HA-68</u>, "Removal and Installation".

NO >> GO TO 21.

21. PERFORM TEST DRIVE

- 1. Continue driving for 35 seconds or more at 11 km/h (7 MPH) or more.
- 2. Check DTC.

Is DTC "P0AA6" detected?

YES >> GO TO 22.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

22. CHECK INSULATION RESISTANCE OF TRACTION MOTOR

Check insulation resistance of traction motor. Refer to <u>TMS-111</u>, "<u>Component Inspection</u>". Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace the traction motor. Refer to TMS-124, "Removal and Installation".

< DTC/CIRCUIT DIAGNOSIS >

P1550, P1551, P1552 BATTERY CURRENT SENSOR

DTC Logic INFOID:0000000007539173

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1550	BATTERY CURRENT SEN- SOR (Battery current sensor circuit range/performance)	The output voltage of the battery current sensor remains within the specified range during READY or charging.	
P1551	BATTERY CURRENT SEN- SOR (Battery current sensor circuit low input)	An excessively low voltage from the sensor is sent to VCM.	Harness or connectors (Battery current sensor circuit is open or shorted.) Battery current sensor
P1552	BATTERY CURRENT SEN- SOR (Battery current sensor circuit high input)	An excessively high voltage from the sensor is sent to VCM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.perform dtc confirmation procedure-i

- Turn power switch ON and wait at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-165, "Diagnosis Procedure".

NO >> GO TO 3.

3.perform dtc confirmation procedure-ii

- Turn power switch OFF and wait at least 20 seconds.
- Maintain the following conditions for at least 60 seconds. 2.

Power switch	READY
Selector lever	P range
Brake pedal	Fully released
Ambient air temperature	10°C (50°F) or more

3. Check self-diagnostic result.

Is DTC detected?

>> Proceed to EVC-165, "Diagnosis Procedure". YFS

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-I

Turn power switch OFF.

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< DTC/CIRCUIT DIAGNOSIS >

- 2. Disconnect battery current sensor harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between battery current sensor harness connector terminals.

В			
Connector	+	_	Voltage (Approx.)
Connector	Terr	minal	
E66	1	5 V	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 2.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-II

Check the voltage between battery current sensor harness connector and ground.

	+		V 16
Battery current sensor		_	Voltage (Approx.)
Connector	Terminal		()
E66	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 5.

3.CHECK VCM GROUND CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between VCM harness connector and ground.

+				
VCM		_	Continuity	
Connector	Terminal			
E61	4		Existed	
LOT	8	Ground		
E63	111	Giodila	LXISTEG	
203	112			

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Check the continuity between battery current sensor harness connector and VCM harness connector.

,	+			
Battery cur	rent sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	3	E62	43	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

5. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

- 1. Turn power switch OFF.
- Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and battery current sensor harness connector.

	_		+			
Battery cui	rent sensor	VCM		VCM		Continuity
Connector	Terminal	Connector	Terminal			
E66	1	E62	41	Existed		

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

V	CM	Sensor		
Connector	Terminal	Name	Connector	Terminal
E62	33	Refrigerant pressure sensor	E49	3
LUZ	37	Accelerator pedal position sensor	E101	4

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-113, "VCM: Diagnosis Pro-

NO >> Repair or replace error-detected parts.

.CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

	+		_	
Battery cui	rent sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	4	E62	42	Existed

Also check harness for short to ground and to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts

$oldsymbol{\mathsf{S}}.$ CHECK BATTERY CURRENT SENSOR

Check the battery current sensor. Refer to <a>EVC-167, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

>> Replace battery current sensor. Refer to PG-110, "Removal and Installation". NO

Component Inspection

1. CHECK BATTERY CURRENT SENSOR

- Turn ignition switch OFF.
- 2. Reconnect harness connectors disconnected.
- Disconnect battery negative cable.

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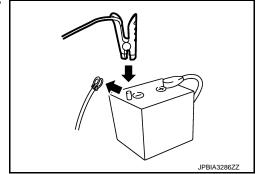
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< DTC/CIRCUIT DIAGNOSIS >

- Install jumper cable between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between VCM harness connector terminals.

	V/ L		
Connector	-	Voltage (Approx.)	
Connector	Terminal		(11 -)
E62	42 (Battery current sensor signal)	43	2.5 V



Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-103, "How to Handle 12V Battery".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery current sensor. Refer to PG-110, "Removal and Installation".

< DTC/CIRCUIT DIAGNOSIS >

P1554 BATTERY CURRENT SENSOR

DTC Logic INFOID:0000000007539176

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1554	BATTERY CURRENT SEN- SOR (Battery current sensor perfor- mance)	The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough.	or shorted)

DTC CONFIRMATION PROCEDURE

1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EVC-169, "Component Function Check".

NOTE:

Use component function check to check the overall function of the battery current sensor circuit. During this check, a DTC might not be confirmed.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EVC-169, "Diagnosis Procedure".

Component Function Check

1.PRECONDITIONING

TESTING CONDITION:

- Before performing the following procedure, confirm that battery voltage is more than 12.8 V while power switch ON.
- Before performing the following procedure, confirm that all load switches and A/C switch are turned OFF.

>> GO TO 2.

2.perform component function check

- Turn power switch ON.
- Check the voltage between VCM harness connector terminals.

Connector	+ -		Voltage
Connector	Terminal	Terminal	
E62	42 (Battery current sensor signal)	43	Above 2.3 V at least once

Is the inspection result normal?

YES >> INSPECTION END

>> Proceed to EVC-169, "Diagnosis Procedure". NO

Diagnosis Procedure

1. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-I

- 1. Turn power switch OFF.
- 2. Disconnect battery current sensor harness connector.
- Turn power switch ON.

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< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between battery current sensor harness connector terminals.

В	Maltana		
Connector	+	_	Voltage (Approx.)
Connector	Terr	minal	
E66	1	5 V	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 2.

2. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-II

Check the voltage between battery current sensor harness connector and ground.

	+		Maltana
Battery current sensor		_	Voltage (Approx.)
Connector	Connector Terminal		(11 - 7
E66	1	Ground	5 V

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 5.

${f 3.}$ CHECK VCM GROUND CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between VCM harness connector and ground.

+				
VCM		_	Continuity	
Connector	Terminal			
E61	4			
LOT	8	Ground	Existed	
E63	111	Glound	LXISTEG	
	112			

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Check the continuity between battery current sensor harness connector and VCM harness connector.

	+		_	
Battery cur	rent sensor	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E66	3	E62	43	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

5. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.

< DTC/CIRCUIT DIAGNOSIS >

- Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and battery current sensor harness connector.

	_		+	
Battery cur	rent sensor	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E66	1	E62	41	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

$\mathsf{6}.$ CHECK SENSOR POWER SUPPLY CIRCUIT

Check harness for short to power and short to ground, between the following terminals.

VCM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E62	33	Refrigerant pressure sensor	E49	3
	37	Accelerator pedal position sensor	E101	4

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-113, "VCM: Diagnosis Pro-

NO >> Repair or replace error-detected parts.

7.check battery current sensor input signal circuit

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

	+		_	
Battery cui	rent sensor	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E66	4	E62	42	Existed

Also check harness for short to ground and to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts

8.CHECK BATTERY CURRENT SENSOR

Check the battery current sensor. Refer to EVC-171, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace battery current sensor. Refer to PG-110, "Removal and Installation".

Component Inspection

1. CHECK BATTERY CURRENT SENSOR

- Turn ignition switch OFF.
- Reconnect harness connectors disconnected.
- Disconnect battery negative cable.

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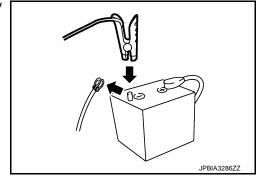
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< DTC/CIRCUIT DIAGNOSIS >

- Install jumper cable between battery negative terminal and body ground.
- 5. Turn ignition switch ON.
- 6. Check the voltage between VCM harness connector terminals.

	Voltage (Approx.)		
Connector	Connector + -		
Connector	(11 /		
E62	42 (Battery current sensor signal)	43	2.5 V



Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-103, "How to Handle 12V Battery".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery current sensor. Refer to PG-110, "Removal and Installation".

P1556, P1557 BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1556, P1557 BATTERY TEMPERATURE SENSOR

DTC Logic INFOID:0000000007539180

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INFOID:0000000007539181

DTC DETECTION LOGIC

NOTE:

If DTC P1556 or P1557 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1556	BATTERY TEMPERATURE SENSOR (Battery temperature sensor cir- cuit low input)	Signal voltage from Battery temperature sensor remains 0.16V or less for 5 seconds or more.	Harness or connectors [Battery current sensor (Battery temperature sensor) circuit is shorted.]
P1557	BATTERY TEMPERATURE SENSOR (Battery temperature sensor cir- cuit high input)	Signal voltage from Battery temperature sensor remains 4.84V or more for 5 seconds or more.	Battery current sensor (Battery tem-

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-173, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY

- Turn power switch OFF.
- Disconnect battery current sensor harness connector.
- Turn power switch ON.
- Check the voltage between battery current sensor harness connector and ground.

	+		\/altaga	
Battery current sensor		_	Voltage (Approx.)	
Connector	Connector Terminal		(, , , , , , , , , , , , , , , , , , ,	
E66	2	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- Turn ignition switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

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P1556, P1557 BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

+		-	_	
Battery curr	ent sensor	V	CM	Continuity
Connector	Terminal	Connector	Terminal	
E66	2	E62	50	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-113, "VCM: Diagnosis Pro-

NO >> Repair or replace error-detected parts.

3.CHECK BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

- Turn ignition switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

+			_	
Battery curr	ent sensor	V	CM	Continuity
Connector	Terminal	Connector	Terminal	
E66	3	E62	43	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BATTERY TEMPERATURE SENSOR

Check the battery temperature sensor. Refer to EVC-174, "Component Inspection".

Is the inspection result normal?

YES

>> Check intermittent incident. Refer to <u>GI-51, "Intermittent Incident"</u>.
>> Replace battery current sensor. Refer to <u>PG-110, "Removal and Installation"</u>. NO

Component Inspection

INFOID:0000000007539182

1. CHECK BATTERY TEMPERATURE SENSOR

- Turn power switch OFF.
- Disconnect battery current sensor harness connector.
- Check the resistance between battery current sensor connector terminals.

Battery cur	rent sensor			
+	-	Condition	Resistance	
Terr	ninal			
2	3	Temperature: 25°C (77°F)	1.9 – 2.1 kΩ	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery current sensor. Refer to PG-110, "Removal and Installation".

P155A BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P155A BATTERY TEMPERATURE SENSOR

DTC Logic INFOID:0000000007539183

DTC DETECTION LOGIC

NOTE:

If DTC P155A is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P155A	BATTERY TEMPERATURE SENSOR (Battery temperature sensor cir- cuit range/performance)	A ambient temperature of 12V battery remains 50°C (122°F) or more for 10 seconds or more.	Harness or connectors [Battery current sensor (Battery temperature sensor) circuit is shorted.] Battery current sensor (Battery temperature sensor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

1. Drive the vehicle under the following conditions.

Coolant temperature	20°C (68°F)
Vehicle speed	20 km/h (13 MPH) or more

Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-175. "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY

- Turn power switch OFF.
- 2. Disconnect battery current sensor harness connector.
- Turn power switch ON.
- Check the voltage between battery current sensor harness connector and ground.

Battery cui	rent sensor	-	Voltage (Approx.)	
Connector	Terminal		(,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
E66	2	Ground	5 V	

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 2.

2.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

- 1. Turn ignition switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

EVC-175 Revision: 2014 June 2011 LEAF

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P155A BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

+		-	_	
Battery current sensor		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	2	E62	50	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-113, "VCM: Diagnosis Pro-

NO >> Repair or replace error-detected parts.

3.CHECK BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

- Turn ignition switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

+	·	-	_	
Battery current sensor		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	3	E62	43	Existed

4. Also check harness for short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK BATTERY TEMPERATURE SENSOR

Check the battery temperature sensor. Refer to EVC-176, "Component Inspection".

Is the inspection result normal?

YES

>> Check intermittent incident. Refer to <u>GI-51, "Intermittent Incident"</u>.
>> Replace battery current sensor. Refer to <u>PG-110, "Removal and Installation"</u>. NO

Component Inspection

INFOID:0000000007539185

1. CHECK BATTERY TEMPERATURE SENSOR

- Turn power switch OFF.
- Disconnect battery current sensor harness connector.
- Check the resistance between battery current sensor connector terminals.

Battery current sensor			
+	_	Condition	Resistance
Terminal			
2	3	Temperature: 25°C (77°F)	1.9 – 2.1 kΩ

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery current sensor. Refer to PG-110, "Removal and Installation".

P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1564 ASCD STEERING SWITCH

DTC Logic INFOID:0000000007539186

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1564	ASCD SWITCH (ASCD steering switch)	 An excessively high voltage signal from the ASCD steering switch is sent to VCM. VCM detects that input signal from the ASCD steering switch is out of the specified range. VCM detects that the ASCD steering switch is stuck ON. 	Harness or connectors (The switch circuit is open or shorted.) ASCD steering switch VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power ON and wait at least 10 seconds.
- 2. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 3. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 sec-
- Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-177, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK ASCD STEERING SWITCH CIRCUIT

(P) With CONSULT

- Turn power switch ON.
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "ASCD CANCEL SW", "RESUME/ ACC SW", and "ASCD SET SW".
- Check each item indication under the following conditions.

Monitor item	Condition		Indication
ASCD CANCEL	CANCEL switch	Pressed	ON
SW	OANOLL SWIGH	Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE	Pressed	ON
RESOME/ACC SW	switch	Released	OFF
ASCD SET SW	SET/COAST switch	Pressed	ON
ACCE CET OW	OL 1700/101 SWITCH	Released	OFF

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.check ascd steering switch ground circuit

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P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn power switch OFF.
- Disconnect VCM harness connector.
- 3. Disconnect combination switch harness connector.
- 4. Check the continuity between combination switch and VCM harness connector.

+			_	
Combination switch		VCM		Continuity
Connector	Terminal	Connector	Terminal	
M302	16	E63	108	Existed

5. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.check ascd steering switch input signal circuit

1. Check the continuity between combination switch and VCM harness connector.

+			_	
Combination switch		VCM		Continuity
Connector	Terminal	Connector	Terminal	
M302	13	E63	104	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK ASCD STEERING SWITCH

Refer to EVC-178, "Component Inspection (ASCD STEERING SWITCH)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace ASCD steering switch. Refer to SR-19, "Exploded View".

Component Inspection (ASCD STEERING SWITCH)

INFOID:0000000007539188

1. CHECK ASCD STEERING SWITCH

- Turn power switch OFF.
- Disconnect combination switch (spiral cable) harness connector.
- 3. Check resistance between combination switch (spiral cable) harness connector terminals under the following conditions.

Combination switch		Condition	Posistanos (O)	
Connector	Terminals	Condition	Resistance (Ω)	
M302	13 and 16	ASCD main switch: Pressed	Approx. 0	
		CANCEL switch: Pressed	Approx. 250	
		SET/COAST switch: Pressed	Approx. 660	
		RESUME/ACCELERATE switch: Pressed	Approx. 1,480	
		All ASCD steering switches: Released	Approx. 4,000	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD steering switch. Refer to SR-19, "Exploded View".

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1572 ASCD BRAKE SWITCH

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DTC DETECTION LOGIC

Trouble diagnosis name (Trouble diagnosis content)		DTC detecting condition	Possible cause	EVC
P1572 ASCD BRAKE SWITCH (ASCD brake switch)	Α	When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the VCM at the same time.	Harness or connectors (The stop lamp switch circuit is shorted.) Harness or connectors	D
	В	ASCD brake switch signal is not sent to VCM for extremely long time while the vehicle is being driven.	 (The ASCD brake switch circuit is shorted.) Stop lamp switch ASCD brake switch Incorrect stop lamp switch installation Incorrect ASCD brake switch in- 	E
	(Trouble diagnosis content) ASCD BRAKE SWITCH	(Trouble diagnosis content) A ASCD BRAKE SWITCH (ASCD brake switch)	(Trouble diagnosis content) A When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the VCM at the same time. ASCD BRAKE SWITCH (ASCD brake switch) ASCD brake switch signal is not sent to VCM for extremely long time while the vehicle is be-	(Trouble diagnosis content) A When the vehicle speed is above 30 km/h (19 MPH), ON signals from the stop lamp switch and the ASCD brake switch are sent to the VCM at the same time. ASCD BRAKE SWITCH (ASCD brake switch) ASCD brake switch signal is not sent to VCM for extremely long time while the vehicle is being driven. Possible cause • Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The ASCD brake switch circuit is shorted.) • Stop lamp switch • ASCD brake switch • Incorrect stop lamp switch installation

DTC CONFIRMATION PROCEDURE

NOTE:

The procedure for malfunction B is not described. It takes an extremely long time to complete the procedure for malfunction B. By performing the procedure for malfunction A, the condition that causes malfunction B can be detected.

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON (VDC switch OFF).
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "VEHICLE SPEED" and "GEAR POSITION".
- 3. Press ASCD MAIN switch and check that CRUISE lamp illuminates.
- Drive the vehicle for at least 5 consecutive seconds under the following conditions.
 CAUTION:

Always drive vehicle at a safe speed.

VEHICLE SPEED	More than 30 km/h (19 MPH)
GEAR POSITION	D or R

5. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-180, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

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

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P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

VEHICLE SPEED	More than 30 km/h (19 MPH)
GEAR POSITION	D or R
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-180, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539190

1. CHECK OVERALL FUNCTION-I

(II) With CONSULT

- Turn power switch ON.
- 2. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "ASCD BRAKE SW".
- 3. Check "ASCD BRAKE SW" indication under the following conditions.

Monitor item	Condition		Indication
ASCD BRAKE SW Brake pedal	Brake pedal	Slightly de- pressed	OFF
	Fully released	ON	

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 2.

2. CHECK ASCD BRAKE SWITCH POWER SUPPLY

- 1. Turn power switch OFF.
- Disconnect ASCD brake switch harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between ASCD brake switch harness connector and ground.

+			
ASCD brake switch		_	Voltage
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.check ascd brake switch power supply circuit

- 1. Turn power switch OFF.
- 2. Pull out #3 fuse.
- 3. Check the continuity between ASCD brake switch harness connector and fuse terminal.

+			
ASCD brake switch		_	Continuity
Connector	Terminal		
E112	1	#3 fuse terminal	Existed

Also check harness for short to ground.

Is the inspection result normal?

< DTC/CIRCUIT DIAGNOSIS >

YES >> Check power supply circuit for power ON power supply.

NO >> Repair or replace error-detected parts.

4. CHECK ASCD BRAKE SWITCH SIGNAL

- Turn power switch OFF.
- 2. Reconnect ASCD brake switch harness connector.
- Disconnect VCM harness connector. 3.
- Turn power switch ON.

NOTE:

Brake pedal is fully released.

5. Check the voltage between VCM harness connector and ground.

	+			
VCM		_	Voltage	
Connector	Terminal			
E61	15	Ground	Battery voltage	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 5.

${f 5.}$ CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

Turn ignition switch OFF.

- Disconnect ASCD brake switch harness connector.
- Check the continuity between ASCD brake switch harness connector and VCM harness connector.

	+		_	
ASCD bra	ake switch	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E61	15	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK ASCD BRAKE SWITCH

Refer to EVC-183, "Component Inspection (ASCD Brake Switch)"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace ASCD brake switch. Refer to BR-251, "Exploded View".

7.CHECK OVERALL FUNCTION-II

(P) With CONSULT

Select "STOP LAMP SW" and check indication under the following conditions.

Monitor item	Condition		Indication
STOP LAMP		Slightly de- pressed	ON
OVV		Fully released	OFF

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 8.

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8.CHECK STOP LAMP SWITCH POWER SUPPLY

Turn power switch OFF.

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< DTC/CIRCUIT DIAGNOSIS >

- 2. Disconnect stop lamp switch harness connector.
- Check the voltage between stop lamp switch harness connector and ground.

+			
Stop lamp switch		_	Voltage
Connector	Terminal		
E102	1	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

- Pull out #38 fuse.
- Check the continuity between stop lamp switch harness connector and fuse terminal.

+			
Stop lamp switch		_	Continuity
Connector	Terminal		
E102	1	#38 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check power supply circuit for battery power supply.

NO >> Repair or replace error-detected parts.

10. CHECK STOP LAMP SWITCH SIGNAL

- 1. Turn power switch OFF.
- 2. Reconnect stop lamp switch harness connector.
- 3. Disconnect VCM harness connector.
- 4. Depress the brake pedal.
- 5. Check the voltage between VCM harness connector and ground.

+ VCM		-	Voltage
Connector	Terminal		
E61	18	Ground	Battery voltage

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 11.

11. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

- 1. Disconnect stop lamp switch harness connector.
- 2. Check the continuity between stop lamp switch harness connector and VCM harness connector.

+			_	
Stop lan	np switch	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E112	2	E61	18	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace error-detected parts.

< DTC/CIRCUIT DIAGNOSIS >

12. CHECK STOP LAMP SWITCH

Refer to EVC-183, "Component Inspection (Stop Lamp Switch)"

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace stop lamp switch. Refer to <u>BR-251, "Exploded View"</u>.

Component Inspection (ASCD Brake Switch)

INFOID:0000000007539191

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1.CHECK ASCD BRAKE SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect ASCD brake switch harness connector.
- 3. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
		Fully released	Existed
1 and 2	Brake pedal	Slightly de- pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2.CHECK ASCD BRAKE SWITCH-II

- 1. Adjust ASCD brake switch installation. Refer to BR-252, "Inspection and Adjustment".
- Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
		Fully released	Existed
1 and 2	Brake pedal	Slightly de- pressed	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace ASCD brake switch. Refer to <u>BR-251</u>, "Exploded View".

Component Inspection (Stop Lamp Switch)

INFOID:0000000007539192

1. CHECK STOP LAMP SWITCH-I

- 1. Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
i and 2	brake pedar	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 2.

2. CHECK STOP LAMP SWITCH-II

- 1. Adjust stop lamp switch installation. Refer to BR-252, "Inspection and Adjustment".
- 2. Check the continuity between stop lamp switch terminals under the following conditions.

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< DTC/CIRCUIT DIAGNOSIS >

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
i aliu z		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to <u>BR-251, "Exploded View"</u>.

P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1574 ASCD VEHICLE SPEED SENSOR

Description INFOID:0000000007539193

The VCM receives two vehicle speed sensor signals via CAN communication. One is sent from the electrically-driven intelligent brake unit, and the other is from the traction motor inverter (motor speed signal). The VCM uses these signals for ASCD control. Refer to EVC-50, "AUTOMATIC SPEED CONTROL DEVICE (ASCD): System Description for ASCD functions.

DTC Logic INFOID:0000000007539194

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1574	ASCD VEHICLE SPEED SENSOR (ASCD vehicle speed sen- sor)	The difference between the two vehicle speed signals is out of the specified range.	Electrically-driven intelligent brake unit Traction motor VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2 PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Set the vehicle to READY.
- Push the VDC OFF switch to stop the VDC control.
- 3. Drive the vehicle at more than 40 km/h (25 MPH).

CAUTION:

Always drive vehicle at a safe speed.

4. Check self-diagnostic result.

Is DTC detected?

>> Proceed to EVC-185, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK DTC IN TRACTION MOTOR INVERTER

Check DTC in traction motor inverter.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check the DTC. Refer to TMS-36. "DTC Index".

2.check dtc in electrically-driven intelligent brake unit

Check DTC in electrically-driven intelligent brake unit.

Is the inspection result normal?

>> GO TO 3. YES

NO >> Check the DTC. Refer to BR-27, "DTC Index".

3.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

>> Replace VCM. Refer to EVC-377, "Removal and Installation".

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P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1805 BRAKE SWITCH

DTC Logic INFOID:0000000007539196

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	
P1805	BRAKE SWITCH (Brake switch)	Stop lamp signal is not sent to VCM for extremely long time while the vehicle is driving.	Harness or connectors (Stop lamp switch circuit is open or shorted.) Stop lamp switch	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

>> Proceed to EVC-187, "Component Function Check".

Component Function Check

1. CHECK BRAKE SWITCH FUNCTION

(II) With CONSULT

- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "STOP LAMP SW".
- Check "STOP LAMP SW" indication under the following conditions.

Monitor item	Condition		Indication
STOP LAMP SW	Brako podal	Slightly depressed	ON
STOP LAWIF SW	Brake pedal	Fully released	OFF

Is the inspection result normal?

YES >> INSPECTION END

>> Proceed to EVC-187, "Diagnosis Procedure". NO

Diagnosis Procedure

1. CHECK STOP LAMP SWITCH OPERATION

- Turn power switch OFF.
- Check the stop lamp when depressing and releasing the brake pedal.

Brake pedal	Stop lamp
Fully released	Not illuminated
Slightly depressed	Illuminated

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 2.

2.CHECK STOP LAMP SWITCH POWER SUPPLY

- Disconnect stop lamp switch harness connector.
- Check the voltage between stop lamp switch harness connector and ground.

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P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

+	-			
Stop lam	p switch	_	Voltage	
Connector Terminal				
E102	1	Ground	Battery voltage	

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 4. NO >> GO TO 3.

3.check stop lamp switch power supply circuit

- 1. Pull out #38 fuse.
- 2. Check that the fuse is not fusing.
- 3. Check the continuity between stop lamp switch harness connector and fuse terminal.

Stop lam	n switch	_	Continuity	
Connector	Terminal			
E102	1	#38 fuse terminal	Existed	

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check power supply circuit for 12V battery power supply.

NO >> Repair or replace error-detected parts.

4. CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to EVC-188, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace stop lamp switch. Refer to <u>BR-251</u>, "Exploded View".

5.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

- 1. Disconnect stop lamp switch harness connector.
- Disconnect VCM harness connector.
- 3. Check the continuity between stop lamp switch harness connector and VCM harness connector.

+			_	
Stop lamp switch		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E102	2	E61	18	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

Component Inspection (Stop Lamp Switch)

INFOID:0000000007539199

1. CHECK STOP LAMP SWITCH-I

- Turn ignition switch OFF.
- 2. Disconnect stop lamp switch harness connector.
- 3. Check the continuity between stop lamp switch terminals under the following conditions.

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Terminals	C	Continuity	
1 and 2	Brake pedal	Fully released	Not existed
r and 2	brake pedar	Slightly depressed	Existed

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Is the inspection result normal?

YES >> INSPECTION END NO

>> GO TO 2.

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2. CHECK STOP LAMP SWITCH-II

- Adjust stop lamp switch installation. Refer to BR-252, "Inspection and Adjustment".
- 2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	C	Continuity	
1 and 2	Brake pedal	Fully released	Not existed
T and 2	brake pedar	Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to BR-251, "Exploded View". F

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P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P2122, P2123 APP SENSOR

DTC Logic

DTC DETECTION LOGIC

NOTE

If DTC P2122 or P2123 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2122	APP SENSOR D (Accelerator pedal position sensor 1 circuit low input)	An excessively low voltage from the accelerator pedal position sensor 1 is sent to VCM.	Harness or connectors (APP sensor 1 circuit is open or shorted.)
P2123	APP SENSOR D (Accelerator pedal position sensor 1 circuit high input)	An excessively high voltage from the accelerator pedal position sensor 1 is sent to VCM.	Accelerator pedal position sensor 1

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 1 second.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-190, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539201

1. CHECK APP SENSOR 1 POWER SUPPLY-I

- Turn power switch OFF.
- 2. Disconnect accelerator pedal position (APP) sensor harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between APP sensor harness connector terminals.

	Voltogo			
Connector	+	_	Voltage (Approx.)	
Connector	Terr	minal	· · · · /	
E101	4	2	5 V	

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

2.CHECK APP SENSOR 1 POWER SUPPLY-II

Check the voltage between APP sensor harness connector and ground.

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

	+		Villa	
APP	sensor	_	Voltage (Approx.)	
Connector Terminal			, , ,	
E101	4	Ground	5 V	

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Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.check app sensor power supply circuit

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between APP sensor harness connector and VCM harness connector.

+		_		
APP sensor		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	4	E62	37	Existed

4. Also check harness for short to ground and snort to power.

Is the inspection result normal?

>> Check power supply circuit for SSOFF relay routing circuit. Refer to EVC-340. "Diagnosis Proce-

NO >> Repair or replace error-detected parts.

4. CHECK APP SENSOR GROUND CIRCUIT

- Turn power switch OFF.
- Disconnect VCM harness connector.
- Check the continuity between APP sensor harness connector and VCM harness connector.

	+		-	
APP	sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	2	E62	39	Existed

4. Also check harness for snort to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

	+			
V	СМ	_	Continuity	
Connector	Terminal			
E61	4			
EOI	8	Ground	Existed	
E63	111	Giodila	Existed	
203	112			

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

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P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

6. CHECK APP SENSOR SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between APP sensor harness connector and VCM harness connector.

	+		_	
APP	sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	3	E62	38	Existed

4. Also check harness for short to ground and snort to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK APP SENSOR

Refer to EVC-192, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace Accelerator pedal. Refer to <u>ACC-4, "Removal and Installation"</u>.

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000007539202

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

- 1. Turn power switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Turn power switch ON.
- 4. Check the voltage VCM harness connector terminals under the following conditions.

VCM					
Connector +		_	Condition		Voltage (V)
Connector	Terminal	Terminal			
	38 (APP sensor 1)	- 141	Accelerator pedal	Fully released	0.6 - 0.9
E62 _				Fully depressed	3.9 - 4.7
	46 (APP sensor 2)			Fully released	0.3 - 0.6
	40 (AFF Sellsol 2)			Fully depressed	1.95 - 2.4

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P2127, P2128 APP SENSOR

DTC Logic

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause	EV
P2127	APP SENSOR E (Accelerator pedal position sensor 2 circuit low input)	An excessively low voltage from the APP sensor 2 is sent to VCM.	Harness or connectors (Accelerator pedal position sen-	D
P2128	APP SENSOR E (Accelerator pedal position sensor 2 circuit high input)	An excessively high voltage from the APP sensor 2 is sent to VCM.	 sor 2 circuit is shorted.) Accelerator pedal position sensor 2 	E

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch ON and wait at least 1 second.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-193, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK APP SENSOR 2 POWER SUPPLY-I

- 1. Turn power switch OFF.
- 2. Disconnect accelerator pedal position (APP) sensor harness connector.
- Turn power switch ON.
- 4. Check the voltage between APP sensor harness connector terminals.

	Voltage		
Connector	+	_	Voltage (Approx.)
Connector	Terr	(11 /	
E101	5	1	5 V

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

2.CHECK APP SENSOR 2 POWER SUPPLY-II

Check the voltage between APP sensor harness connector and ground.

	+		Maltana	
APP sensor		_	Voltage (Approx.)	
Connector	Terminal		(11 -)	
E101	5	Ground	5 V	

Is the inspection result normal?

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 4. NO >> GO TO 3.

3.CHECK APP SENSOR POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between APP sensor harness connector and VCM harness connector.

	+		-	
APP	sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	5	E62	45	Existed

4. Also check harness for short to ground and snort to power.

Is the inspection result normal?

YES >> Check power supply circuit for SSOFF relay routing circuit. Refer to EVC-340, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

f 4.CHECK APP SENSOR GROUND CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between APP sensor harness connector and VCM harness connector.

+				
APP	sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	1	E62	47	Existed

4. Also check harness for snort to power.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

	+			
V	CM	_	Continuity	
Connector	Terminal			
E61	4		Existed	
201	8	Ground		
E63	111	Giodila		
E03	112			

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

6.CHECK APP SENSOR SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between APP sensor harness connector and VCM harness connector.

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

	+			
APP :	sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E101	6	E62	46	Existed

4. Also check harness for short to ground and snort to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK APP SENSOR

Refer to EVC-195, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace Accelerator pedal. Refer to ACC-4, "Removal and Installation".

Component Inspection (Accelerator Pedal Position Sensor)

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

- 1. Turn power switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Turn power switch ON.
- 4. Check the voltage VCM harness connector terminals under the following conditions.

VCM						
Connector +		_	Condition		Voltage (V)	
Connector	Terminal	Terminal				
	38 (APP sensor 1)	141		Fully released	0.6 - 0.9	
E62 -			Accelerator pedal	Fully depressed	3.9 - 4.7	
			Accelerator pedar	Fully released	0.3 - 0.6	
	46 (APP sensor 2)			Fully depressed	1.95 - 2.4	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

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P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P2138 APP SENSOR

DTC Logic

DTC DETECTION LOGIC

NOTE

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2138	APP SENSOR (Accelerator pedal position sensor circuit range/perfor- mance)	VCM detects abnormal signal of APP sensor 1 and APP sensor 2 at a time.	Harness or connectors (APP sensor 1 or 2 circuit is open or shorted.) APP sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch ON and wait at least 1 second.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-196, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539207

1. CHECK VCM GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between VCM harness connector and ground.

+			
V	VCM		Continuity
Connector	Terminal		
E61	4	Ground	Existed
LOT	8		
E63	111	Glound	Existed
E03	112		

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR SIGNAL CIRCUIT

- 1. Disconnect APP sensor harness connector.
- Check the continuity between APP sensor harness connector terminals.

P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

	APP sensor		
Connector	+	_	Continuity
Connector	Terr	minal	
E101	3	6	Not existed

3. Also check harness for short to ground and snort to power.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK APP SENSOR

Refer to EVC-197, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace Accelerator pedal. Refer to ACC-4, "Removal and Installation".

Component Inspection (Accelerator Pedal Position Sensor)

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

- 1. Turn power switch OFF.
- 2. Reconnect all harness connectors disconnected.
- 3. Turn power switch ON.
- 4. Check the voltage VCM harness connector terminals under the following conditions.

	VCM					
Connector	+	_	Condition		Voltage (V)	
Connector	Terminal	Terminal				
	20 (ADD corecy 1)			Fully released	0.6 - 0.9	
E62	38 (APP sensor 1)	141	Accelerator pedal	Fully depressed	3.9 - 4.7	
E02	46 (ADD concor 2)		141	·	Fully released	0.3 - 0.6
	46 (APP sensor 2)			Fully depressed	1.95 - 2.4	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

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INFOID:0000000007539208

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P3100 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3100 EV SYSTEM CAN COMMUNICATION

Description INFOID.000000007539209

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.

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P3100 is displayed with DTC P3191 or P3193, perform diagnosis for DTC P3191 or P3193.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3100	COMMUNICATION ERROR (EV system CAN communication error)	VCM cannot receive EV system CAN communication signal from LBC and traction motor inverter for 5 seconds or more when VCM starts-up.	Harness or connectorsLBCTraction motor inverterVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 20 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-198, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Turn power switch OFF.
- 2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 20 seconds.
- 4. Turn power switch ON.
- 5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-198, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539211

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(P)With CONSULT

- 1. Erase DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-198, "DTC Logic"</u>.

Is DTC" P3100" detected again?

P3100 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation". NO >> INSPECTION END

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P3101 VCM

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3101	VCM [Engine control module (Processor)]	VCM calculation function is malfunctioning.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch ON wait at least 10 seconds.
- 2. Set the vehicle to READY.
- 3. Shift selector lever to the entire position from "P" to "D".
- 4. Turn power switch OFF and wait at least 20 seconds.
- 5. Turn power switch ON wait at least 10 seconds.
- 6. Turn power switch OFF and wait at least 20 seconds.
- 7. Turn power switch ON.
- 8. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-200, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539213

1. PERFORM CONFIRMATION PROCEDURE AGAIN

- 1. Erase DTC.
- 2. Perform DTC confirmation procedure again. Refer to EVC-200, "DTC Logic".
- Check self-diagnostic result.

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P3102 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P3102 LI-ION BATTERY

Description INFOID:0000000007539214

Li-ion Battery ID Registration must be performed if the Li-ion battery controller or VCM is replaced.

DTC Logic INFOID:0000000007539215

DTC DETECTION LOGIC

CAUTION:

This DTC may be detected when the Li-ion battery is replaced. If this DTC is detected, check that the Li-ion battery is replaced by using the correct parts and method.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3102	INVALID BATTERY	Detects invalid Li-ion battery ID.	Improper replacement of Liion battery or Li-ion battery controller. Li-ion battery Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON and wait at least 5 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-201, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK SELF-DIAGNOSTIC RESULT OF LI-ION BATTERY CONTROLLER

(P)With CONSULT

- Turn power switch ON.
- Check self-diagnostic result of the "HV BAT".

Is any DTC detected?

YES >> Check the DTC. Refer to EVB-50. "DTC Index" (TYPE 1), EVB-268. "DTC Index" (TYPE 2), EVB-502, "DTC Index" (TYPE 3) or EVB-734, "DTC Index" (TYPE 4).

>> GO TO 2. NO

2.LI-ION BATTERY VISUALLY CHECK

Revision: 2014 June

This DTC may be detected when the Li-ion battery is replaced. If this DTC is detected, check that the Li-ion battery is replaced by using the correct parts and method.

Visually check Li-ion battery for malfunction.

Is the inspection result normal?

>> Perform Li-ion Battery ID Registration. Refer to "Li-ion Battery Registration Operation Manual".

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P3102 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace Li-ion battery. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1) or <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or <u>EVB-866</u>, "Removal and Installation" (TYPE 4).

P3117 A/C SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

P3117 A/C SYSTEM

Description

This DTC shows a decrease in insulation resistance of the high voltage circuit.

When detecting a decrease in insulation resistance of the high voltage circuit during use of air-conditioner, VCM turns ON/OFF the electric compressor and the PTC elements heater to check changes in insulation resistance and identifies a decrease in insulation resistance of the air-conditioning system.

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3117	A/C SYSTEM	When VCM detects a decrease in insulation resistance of A/C system.	Electric compressor A/C refrigerant gas PTC elements heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

(I) With CONSULT

1. Set the vehicle as the following condition and wait at least 30 minutes.

Power switch	READY
Vehicle speed	0 km/h (0 MPH)
A/C switch	ON
A/C set temperature	Full cold

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-204, "Diagnosis Procedure"

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

1. Set the vehicle as the following condition and wait at least 30 minutes.

Power switch	READY
Vehicle speed	0 km/h (0 MPH)
A/C switch	ON
A/C set temperature	Full hot

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-204, "Diagnosis Procedure"

NO >> INSPECTION END

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P3117 A/C SYSTEM

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:0000000007747732

1. CHECK A/C REFRIGERANT GAS

Interview the customer and check maintenance records to see if there is possibility that a refrigerant gas other than EV specific refrigerant gas is mixed in A/C refrigerant gas.

NOTE:

If A/C refrigerant gas other than EV specific refrigerant gas is used, insulation resistance may decrease. Is the inspection result normal?

- YES-1 (DTC P3117 is detected during Step 1 of DTC CONFIRMATION PROCEDURE)>>Replace electric compressor. Refer to HA-46, "Removal and Installation".
- YES-2 (DTC P3117 is detected during Step 1 of DTC CONFIRMATION PROCEDURE)>>Replace PTC elements heater. Refer to <u>HA-68</u>, "Removal and Installation".
- NO >> Change A/C refrigerant gas and compressor oil.

< DTC/CIRCUIT DIAGNOSIS >

P311C HIGH VOLTAGE CIRCUIT

DTC Logic INFOID:0000000007539217

DTC DETECTION LOGIC

NOTE:

If DTC P311C is displayed with DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD, perform diagnosis for DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
		Remains all of following condition for 0.2 seconds. Li-ion battery current: 5.5 A or more Input voltage to traction motor inverter: 24 V or less Pre-charge impossible	
P311C	HIGH VOLTAGE SYSTEM (High voltage system malfunction)	Remains all of following condition for 0.5 seconds. Li-ion battery current: less than 5.5 A Input voltage to traction motor inverter: 24 V or less Pre-charge impossible	High voltage circuit Li-ion battery J/B
		Remains all of following condition for 0.5 seconds. Difference between Li-ion battery voltage and input voltage to traction motor inverter 100 V or more. Pre-charge impossible	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Set the vehicle to READY.
- 2. Check DTC.

Is DTC detected?

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YES >> Proceed to EVC-205, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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.

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< DTC/CIRCUIT DIAGNOSIS >

• Refer to EVC-11, "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.
- Erase DTC after the work is completed.

 ${f 1}$.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

(P)With CONSULT

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 2.

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

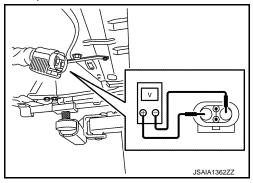
- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or <u>EVB-866</u>, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

- 1. Disconnect electric compressor high voltage harness connector.
- 2. Check the short circuit between electric compressor terminals.

Electric c		
+	_	Resistance
Terr		
7	8	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK DC/DC JUNCTION BOX

- 1. Remove DC/DC junction box. Refer to EVC-369. "Removal and Installation".
- 2. Check the continuity between DC/DC junction box connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

DC/DC-J/B		,
+ -		Continuity
Terminal		
18 24		Existed

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Is the inspection result normal?

YES >> Replace electric compressor. Refer to <u>HA-46, "Removal and Installation"</u>. And then, GO TO 10.

NO >> Replace electric compressor and DC/DC junction box. And then, GO TO 10. Refer to HA-46. "Removal and Installation" (electric compressor), EVC-369, "Removal and Installation" (DC/DC-J/

5. CHECK PTC ELEMENTS HEATER

- Disconnect PTC elements heater high voltage harness connector.
- 2. Check the short circuit between PTC elements heater terminals.

PTC elem	Resistance	
+ -		
Terminal		
7 8		$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

O.CHECK DC/DC JUNCTION BOX

- Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- Check the continuity between DC/DC junction box connector terminals.

DC/D	DC/DC-J/B + –	
+		
Terr		
30	Existed	

Is the inspection result normal?

YES >> Replace PTC elements heater. Refer to <u>HA-68, "Removal and Installation"</u>. And then, GO TO 10.

NO >> Replace PTC elements heater and DC/DC junction box. And then, GO TO 10. Refer to HA-68, "Removal and Installation" (PTC elements heater), EVC-369, "Removal and Installation" (DC/DC-J/B).

7. CHECK TRACTION MOTOR INVERTER

- Disconnect DC/DC junction box high voltage harness connector (H15).
- Check the short circuit between DC/DC junction box harness connector terminals.

DC/DC-J/B			
Connector	+	_	Resistance
Connector	Terminal		
H15	35	36	$3~\text{k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

>> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation". And then, GO TO NO 10.

8. CHECK HIGH VOLTAGE HARNESS

- Remove DC/DC junction box.
- Check the short circuit between high voltage harness terminals.

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< DTC/CIRCUIT DIAGNOSIS >

		DC/DC-J/B		
Connected to:	Connector	+	_	Resistance
	Connector	Terr	Terminal	
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3~\text{k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES-1 (with Li-ion battery heater)>>GO TO 9.

YES-2 (without Li-ion battery heater)>>GO TO 10.

NO >> Replace malfunctioning harness. And then, GO TO 10.

9. CHECK LI-ION BATTERY HEATER CIRCUIT

Check the short circuit between Li-ion battery terminals.

Li-ion battery		
+ -		Resistance
Terminal		
23 24		3 kΩ or more

Is the inspection result normal?

YES >> GO TO 10.

NO >> Check Li-ion battery heater system.

10. CHECK SERVICE PLUG FUSE

- 1. Turn power switch OFF.
- Disconnect service plug.
- 3. Check service plug fuse fusing.

Is the fuse is fusing?

YES >> Replace service plug. And then, GO TO 11.

NO >> GO TO 11.

11. REPLACE LI-ION BATTERY JUNCTION BOX

Replace Li-ion battery junction box. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (without Li-ion battery heater), <u>EVB-402</u>, "<u>Exploded view</u>" (with Li-ion battery heater).

>> INSPECTION END

P312A EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P312A EV SYSTEM CAN COMMUNICATION

Description INFOID:0000000007539219

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.

INFOID:0000000007539220

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312A	COMMUNICATION ERROR (EV system CAN communication error)	CAN communication of the EV system CAN connecting unit does not stop for 25.5 seconds or more immediately before the VCM self-shutoff.	Harness or connectors LBC Traction motor inverter On board charger Electric shift control module A/C auto amp. TCU VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.perform dtc confirmation procedure-i

(P)With CONSULT

- Turn power switch ON and wait at least 20 seconds.
- Turn power switch OFF and wait at least 1 minutes.
- Turn power switch ON.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-210, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Turn power switch OFF.
- Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 10 seconds.
- Disconnect EVSE and wait at least 1 minutes.
- Turn power switch ON. 5.
- 6. Check DTC.

Is DTC detected?

>> Proceed to EVC-210, "Diagnosis Procedure". YES

>> INSPECTION END NO

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P312A EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:0000000007539221

1. CHECK VCM POWER SUPPLY CIRCUIT

- 1. Turn power switch ON.
- 2. Check the voltage between IPDM E/R harness connector and ground.

+			
IPDM E/R		_	Voltage
Connector	Terminal		
E15	57	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 2.

2. CHECK FUSE

- Turn power switch OFF.
- 2. Pull out #55 fuse.
- Check the fuse is not fusing.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK VCM POWER SUPPLY

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between VCM harness connector and ground.

+ VCM		_	Voltage
Connector	Terminal		
E61	21	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK VCM POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between VCM harness connector and IPDM E/R harness connector.

	+		_	
IPDN	/I E/R	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E15	21	E61	21	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

5. CHECK TRACTION MOTOR INVERTER POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.

P312A EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS > Reconnect VCM harness connector. Disconnect traction motor inverter harness connector (F13). Α Perform confirmation procedure. Refer to EVC-209, "DTC Logic". Is DTC "P312A" detected? YES >> GO TO 6. В NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power. $oldsymbol{6}.$ CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT **EVC** Turn power switch OFF. 2. Reconnect traction motor inverter harness connector harness connector. Disconnect LBC harness connector (B24). Perform confirmation procedure. Refer to EVC-209, "DTC Logic". D Is "P312A" detected? YES >> GO TO 7. NO >> Check LBC power supply (POWER ON) circuit for short to power. 7.CHECK ON BOARD CHARGER POWER SUPPLY (POWER ON) CIRCUIT Turn power switch OFF. F 2. Reconnect LBC harness connector. Disconnect on-board charger harness connector (B26). Perform confirmation procedure. Refer to EVC-209, "DTC Logic". Is DTC "P312A" detected? YES >> GO TO 8. NO >> Check on board charger power supply (POWER ON) circuit for short to power. Н 8.CHECK A/C AUTO AMP. POWER SUPPLY (POWER ON) CIRCUIT Turn power switch OFF. Reconnect on-board charger harness connector. 3. Disconnect A/C auto amp. harness connector (M50). Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>". Is DTC "P312A" detected? YES >> GO TO 9. NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power. 9.CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT K Turn power switch OFF. 2. Reconnect A/C auto amp. harness connector. Disconnect TCU harness connector (M2). Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>". Is DTC "P312A" detected? YES >> GO TO 10. NO >> Check TCU power supply (POWER ON) circuit for short to power. 10.CHECK ELECTRIC SHIFT CONTROL MODULE POWER SUPPLY (POWER ON) CIRCUIT N 1. Turn power switch OFF. Reconnect TCU harness connector. Disconnect electric shift control module harness connector (M59). Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>". Is DTC "P312A" detected? >> Check intermittent incident. Refer to GI-51, "Intermittent Incident". YES NO >> Check electric shift control module power supply (POWER ON) circuit for short to power.

P312B EV SYSTEM RESTART ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312B EV SYSTEM RESTART ERROR

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P312B	RESTART ERROR	The traction motor inverter and the on-board charger cannot be activated for 30 seconds or more at a restart before the completion of VCM self shut off.	Harness or connectorsTraction motor inverterOn board chargerVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

(I) With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Turn OFF the power switch. Between 5 seconds later and within 10 seconds, turn ON the power switch again. Wait at least 1 minute.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-212, "Diagnosis Procedure".

NO >> GO TO 3.

3-PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Turn power switch OFF.
- 2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 10 seconds.
- 4. Disconnect EVSE and wait at least 1 minutes.
- 5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-212, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539223

1. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(P)With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger.

Is DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

P312B EV SYSTEM RESTART ERROR

< DTC/CIRCUIT DIAGNOSIS >

1. Erase DTC.

NO

2. Perform DTC confirmation procedure again. Refer to EVC-212, "DTC Logic". Is DTC "P312B" detected again?

>> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Α

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

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P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ER-ROR

< DTC/CIRCUIT DIAGNOSIS >

P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P312C or P3130 is displayed with DTC P0AA0 or P0AA1, perform diagnosis for DTC P0AA0 or P0AA1.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P312C	INVERTER DISCHARGE ER-	Traction motor inverter voltage is 54 V or more for 14 sec-	Battery J/B
P3130	ROR	onds during stop of READY or charge	Traction motor inverterVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Set the vehicle to READY and perform test drive.
- Turn power switch OFF and wait at least 20 seconds.
- 3. Turn power switch ON and wait at least 1 minutes.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-214, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Turn power switch OFF.
- 2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 1 minutes.
- 4. Disconnect EVSE and wait at least 1 minutes.
- 5. Turn power switch ON and wait at least 1 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-214, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539225

1. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(P)With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE AGAIN

Perform confirmation procedure again. Refer to EVC-214, "DTC Logic"

Is DTC "P312C" or "P3030" detected?

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P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace VCM. Refer to <u>EVC-377</u>, "<u>Removal and Installation</u>". NO >> Check intermittent incident. Refer to <u>GI-51</u>, "<u>Intermittent Incident</u>".

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P312D QUICK CHARGE ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312D QUICK CHARGE ERROR

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P312D	QUICK CHARGE RELAY	Immediately before starting quick charge, the quick charger cannot be ready for 60 seconds.	 Harness or connector On-board charger VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 2. Connect quick charge connector.
- 3. Start the guick charging and wait at least 2 minutes.
- 4. Turn power switch ON.
- 5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-216, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539227

1.PERFORM SELF-DIAGNOSIS OF ON-BOARD CHARGER

(P)With CONSULT

Perform self-diagnosis of on-board charger.

Is DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(P)With CONSULT

- Erase DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-216</u>, "<u>DTC Logic</u>".

Is DTC detected?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

P312E READY OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312E READY OFF ERROR

DTC Logic INFOID:0000000007539228

DTC DETECTION LOGIC

NOTE:

If DTC P312E is displayed with DTC P0A08, P317A, P3191, P31A7, or P319C, perform diagnosis for DTC P0A08, P317A, P3191, P31A7, or P319C.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P312E	READY OFF ERROR	 During the shutdown from READY, battery current remains 5.5 A or more for 25.5 seconds or more. During the shutdown from READY, traction motor inverter is not ready for discharge for 25.5 seconds or more. 	Harness or connector LBC Traction motor inverter A/C auto amp. DC/DC-J/B VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(E) With CONSULT

- Set the vehicle to READY.
- Operate the automatic air conditioning system (A/C switch ON).
- 3. Turn power switch OFF as automatic air conditioning system ON condition
- Wait at least 30 seconds.
- 5. Turn power switch ON.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-217, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

(P)With CONSULT

Perform self-diagnosis of A/C auto amp.

Is DTC detected?

>> Check the DTC. Refer to HAC-40, "DTC Index". YES

NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(P)With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 3.

3.perform self-diagnosis of LBC $\,$

(P)With CONSULT

Perform self-diagnosis of LBC.

Is DTC detected?

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P312E READY OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Check the DTC. Refer to EVB-50, "DTC Index" (TYPE 1), EVB-268, "DTC Index" (TYPE 2), EVB-502, "DTC Index" (TYPE 3) or EVB-734, "DTC Index" (TYPE 4).

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(I) With CONSULT

- 1. Erase DTC.
- 2. Perform DTC confirmation procedure again. Refer to EVC-217, "DTC Logic".

Is DTC "P312E" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

P312F CHARGE OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312F CHARGE OFF ERROR

DTC Logic INFOID:0000000007539230

DTC DETECTION LOGIC

NOTE:

If DTC P312F is displayed with DTC P0A08, P317A, P3191, P3196, P319C, P31A1, P31A7, or P31AE, perform diagnosis for DTC P0A08, P317A, P3191, P3196, P319C, P31A1, P31A7, or P31AE.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P312F	CHARGE OFF ERROR	During the shutdown from charging, 10 seconds pass without satisfying the following conditions: • Battery current is 5.5 A or less • Traction motor inverter is ready for discharge. • Quick charge relay OFF	 Harness or connector LBC Traction motor inverter A/C auto amp. DC/DC-J/B On board charger VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT

- 1. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- Connect EVSE (with AC power input) and wait at least 60 seconds.
- 3. Disconnect EVSE and wait at lease 30 seconds.
- 4. Turn power switch ON.
- 5. Check DTC.

Is DTC detected?

>> Proceed to EVC-219, "Diagnosis Procedure".

NO-1 (with quick charge port)>>GO TO 3.

NO-2 (without quick charge port)>>INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Turn power switch OFF.
- Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- Connect quick charge connector.
- Start quick charging and wait at least 60 seconds.
- Stop quick charge and wait at lease 30 seconds.
- 6. Turn power switch ON.
- 7. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-219, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

 $oldsymbol{1}$.PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

(P)With CONSULT

Perform self-diagnosis of A/C auto amp.

Is DTC detected?

>> Check the DTC. Refer to HAC-40, "DTC Index".

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P312F CHARGE OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.perform self-diagnosis of on-board charger

(I) With CONSULT

Perform self-diagnosis of on-board charger.

Is DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(P)With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 4.

4.PERFORM SELF-DIAGNOSIS OF LBC

(P)With CONSULT

Perform self-diagnosis of LBC.

Is DTC detected?

YES >> Check the DTC. Refer to EVB-50, "DTC Index" (TYPE 1), EVB-268, "DTC Index" (TYPE 2), EVB-502, "DTC Index" (TYPE 3) or EVB-734, "DTC Index" (TYPE 4).

NO >> GO TO 5.

${f 5}$.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(P)With CONSULT

- 1. Erase DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-217</u>, "<u>DTC Logic</u>".

Is DTC "P312F" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

P3131 SYSTEM SHUTOFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3131 SYSTEM SHUTOFF ERROR

DTC Logic INFOID:0000000007539232

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3131	SYSTEM SHUTOFF TIMEOUT	When before shutdown, all of the following conditions are fulfilled for 31 minutes or more. VCM does not receive a EV system activation request signal. Either of EV system CAN connection unit is not shutdown	 Harness or connectors LBC Traction motor inverter On board charger Electric shift control module A/C auto amp. TCU VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- Turn power switch ON.
- Turn power switch OFF and wait at least 35 minutes.

NOTE:

Proceeding to the next step is allowed without waiting for 35 minutes when checked that the SSOFF relay is OFF.

- 3. Turn power switch ON.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-221, "Diagnosis Procedure".

NO >> GO TO 3.

3.perform dtc confirmation procedure-ii

- Turn power switch OFF.
- Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- Connect EVSE (with AC power input) and wait at least 10 seconds.
- Disconnect EVSE and wait at least 35 minutes.

NOTE:

Proceeding to the next step is allowed without waiting for 35 minutes when checked that the SSOFF relay is OFF.

5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-221, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK VCM POWER SUPPLY CIRCUIT

- Turn power switch ON.
- Check the voltage between IPDM E/R harness connector and ground.

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P3131 SYSTEM SHUTOFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

IPDN	+ // E/R	_	Voltage	
Connector	Terminal			
E15	57	Ground	12V battery voltage	

Is the inspection result normal?

YES >> GO TO 3. NO >> GO TO 2.

2.check fuse

- 1. Turn power switch OFF.
- 2. Pull out #55 fuse.
- Check the fuse is not fusing.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK VCM POWER SUPPLY

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between VCM harness connector and ground.

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V	CM	_	Voltage
Connector	Terminal		
E61	21	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5. NO >> GO TO 4.

f 4.CHECK VCM POWER SUPPLY CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between VCM harness connector and IPDM E/R harness connector.

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IPDM E/R		VCM		Continuity
Connector	Terminal	Connector Terminal		
E15	21	E61	21	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

${f 5.}$ CHECK TRACTION MOTOR INVERTER POWER SUPPLY (POWER ON) CIRCUIT

- 1. Turn power switch OFF.
- Reconnect VCM harness connector.
- 3. Disconnect traction motor inverter harness connector (F13).
- Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>".

Is DTC "P3131" detected?

YES >> GO TO 6.

NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power.

P3131 SYSTEM SHUTOFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

C DTG/CINCOTT DIAGNOSIS >	
6. CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT	А
 Turn power switch OFF. Reconnect traction motor inverter harness connector harness connector. Disconnect LBC harness connector (B24). 	Л
4. Perform confirmation procedure. Refer to <u>EVC-209, "DTC Logic"</u> .	D
Is "P3131" detected? YES >> GO TO 7.	
NO >> Check LBC power supply (POWER ON) circuit for short to power.	EVC
7.CHECK ON BOARD CHARGER POWER SUPPLY (POWER ON) CIRCUIT	
Turn power switch OFF.	D
 Reconnect LBC harness connector. Disconnect on-board charger harness connector (B26). 	
4. Perform confirmation procedure. Refer to EVC-209, "DTC Logic".	Е
Is DTC "P3131" detected?	
YES >> GO TO 8. NO >> Check on board charger power supply (POWER ON) circuit for short to power.	_
8. CHECK A/C AUTO AMP. POWER SUPPLY (POWER ON) CIRCUIT	F
 Turn power switch OFF. Reconnect on-board charger harness connector. Disconnect A/C auto amp. harness connector (M50). Perform confirmation procedure. Refer to EVC-209. "DTC Logic". Is DTC "P3131" detected? YES >> GO TO 9. NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power. 9.CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT 	G H
 Turn power switch OFF. Reconnect A/C auto amp. harness connector. Disconnect TCU harness connector (M2). Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>". 	J
Is DTC "P3131" detected?	K
YES >> GO TO 10. NO >> Check TCU power supply (POWER ON) circuit for short to power.	r.
10. CHECK ELECTRIC SHIFT CONTROL MODULE POWER SUPPLY (POWER ON) CIRCUIT	
1. Turn power switch OFF.	L
 Reconnect TCU harness connector. Disconnect electric shift control module harness connector (M59). Perform confirmation procedure. Refer to <u>EVC-209</u>, "<u>DTC Logic</u>". 	M
Is DTC "P3131" detected? VES ->> Check intermittent incident. Pefer to CLE1. "Intermittent Incident"	
YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident". NO >> Check electric shift control module power supply (POWER ON) circuit for short to power.	N
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P3137 CAR CRASH DETECTION

< DTC/CIRCUIT DIAGNOSIS >

P3137 CAR CRASH DETECTION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3137	CAR CLASH	VCM received car crash information signal from air bag diagnosis sensor unit	 Air bag inflated CAN communication signal Air bag diagnosis sen- sor unit VCM

DTC CONFIRMATION PROCEDURE

1. CHECK AIR BAG MODULE

Check that the air bag modules are not inflating.

Is air bag module inflating?

YES >> Refer to SR-13, "FOR FRONTAL COLLISION: When SRS is activated in a collision".

NO >> GO TO 2.

2.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE

Turn power switch ON and wait at least 5 seconds.

Is DTC detected?

YES >> Proceed to EVC-224, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008525476

1. CHECK THE IMPLEMENTATION OF AIR BAG MODULE REPLACEMENT

Check to see if there is a record of air bag module replacement.

Is there a record of air bag module replacement?

YES >> GO TO 2.

NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- Erase DTC.
- 2. Perform DTC confirmation procedure again. Refer to EVC-224, "DTC Logic".

Is DTC "P3137" detected again?

YES >> GO TO 3.

NO >> INSPECTION END

3. CHECK CAR CRASH INFORMATION SIGNAL

With CONSULT

On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "CLASH DETECT INFO".

Is indicated ##?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Replace air bag diagnosis sensor unit. Refer to SR-35, "Removal and Installation".

< DTC/CIRCUIT DIAGNOSIS >

P3141 ON-BOARD CHARGER

Description INFOID:0000000008525480

If the situation is not improved under the operation of the Charge Insulation Resistance Loss Protection Control, VCM stops charging and detects DTC P3141. For details of the protection control, refer to EVC-368. "Description".

DTC Logic INFOID:0000000008525481

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DTC DETECTION LOGIC

NOTE:

If DTC P3141 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3141	ON-BOARD CHARGER	The Charge Insulation Resistance Loss Protection Control is repeated more than the specified number of times or active for 255 consecutive seconds or more.	High voltage harness or connectors Electric compressor PTC elements heater Traction motor On-board charger Li-ion battery DC/DC J/B On-board charger

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

NOTE:

Since this DTC is difficult to be confirmed, check component function to judge the normality.

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INFOID:0000000008525483

>> Proceed to EVC-225, "Component Function Check".

Component Function Check

1. CHECK OPERATIONAL HISTORY OF CHARGE INSULATION RESISTANCE LOSS PROTECTION CON-TROL

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "PRTCTN CNT OPERAT HIST 1".
- Check that "0" is indicated.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EVC-225, "Diagnosis Procedure".

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

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< DTC/CIRCUIT DIAGNOSIS >

- 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 EVC-11, "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.
- Erase DTC after the work is completed.

NOTE:

If DTC P3141 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

1. IDENTIFY ON BOARD CHARGER DIAGNOSIS OCCURRENCE MODE-I

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Turn power switch ON.
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "IR SENSOR SIGNAL P-P".

Is the indicated value 3,550 mV or less?

YES >> Perform Li-ion battery insulation resistance loss check. Refer to <u>EVB-154</u>, "Component Inspection" (TYPE 1), <u>EVB-377</u>, "Component Inspection" (TYPE 2), <u>EVB-611</u>, "Component Inspection" (TYPE 3) or <u>EVB-848</u>, "Component Inspection" (TYPE 4).

NO >> GO TO 2.

2.IDENTIFY ON BOARD CHARGER DIAGNOSIS OCCURRENCE MODE-II

- 1. Turn power switch OFF and wait at least 20 seconds.
- Perform normal charging (charge status indicator is ON) at least 5 minutes.

CAUTION

- Never perform normal charge for 6 minutes or more continuously.
- Never turn ON the power switch or air conditioner while performing normal charge.
- 3. Turn power switch ON.
- 4. Check self-diagnostic result in "EV/HEV".

Is DTC "P3141" detected?

YES >> GO TO 4.

NO >> GO TO 3.

3.replace on-board charger

- 1. Replace on-board charger. Refer to VC-112, "Removal and Installation".
- 2. Turn power switch ON.
- 3. Erase self-diagnostic result.
- 4. Turn power switch OFF.
- Perform normal charge at least 5 minutes.

CAUTION:

Never turn ON the power switch or air conditioner while performing normal charge.

- 6. Check that normal charge operates normally.
- 7. Stop normal charge.
- 8. Check self-diagnostic result of VCM and On-board charger.

Are any DTC detected?

YES >> Check the DTC. Refer to <u>EVC-84, "DTC Index"</u> (VCM), <u>VC-27, "DTC Index"</u> (on-board charger).

NO >> INSPECTION END

4.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or <u>EVB-866</u>, "Removal and Installation" (TYPE 4).
- Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, "<u>Removal and Installation</u>" (without Li-ion battery heater models), <u>EVB-395</u>, "<u>Removal and Installation</u>" (with Li-ion battery heater models).

< DTC/CIRCUIT DIAGNOSIS >

Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 5.

5.CHECK INSULATION RESISTANCE OF ON-BOARD CHARGER-I

Check insulation resistance of on-board charger. Refer to VC-102, "Component Insulation Resistance Check" **CAUTION:**

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 6.

O.CHECK INSULATION RESISTANCE OF ON-BOARD CHARGER-II

- Disconnect on-board charger high voltage harness connector (H6).
- 2. Check insulation resistance of on-board charger. Refer to VC-102, "Component Insulation Resistance Check".

CAUTION:

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace on-board charger. Refer to VC-112, "Removal and Installation".

1. CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS-I

- 1. Disconnect normal charge port high voltage harness connector (H8).
- 2. Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester), between normal charge port and on-board charger.

WARNING:

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely.

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CAUTION:

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

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< DTC/CIRCUIT DIAGNOSIS >

	+		
On-boar	d charger	_	Resistance
Connector	Terminal		
	34		$\infty \Omega$
H6	35	Ground	
	36		

Is the inspection result normal?

YES >> Replace normal charge port. Refer to <u>VC-122, "Removal and Installation"</u>.

NO >> Replace high voltage harness.

8.CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS-II

- 1. Disconnect DC/DC junction box high voltage harness connector (H7).
- 2. Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester), between DC/DC junction box and on-board charger.

WARNING:

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely.

CAUTION:

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

	+			
On-boar	d charger	_	Resistance	
Connector	Terminal			
H7	27	Ground	$\infty \Omega$	
П	28			

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace high voltage harness.

9. PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "<u>Removal and Installation</u>" (TYPE 1), <u>EVB-395</u>. "<u>Removal and Installation</u>" (TYPE 2), <u>EVB-626</u>. "<u>Removal and Installation</u>" (TYPE 3) or <u>EVB-866</u>. "<u>Removal and Installation</u>" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).

< DTC/CIRCUIT DIAGNOSIS >

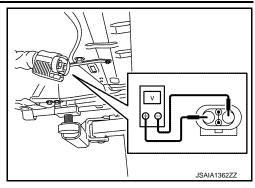
Measure voltage between high voltage harness connector terminals.

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 500 V or higher.

>> GO TO 10.

10.CHECK INSULATION RESISTANCE OF ELECTRIC COMPRESSOR

Check insulation resistance of electric compressor. Refer to HAC-132, "Component Inspection". **CAUTION:**

. Since testers are polarized, check the polarity of the tester and connect it in the forward direction to

the circuit. If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace electric compressor. Refer to HA-46, "Removal and Installation".

11. CHECK INSULATION RESISTANCE OF PTC ELEMENTS HEATER

Check insulation resistance of PTC elements heater. Refer to HAC-134, "Component Inspection". **CAUTION:**

 Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.

If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 12.

NO >> Replace PTC elements heater. Refer to HA-68, "Removal and Installation".

12. CHECK INSULATION RESISTANCE OF TRACTION MOTOR INVERTER

Check insulation resistance of traction motor inverter. Refer to TMS-113, "Component Inspection". **CAUTION:**

- Since testers are polarized, check the polarity of the tester and connect it in the forward direction to the circuit.
- If the inspection results show no continuity, check the parts for proper installation.

Is the inspection result normal?

YES >> GO TO 13.

WARNING.

NO >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation".

13.check insulation resistance of high voltage harness-iii

- Remove traction motor inverter. Refer to TMS-116, "Removal and Installation".
- 2. Remove DC/DC junction box.
- Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester).

Unlike the ordinary tester, the insulation resistance tester applies 500 V when measuring. If used incorrectly, there is the danger of electric shock. If used in the vehicle 12V system, there is the danger of damage to electronic devices. Read the insulation resistance tester instruction manual carefully and be sure to work safely. **CAUTION:**

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< DTC/CIRCUIT DIAGNOSIS >

- Use 500V range of insulation resistance tester to measure insulation resistance.
- Wait for 30 seconds until the value becomes stable.
- If the inspection results show no continuity, check the parts for proper installation.

Connected to:	+			Resistance	
Connected to.	Connector	Terminal	_	Resistance	
Li ian hattarı	H4	24		$\infty \Omega$	
Li-ion battery	Π4	25			
Electric compressor	H2	18	Ground		
Electric compressor	П2	19	Giouria		
PTC elements heater	Un	30			
r i C elements neater	H9	31	1		

Is the inspection result normal?

YES >> Replace DC/DC junction box. Refer to EVC-369, "Removal and Installation".

NO >> Replace high voltage harness.

P315C CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P315C CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P315C	CHARGE RELAY	VCM detected P31C8, P31C9, P31CA or P31CB.	 Harness or connectors Normal charge relay Quick charge relay On-board charger

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

NOTE:

This DTC is detected when DTC P31C8, P31C9, P31CA or P31CB. If this DTC is detected, perform trouble diagnosis for DTC P31C8, P31C9, P31CA or P31CB.

>> Proceed to EVC-231, "Diagnosis Procedure".

Diagnosis Procedure

Perform diagnosis for P31C8, P31C9, P31CA or P31CB.

- P31C8 or P319C: Refer to <u>EVC-282</u>, "<u>DTC Logic</u>".
- P31CA or P31CB: Refer to EVC-284, "DTC Logic".

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P315E ABS/VDC

< DTC/CIRCUIT DIAGNOSIS >

P315E ABS/VDC

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P315E	VDC SYSTEM	VCM detected torque request signal error for 2 seconds	CAN communication signal ABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Turn power switch OFF and wait at least 10 seconds.
- 3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-232, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539239

1. PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM.

Is DTC detected other than P315E?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

- 1. Replace ABS actuator and electric unit (control unit). Refer to BRC-154, "Removal and Installation".
- 2. Erase DTC.
- Perform DTC confirmation procedure. Refer to <u>EVC-232</u>, "<u>DTC Logic</u>".

Is DTC "P315E" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P3160 ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT

< DTC/CIRCUIT DIAGNOSIS >

P3160 ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3160	E-DIB SYSTEM	VCM received an error signal sent from the electrically-driven intelligent brake unit.	Electrically-driven intelligent brake system VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-233, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007829366

${f 1}$.PERFORM SELF-DIAGNOSIS OF ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT

(P)With CONSULT

Check self-diagnostic result in "BRAKE".

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC. Refer to BR-27, "DTC Index".

NO >> GO TO 2.

2 PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- 1. Erase all DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-233</u>, "<u>DTC Logic</u>".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

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P316A MOTOR SPEED

< DTC/CIRCUIT DIAGNOSIS >

P316A MOTOR SPEED

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P316A	MOTOR SPEED	VCM received motor speed invalid value from traction motor inverter	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 60 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-234, "Diagnosis Procedure".

NO >> GO TO 3.

3.perform dtc confirmation procedure-ii

(P)With CONSULT

- 1. Perform test drive.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-234, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539241

1. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(I) With CONSULT

Perform self-diagnosis of traction motor.

>> Perform diagnosis procedure of detected DTC. Refer to TMS-36, "DTC Index".

< DTC/CIRCUIT DIAGNOSIS >

P316F ON-BOARD CHARGER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P316F	ON BOARD CHARGER SYSTEM	The charge electricity of the on-board charger is less than 0.1KW	Harness or connector On-board charger VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

- 1. Perform normal charging and wait at least 10 minutes.
- Turn power switch ON.
- 3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-235. "Diagnosis Procedure".

NO (Without quick charge port)>>INSPECTION END

NO (With quick charge port)>>GO TO 3.

3.perform dtc confirmation procedure-ii

- Turn power switch OFF.
- Perform quick charging and wait at least 10 minutes.
- 3. Turn power switch ON.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-235, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539243

1. CHECK ON-BOARD CHARGER OUTPUT POWER-I

(P)With CONSULT

- Turn power switch OFF.
- Perform normal charging.
- Turn power switch ON.
- 4. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "OBC OUT PWR".

Is value 0kW?

YES >> GO TO 3.

NO-1 (with quick charge port)>>GO TO 2.

NO-2 (without quick charge port)>>Replace VCM. Refer to EVC-377, "Removal and Installation".

2.check on-board charger output power-i

(P)With CONSULT

- Turn power switch OFF.
- Perform quick charging.
- 3. Turn power switch ON.
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "OBC OUT PWR".

Is value 0kW?

< DTC/CIRCUIT DIAGNOSIS >

YES >> INSPECTION END (quick charger malfunction)

NO >> Replace VCM. Refer to EVC-377, "Removal and Installation".

 ${f 3.}$ PERFORM SELF-DIAGNOSIS OF ON-BOARD CHARGER

Perform self-diagnosis of on-board charger.

Is any DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> Check to see if there is a factor causing a situation that battery charge does not start. Refer to EVC-355. "Symptom Index".

P3172, P3173 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

P3172, P3173 ON-BOARD CHARGER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3172	ON BOARD CHARGER	VCM detects an error signal that is received from on-board charger	On-board charger
P3173	SYSTEM	via CAN communication.	On-board charger

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DTC CONFIRMATION PROCEDURE

1. INSPECTION START

NOTE:

This DTC is detected when on-board charger detects DTC. If this DTC detected, perform trouble diagnosis for a DTC that detected by on-board charger.

>> Proceed to EVC-237, "Diagnosis Procedure".

Diagnosis Procedure

Perform the self-diagnosis of on-board charger.

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P3175 VCM

< DTC/CIRCUIT DIAGNOSIS >

P3175 VCM

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3175	VCM	VCM detects a CAN error signal that is received from electric shift control module via CAN communication for 0.1 seconds or more.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-238, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539247

1.REPLACE VCM

- 1. Replace the VCM. Refer to EVC-377, "Removal and Installation".
- 2. Turn power switch ON.
- 3. Erase DTC.
- 4. Perform confirmation procedure. Refer to EVC-238, "DTC Logic".

Is DTC detected?

YES >> Replace the electric shift control module. Refer to TM-138, "Removal and Installation".

NO >> INSPECTION END

< DTC/CIRCUIT DIAGNOSIS >

P3176 TRACTION MOTOR INVERTER CONDENSER

DTC Logic

DTC DETECTION LOGIC

NOTE

If DTC P3176 is displayed with DTC P0A94, P0A08, P311C, P317A, P3191, P319C, P31A7, P31D4, P31D7, or P31DD, perform diagnosis for DTC P0A94, P0A08, P311C, P317A, P3191, P319C, P31A7, P31D4, P31D7, or P31DD.

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DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3176	INVERTER CONDENS- ER	Immediately before READY or the start of charge, pre-charging cannot be performed for 5 seconds or more.	Harness or connectors Li-ion battery J/B LBC DC/DC-J/B Traction motor inverter VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-239, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

- 1. Turn power switch OFF.
- Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 10 seconds.
- 4. Turn power switch ON.
- 5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-239, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

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< DTC/CIRCUIT DIAGNOSIS >

- 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 EVC-11, "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.
- Erase DTC after the work is completed.

1.PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM.

Is DTC detected other than P3176?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

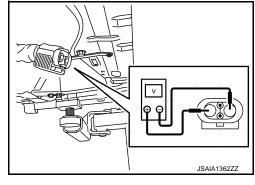
- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, <u>"Removal and Installation"</u> (TYPE 1), <u>EVB-395</u>, <u>"Removal and Installation"</u> (TYPE 2), <u>EVB-626</u>, <u>"Removal and Installation"</u> (TYPE 3) or <u>EVB-866</u>, <u>"Removal and Installation"</u> (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

- 1. Disconnect electric compressor high voltage harness connector.
- 2. Check the short circuit between electric compressor terminals.

Electric c		
+	_	Resistance
Terr		
7	8	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

>> GO TO 4.

YES >> GO TO 5.

NO

4. CHECK DC/DC JUNCTION BOX

1. Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".

< DTC/CIRCUIT DIAGNOSIS >

Check the continuity between DC/DC junction box connector terminals.

DC/DC-J/B		
+	-	Continuity
Terr		
18	24	Existed

Is the inspection result normal?

YES >> Replace electric compressor. Refer to HA-46, "Removal and Installation".

NO >> Replace electric compressor and DC/DC junction box. Refer to HA-46, "Removal and Installation" (electric compressor), EVC-369, "Removal and Installation" (DC/DC-J/B).

5. CHECK PTC ELEMENTS HEATER

- Disconnect PTC elements heater high voltage harness connector.
- Check the short circuit between PTC elements heater terminals.

PTC elem		
+	_	Resistance
Terminal		
7	8	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

$\mathbf{6}$. CHECK DC/DC JUNCTION BOX

- Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- Check the continuity between DC/DC junction box connector terminals.

DC/D	C-J/B		
+	_	Continuity	
Terr	ninal		
30	24	Existed	

Is the inspection result normal?

>> Replace PTC elements heater. Refer to HA-68, "Removal and Installation". YES

>> Replace PTC elements heater and DC/DC junction box. Refer to HA-68, "Removal and Installa-NO tion" (PTC elements heater), EVC-369, "Removal and Installation" (DC/DC-J/B).

.CHECK TRACTION MOTOR INVERTER

- Disconnect DC/DC junction box high voltage harness connector (H15).
- Check the short circuit between DC/DC junction box harness connector terminals.

DC/DC-J/B			
Connector	+	_	Resistance
Connector	Terr	minal	
H15	7	8	$3~\text{k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation".

8. CHECK HIGH VOLTAGE HARNESS

- Remove DC/DC junction box.
- Check the short circuit between high voltage harness terminals.

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< DTC/CIRCUIT DIAGNOSIS >

		DC/DC-J/B		
Connected to:	Connector	+	_	Resistance
	Connector	Terminal		
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3~\text{k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES-1 (with Li-ion battery heater)>>GO TO 9.

YES-2 (without Li-ion battery heater)>>Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Replace malfunctioning harness.

9. CHECK LI-ION BATTERY HEATER CIRCUIT

Check the short circuit between Li-ion battery terminals.

Li-ion battery		
+	_	Resistance
Terr	ninal	
23	24	3 kΩ or more

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check Li-ion battery heater system.

P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3177 ECU ACTIVATION ERROR

DTC Logic INFOID:0000000007539250

DTC DETECTION LOGIC

NOTE:

If DTC P3177 is displayed with DTC P3173, P317A, or P3191, perform diagnosis for DTC P3173, P317A, or P3191.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3177	ECU ACTIVATION ERROR (EV system start error)	When EV system starts up, on-board charger or traction motor inverter does not permit EV system activation.	Charging systemTraction motor systemEVSEQuick chargerExternal input

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

With CONSULT

- Set the vehicle to READY and wait at least 200 seconds. 1.
- 2. Check DTC.

Is DTC detected?

>> Proceed to EVC-244, "TYPE 1 : Diagnosis Procedure".

NO-1 (with quick charge port)>>GO TO 3.

NO-2 (without quick charge port)>>GO TO 4.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Turn power switch OFF.
- 2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- Connect quick charge connector.
- Start guick charging and wait at least 200 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-244, "TYPE 2 : Diagnosis Procedure".

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-III

(I) With CONSULT

- Turn power switch OFF.
- Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect normal charge connector (with AC power input) and wait at least 200 seconds. **CAUTION:**

When performing the DTC Confirmation Procedure before Diagnosis Procedure, use the EVSE used at the occurrence of malfunction.

Check DTC.

Is DTC detected?

>> Proceed to EVC-245, "TYPE 3: Diagnosis Procedure".

NO-1 (before diagnosis procedure)>>EVC-245, "TYPE 3: Diagnosis Procedure"

NO-2 (after diagnosis procedure)>>INSPECTION END

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P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

TYPE 1

TYPE 1: Diagnosis Procedure

INFOID:0000000007539251

1. CHECK DTC

(A) With CONSULT

Check other DTC is detected.

Are any DTC detected?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

(A) With CONSULT

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

(P)With CONSULT

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

TYPE 2

TYPE 2: Diagnosis Procedure

INFOID:0000000007539253

1. CHECK CONDITION

Check and study the quick charger to see that it is within the specification.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Erase DTC. (Quick charger malfunction)

2.CHECK DTC

(P)With CONSULT

Check other DTC detected.

Are any DTC detected?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

(P)With CONSULT

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 4.

4. CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

(P)With CONSULT

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

TYPE 3

P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

< DTC/CIRCUIT DIAGNOSIS >	
TYPE 3 : Diagnosis Procedure	INFOID:0000000007539252
1. PERFORM NORMAL CHARGING	
Erase DTC of all ECU. Turn power switch OFF. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.l. Connect normal charge connector (with AC power input) and wait at least 200 seconds. CAUTION:	
 Use an EVSE other than the one used for the previous DTC confirmation procedure Use NISSAN genuine EVSE or an equivalent. Check DTC. 	е.
s DTC detected again?	
YES >> GO TO 3. NO >> GO TO 2.	
2.check condition	
Check adherence to the following conditions at the occurrence of the malfunction: No interruption in the indoor power and EVSE. Use of the specified EVSE. Proper connection of EVSE.	
EVSE LED (FAULT) is not ON or blinking.	
>> INSPECTION END (Malfunctions except for vehicle) 3.CHECK DTC	
With CONSULT Check other DTC detected.	
Are any DTC detected? YES >> Check the DTC. Refer to EVC-84, "DTC Index". NO >> GO TO 4.	
4.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER	
With CONSULT Check self-diagnostic result in "CHARGER". Are any DTC detected?	
YES >> Check the DTC. Refer to VC-27, "DTC Index". NO >> GO TO 5.	
CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER	
With CONSULT Check self-diagnostic result in "MOTOR".	
Are any DTC detected? YES >> Check the DTC. Refer to EVC-84, "DTC Index". NO >> GO TO 6.	
CHECK CONDITION	
Check and study the following items: No interruption in the indoor power and EVSE. Use of the specified EVSE.	
Proper connection of EVSE. The charger remains cold.	
Is the inspection result normal? YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident". NO >> Repair or replace error-detected parts.	

P3178 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3178 ECU ACTIVATION ERROR

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P3178 is displayed with DTC P0AA0, P317A, P3191, P3193, P319C, P319E, P31A7, or P31A9, perform diagnosis for DTC P0AA0, P317A, P3191, P3193, P319C, P319E, P31A7, or P31A9.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3178	ECU ACTIVATION ERROR (EV system start error)	When EV system starts up, Li-ion battery or traction motor inverter does not permit EV system activation.	 Harness or connectors Li-ion battery system Traction motor system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 20 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-246, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Turn power switch OFF.
- 2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
- 3. Connect EVSE (with AC power input) and wait at least 20 seconds.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-246, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539255

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Perform self-diagnosis of VCM.

Is DTC detected other than P3178?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.check self-diagnostic result in traction motor inverter

(P)With CONSULT

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to TMS-36, "DTC Index".

NO >> GO TO 3.

P3178 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

3.check self-diagnostic result in Li-ion battery controller

(P)With CONSULT

Check self-diagnostic result in "HV BAT".

Are any DTC detected?

>> Check the DTC. Refer to <u>EVB-50. "DTC Index"</u> (TYPE 1), <u>EVB-268. "DTC Index"</u> (TYPE 2), <u>EVB-502. "DTC Index"</u> (TYPE 3) or <u>EVB-734. "DTC Index"</u> (TYPE 4). YES

NO >> Check high voltage harness connector installation condition of Li-ion battery and traction motor inverter.

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P3179, P317A, P317B TRACTION MOTOR INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3179, P317A, P317B TRACTION MOTOR INVERTER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3179			
P317A	MOTOR SYSTEM	VCM detects an error signal that is received from traction motor inverter via CAN communication for 0.01 seconds or more.	Traction motor inverter
P317B			

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

NOTE:

This DTC is detected when the traction motor inverter detects DTC. If this DTC detected, perform trouble diagnosis for a DTC that detected by traction motor inverter.

>> Proceed to EVC-248, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007539257

Perform the self-diagnosis of traction motor inverter.

P317D TRACTION MOTOR INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P317D TRACTION MOTOR INVERTER

DTC Logic

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INFOID:0000000007539259

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P317D	MOTOR SYSTEM	 The estimated torque value from the traction motor inverter to VCM remains greater/smaller than the torque command value from VCM to the traction motor inverter for the specified time. The difference between the estimated power consumption calculated based on a torque value from VCM to the traction motor inverter and the actual power consumption calculated based on a high voltage battery voltage and current is 20 kW or more. 	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

1. Set the vehicle to READY and perform test drive.

CAUTION:

Always drive vehicle at a safe speed.

NOTE:

DTC can be reproduced more easily when vehicle speed is higher.

Check DTC.

Is DTC detected?

YES >> Proceed to EVC-249, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK TRACTION MOTOR TORQUE

(P)With CONSULT

- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "TRG MOTOR TORQ 1" and "CUR-RENT MOTOR TORQ".
- Shift selector lever in P range.
- 3. Set the vehicle to READY.
- 4. Check that the difference between values indicated by "TRG MOTOR TORQ 1" and "CURRENT MOTOR TORQ" is within 20 N⋅m.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation".

2.REPLACE VCM

Revision: 2014 June

- 1. Replace VCM. Refer to EVC-377, "Removal and Installation".
- 2. Turn power switch ON and erase DTC.
- Perform DTC confirmation procedure. Refer to <u>EVC-249</u>, "<u>DTC Logic</u>".

Is DTC "P317D" detected again?

YES >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation".

NO >> INSPECTION END

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P317E, P3180, P3182 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P317E, P3180, P3182 LI-ION BATTERY

DTC Logic

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P317E			
P3180	HV BATTERY SYSTEM	VCM detects an error signal that is received from LBC via CAN communication for 0.02 seconds or more.	LBC
P3182			

DTC CONFIRMATION PROCEDURE

1. INSPECTION START

NOTE:

This DTC is detected when LBC detects DTC. If this DTC detected, perform trouble diagnosis for a DTC that detected by LBC.

>> Proceed to EVC-250, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007539261

Perform the self-diagnosis of LBC.

P3183 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P3183 LI-ION BATTERY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3183	HV BATTERY SYSTEM	After a lapse of 0.3 seconds from M/C RELAY ON, the following state remains for 2.8 seconds or more: LBC's calculation result to the VCM-set example question is incorrect.	• LBC • VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-251, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.REPLACE LBC

- 1. Replace LBC. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2), <u>EVB-645</u>, "<u>LI-ION BATTERY CONTROLLER</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-885</u>, "<u>LI-ION BATTERY CONTROLLER</u>: <u>Exploded View</u>" (TYPE 4).
- Turn power switch ON and erase DTC.
- 3. Perform DTC confirmation procedure. Refer to EVC-251, "DTC Logic".

Is DTC "P3183" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

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P3188 ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P3188 ELECTRIC SHIFT

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3188	ELECTRIC SHIFT SYSTEM	VCM receives a DTC detection signal sent from electric shift control module.	Electric shift control mod- ule

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:

This DTC is detected when the electric shift control module detects DTC. If this DTC detected, perform trouble diagnosis for a DTC that detected by electric shift control module.

>> Proceed to EVC-252, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000007539265

Perform self-diagnosis of electric shift control module.

P318A ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P318A ELECTRIC SHIFT

DTC Logic INFOID:0000000007539266

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318A	ELECTRIC SHIFT SYSTEM (Shift position signal invalid)	Difference between target shift position signal and current shift position signal for 1.2 seconds.	Electric shift system VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- Shift selector lever in N range and wait at least 20 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-253, "Diagnosis Procedure".

NO >> GO TO 3.

3.perform dtc confirmation procedure-ii

(P)With CONSULT

Shift the selector lever to the entire position from P to D, and shift it to N position.

Hold the lever at each position for 3 seconds or more.

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-253, "Diagnosis Procedure".

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is DTC detected other than P318A?

YES >> Check the DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

Check self-diagnostic result in "SHIFT".

Is any DTC detected?

YES >> Check the DTC. Refer to TM-51, "DTC Index".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- Erase DTC.
- Perform DTC confirmation procedure again. Refer to EVC-253, "DTC Logic".

EVC-253 Revision: 2014 June 2011 LEAF

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INFOID:0000000007539267

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P318A ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

Is the DTC "P318A" detected again?

- YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".
- NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

P318B ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P318B ELECTRIC SHIFT

DTC Logic INFOID:0000000007539268

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318B	ELECTRIC SHIFT SYSTEM (Electric shift malfunction)	 VCM detects invalid signal of shift position signal sent from electric shift control module. VCM receives abnormal shift position signal for 0.1 seconds or more. 	Electric shift system VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-256, "Diagnosis Procedure".

NO >> GO TO 3.

3 Perform DTC Confirmation PROCEDURE-II

(P)With CONSULT

1. Shift the selector lever to the entire position from P to D, and shift it to P position.

Hold the lever at each position for 15 seconds or more.

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-256, "Diagnosis Procedure".

NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-III

(P)With CONSULT

- 1. Set the vehicle to READY.
- 2. Drive the vehicle at 15 km/h (10 MPH) with the selector lever in D range. From this condition, shift the selector lever in R range.

CAUTION:

Always drive vehicle at safe speed.

- Stop the vehicle.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-256, "Diagnosis Procedure".

NO >> GO TO 5.

${f 5}$.PERFORM DTC CONFIRMATION PROCEDURE-IV

(P)With CONSULT

1. Drive the vehicle at 15 km/h (10 MPH) with the selector lever in R range. From this condition, shift the selector lever in D range.

CAUTION:

Always drive vehicle at safe speed.

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P318B ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

- Stop the vehicle.
- 3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-256, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539269

1. CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

(P)With CONSULT

Check self-diagnostic result in "SHIFT".

Are any DTC detected?

YES >> Check the DTC. Refer to TM-51, "DTC Index".

NO >> GO TO 2.

2. REPLACE ELECTRIC SHIFT CONTROL MODULE

- 1. Replace electric shift control module. Refer to TM-138, "Removal and Installation".
- 2. Power switch ON and erase DTC.
- 3. Perform DTC confirmation procedure again. Refer to EVC-255, "DTC Logic".

Is the DTC "P318B" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P318D CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P318D CAN COMMUNICATION

DTC Logic INFOID:0000000007539270

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P318D	COMMUNICATION ERROR	When VCM is not transmitting CAN communication signal for 2 seconds or more.	VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-257, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. PERFORM CONFIRMATION PROCEDURE AGAIN

- Erase DTC.
- 2. Perform confirmation procedure again. Refer to EVC-257, "DTC Logic".

Is DTC "P318D" detected again?

>> Replace VCM. Refer to EVC-377, "Removal and Installation". YES

>> Check intermittent incident. Refer to GI-51, "Intermittent Incident". NO

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P3191, P319C, P31A7 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3191, P319C, P31A7 EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3191			
P319C	COMMUNICATION ER-	When VCM detects an error signal that is received from traction motor inverter via CAN communication	Traction motor inverterVCM
P31A7			

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(I) With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-258, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539273

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P3191, P3191C, and P31A7 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

Mith CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-258, "DTC Logic".

Is DTC P3191, P319C, or P31A7 detected again?

YES >> Replace traction motor inverter. Refer to TMS-116, "Removal and Installation".

NO >> INSPECTION END

3. REPLACE TRACTION MOTOR INVERTER

(I) With CONSULT

- Replace traction motor inverter. Refer to <u>TMS-116</u>, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-258, "DTC Logic".

Is DTC P3191, P319C, or P31A7 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P3193, P319E, P31A9 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3193, P319E, P31A9 EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3193		WILL VOM LEAD TO THE TOTAL TO T	1.00
P319E	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from LBC via CAN communication	LBC VCM
P31A9	_		

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-259, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539275

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(I) With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P3193, P3191E, and P31A9 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-259</u>, "<u>DTC Logic</u>".

Is DTC P3193, P319E, or P31A9 detected again?

YES >> Replace LBC. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2), <u>EVB-645</u>, "<u>LI-ION BATTERY CONTROLLER</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-885</u>, "<u>LI-ION BATTERY CONTROLLER</u>: <u>Exploded View</u>" (TYPE 4).

NO >> INSPECTION END

3.REPLACE LBC

(P)With CONSULT

- 1. Replace LBC. Refer to EVB-176, "Exploded view" (TYPE 1), EVB-402, "Exploded view" (TYPE 2), EVB-645, "LI-ION BATTERY CONTROLLER: Exploded View" (TYPE 3) or EVB-885, "LI-ION BATTERY CONTROLLER: Exploded View" (TYPE 4).
- Perform DTC confirmation procedure again. Refer to EVC-259, "DTC Logic".

Is DTC P3193, P319E, or P31A9 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

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P3194, P319F, P31AA CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3194, P319F, P31AA CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3194		W VON I A TO THE TOTAL THE TOTAL TO THE TOTAL THE TOTAL TO THE TOTAL TOTAL TO THE TOTAL TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TO THE TOTAL TH	ABS actuator and elec-
P319F	COMMUNICATION ER-	When VCM detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication	tric unit (control unit)
P31AA		, , , , , , , , , , , , , , , , , , , ,	• VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-260, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539277

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(I) With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P3194, P3191F, and P31AA detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-260</u>, "<u>DTC Logic</u>".

Is DTC P3194, P319F, or P31AA detected again?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-154, "Removal and Installation".

NO >> INSPECTION END

3.replace abs actuator and electric unit (control unit)

(P)With CONSULT

- Replace ABS actuator and electric unit (control unit). Refer to <u>BRC-154, "Removal and Installation"</u>.
- 2. Perform DTC confirmation procedure again. Refer to EVC-260, "DTC Logic".

Is DTC P3194, P319F, or P31AA detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P3195, P31A0, P31AB CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3195, P31A0, P31AB CAN COMMUNICATION

DTC Logic INFOID:0000000007539278

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3195	00144411047101455		Electrically-driven intel-
P31A0	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from electrically-driven intelligent brake unit via CAN communication	ligent brake unit
P31AB		,	• VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-261, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539279

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P3195, P319A0, and P31AB detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to EVC-377, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-261, "DTC Logic".

Is DTC P3195, P31A0, or P31AB detected again?

>> Replace electrically-driven intelligent brake unit. Refer to BR-261, "Removal and installation". YES

NO >> INSPECTION END

3.replace electrically-driven intelligent brake unit

(P)With CONSULT

Revision: 2014 June

- Replace electrically-driven intelligent brake unit. Refer to BR-261, "Removal and installation".
- Perform DTC confirmation procedure again. Refer to EVC-261, "DTC Logic".

Is DTC P3195, P31A0, or P31AB detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> INSPECTION END NO

EVC-261

P3196, P31A1, P31AE EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3196, P31A1, P31AE EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3196		W VOM I	
P31A1	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from on-board charger via CAN communication	On-board chargerVCM
P31AE		gg.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-262, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

Paure (INFOID:000000007539281

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P3196, P319A1, and P31E7 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-262</u>, "<u>DTC Logic</u>".

Is DTC P3196, P31A1, or P31AE7 detected again?

YES >> Replace on-board charger. Refer to VC-112, "Removal and Installation".

NO >> INSPECTION END

3.REPLACE ON-BOARD CHARGER

(I) With CONSULT

- Replace on-board charger. Refer to <u>VC-112, "Removal and Installation"</u>.
- 2. Perform DTC confirmation procedure again. Refer to EVC-262, "DTC Logic".

Is DTC P3196, P31A1, or P31AE7 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P3197, P31A2, P31AD EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3197, P31A2, P31AD EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P3197			Electric shift control
P31A2	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from electric shift control module via CAN communication	module
P31AD			• VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-263, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539283

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P3197, P319A2, and P31AD detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-263</u>, "<u>DTC Logic</u>".

Is DTC P3197, P31A2, or P31AD detected again?

YES >> Replace electric shift control module. Refer to TM-138, "Removal and Installation".

NO >> INSPECTION END

3.replace electric shift control module

(P)With CONSULT

- 1. Replace electric shift control module. Refer to TM-138, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-263</u>, "<u>DTC Logic</u>".

Is DTC P3197, P31A2, or P31AD detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

Revision: 2014 June EVC-263 2011 LEAF

P31AF, P31B3 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31AF, P31B3 EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31AF	COMMUNICATION ER-	When VCM detects an error signal that is received from A/C auto	A/C auto amp.
P31B3	ROR	amp. via CAN communication	• VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(I) With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-264, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539285

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P31AF and P31B3 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-264, "DTC Logic".

Is DTC P31AF or P31B3 detected again?

YES >> Replace A/C auto amp. Refer to HAC-141, "Removal and Installation".

NO >> INSPECTION END

3.REPLACE A/C AUTO AMP.

(II) With CONSULT

- 1. Replace A/C auto amp. Refer to HAC-141, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-264, "DTC Logic"</u>.

Is DTC P31AF or P31B3 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P31B0, P31B4 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B0, P31B4 CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B0	COMMUNICATION ER-	When VCM detects an error signal that is received from AV control	AV control unit
P31B4	ROR	unit via CAN communication	• VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-265, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539287

${f 1}$.CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P31B0 and P31B4 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

With CONSULT

- Replace VCM. Refer to <u>EVC-377</u>, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-265</u>, "<u>DTC Logic</u>".

Is DTC P31B0 or P31B4 detected again?

YES >> Replace AV control unit. Refer to AV-119, "Removal and Installation".

NO >> INSPECTION END

3.REPLACE AV CONTROL UNIT

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With CONSULT

- 1. Replace AV control unit. Refer to AV-119, "Removal and Installation"
- 2. Perform DTC confirmation procedure again. Refer to EVC-265, "DTC Logic".

Is DTC P31B0 or P31B4 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P31B5 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B5 CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B5	COMMUNICATION ERROR	VCM detects an error signal that is received from combination meter via CAN communication	Combination meter VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch OFF.
- 2. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-266, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539289

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P31B5 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.REPLACE VCM

(I) With CONSULT

- 1. Replace VCM. Refer to EVC-377, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-266</u>, "<u>DTC Logic</u>".

Is DTC P31B5 detected again?

YES >> Replace combination meter. Refer to MWI-101, "Removal and Installation".

NO >> INSPECTION END

3.REPLACE COMBINATION METER

(P)With CONSULT

- 1. Replace combination meter. Refer to MWI-101, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-266, "DTC Logic".

Is DTC P31B5 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P31B6 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B6 CAN COMMUNICATION

DTC Logic INFOID:0000000007539290

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B6	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from IPDM E/R via CAN communication	IPDM E/R VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

>> Proceed to EVC-267, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P31B6 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.replace vcm

(P)With CONSULT

- Replace VCM. Refer to EVC-377, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-267, "DTC Logic".

Is DTC P31B6 detected again?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

>> INSPECTION END NO

3.REPLACE IPDM E/R

(P)With CONSULT

- Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-267, "DTC Logic".

Is DTC P31B6 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> INSPECTION END NO

EVC-267 Revision: 2014 June 2011 LEAF

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P31B7 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B7 CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B7	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from air bag diagnosis sensor unit via CAN communication	Air bag diagnosis sensor unit VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-268, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539293

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(A) With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P31B7 detected?

YES >> GO TO 2. NO >> GO TO 3.

2.REPLACE VCM

(P)With CONSULT

- 1. Replace VCM. Refer to EVC-377, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-268, "DTC Logic".

Is DTC P31B7 detected again?

YES >> Replace air bag diagnosis sensor unit. Refer to <u>SR-35</u>, "Removal and Installation".

NO >> INSPECTION END

3.replace air bag diagnosis sensor unit

(P)With CONSULT

- 1. Replace air bag diagnosis sensor unit. Refer to SR-35, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-268, "DTC Logic".

Is DTC P31B7 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P31B8 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B8 EV SYSTEM CAN COMMUNICATION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B8	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from TCU via CAN communication	• TCU • VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-269, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539295

1. CHECK TCU CONDITION

Check that the TCU activation is performed normally. Refer to <u>AV-187, "ADDITIONAL SERVICE WHEN USING TELEMATICS SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION: Description"</u>.

Is TCU activation performed normally?

YES >> GO TO 2.

NO >> Perform TCU activation. Refer to <u>AV-187</u>, "<u>ADDITIONAL SERVICE WHEN USING TELEMATICS SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION</u>: Work Procedure".

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any EV system CAN error (U1000 excluded) other than DTC P31B8 detected?

YES >> GO TO 3.

NO >> GO TO 4.

3. REPLACE VCM

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(II) With CONSULT

- 1. Replace VCM. Refer to EVC-377, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to <u>EVC-269</u>, "<u>DTC Logic</u>".

Is DTC P31B8 detected again?

YES >> Replace TCU. Refer to AV-212, "Removal and Installation".

NO >> INSPECTION END

4. REPLACE TCU

(P)With CONSULT

- 1. Replace TCU. Refer to AV-212, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-269, "DTC Logic".

Is DTC P31B8 detected again?

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P31B8 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

P31B9 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B9 CAN COMMUNICATION

DTC Logic INFOID:0000000007539296

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B9	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from electric parking brake control module via CAN communication	Electric parking brake control module VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

>> Proceed to EVC-271, "Diagnosis Procedure". YES

>> INSPECTION END NO

Diagnosis Procedure

INFOID:0000000007539297

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

(P)With CONSULT

Check self-diagnostic result in "EV/HEV".

Is any CAN error (U1000 excluded) other than DTC P31B9 detected?

YES >> GO TO 2.

NO >> GO TO 3.

2.replace vcm

(I) With CONSULT

- Replace VCM. Refer to EVC-377, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-271, "DTC Logic".

Is DTC P31B9 detected again?

YES >> Replace electric parking brake control module. Refer to PB-84, "Removal and Installation".

NO >> INSPECTION END

3.replace electric parking brake control module

(P)With CONSULT

- Replace electric parking brake control module. Refer to PB-84, "Removal and Installation".
- Perform DTC confirmation procedure again. Refer to EVC-271, "DTC Logic".

Is DTC P31B9 detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> INSPECTION END NO

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P31C0 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

P31C0 ON-BOARD CHARGER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C0	ON BOARD CHARGER SYSTEM	The voltage of a starting signal received from the charger remains HIGH for 5 seconds or more.	Harness or connectors On-board charger VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check the DTC.

Is DTC detected?

YES >> Proceed to EVC-272, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Connect EVSE (with AC power input) and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-272, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539299

1. CHECK EV SYSTEM ACTIVATION REQUEST SIGNAL-I

(P)With CONSULT

- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "EV SYS ACT REQ (OBC)".
- Disconnect EVSE.
- 3. Reconnect EVSE (with AC power input).
- 4. Check that "EV SYS ACT REQ (OBC)" indicates "On" for 1 second after EVSE connected.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 2.

$2.\mathsf{CHECK}$ EV SYSTEM ACTIVATION REQUEST SIGNAL-II

- Turn power switch OFF.
- Disconnect VCM harness connector.
- 3. Check the voltage between VCM harness connector and ground under the following condition.

P31C0 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

+ VCM		_	Condition	Value
Connector	Terminal			
E63	96	Ground	Power switch ON Immediately after EVSE is connected (with AC power input)	500mSec/div = 2V/div JSCIA0343ZZ

Is inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> GO TO 3.

3. CHECK EV SYSTEM ACTIVATION REQUEST SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect on-board charger harness connector.
- 3. Check continuity VCM harness connector and on board charger harness connector.

+				
VCM		On board charger		Continuity
Connector	Terminal	Connector	Terminal	
E63	96	B26	18	Existed

4. Also check harness for short to ground and power.

Is inspection result normal?

YES >> Replace on-board charger. Refer to <u>VC-112, "Removal and Installation"</u>.

NO >> Repair or replace error-detected parts.

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P31C1, P31C2 TCU

< DTC/CIRCUIT DIAGNOSIS >

P31C1, P31C2 TCU

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C1	TCU	VCM detects the EV system activation request signal (from TCU) is Approx. 5 V for 5 seconds.	Harness VCM
P31C2	100	VCM detects the EV system activation request signal (from TCU) is 0 V for 3 seconds after power switch OFF \rightarrow ON.	• TCU

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-274, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539301

1. CHECK TCU CONDITION

Check that the TCU activation is performed normally. Refer to <u>AV-187</u>, "<u>ADDITIONAL SERVICE WHEN USING TELEMATICS SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION</u>: <u>Description</u>".

Is TCU activation performed normally?

YES >> GO TO 2.

NO >> Perform TCU activation. Refer to <u>AV-187</u>, "<u>ADDITIONAL SERVICE WHEN USING TELEMATICS</u> SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION: Work Procedure".

2. CHECK EV SYSTEM ACTIVATION REQUEST SIGNAL-I

(P)With CONSULT

- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "EV SYS ACT REQ (TCU)".
- 2. Turn power switch OFF.
- 3. Turn power switch ON.
- 4. Check that "EV SYS ACT REQ (TCU)" indicates "On" for 1 second after EVSE connected.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 3.

3.check ev system activation request signal-ii $\,$

- Turn power switch OFF.
- Disconnect VCM harness connector.
- Check the voltage between VCM harness connector and ground under the following condition.

P31C1, P31C2 TCU

< DTC/CIRCUIT DIAGNOSIS >

V	+ VCM Connector Terminal		Condition	Value
E63	84	Ground	Power switch: OFF⇒ON	500mSec/div

Is inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> GO TO 4.

4. CHECK EV SYSTEM ACTIVATION REQUEST SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect TCU harness connector.
- 3. Check the continuity between VCM harness terminal and TCU harness terminal.

+				
VCM		TCU		Continuity
Connector	Terminal	Connector	Terminal	
E63	84	M2	11	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Replace TCU. Refer to AV-212, "Removal and Installation".

NO >> Repair or replace error-detected parts.

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P31C4 VCM TIMER

< DTC/CIRCUIT DIAGNOSIS >

P31C4 VCM TIMER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C4	VCM TIMER	When VCM starts, the setting of timer charge time is cleared even when it is stored.	VCM power supply circuit 12V battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Turn power switch OFF and wait at least 20 seconds.
- 3. Repeat steps 1 and 2 for 3 times.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-276, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539303

1. CHECK VCM POWER SUPPLY

Check VCM power supply (battery power). Refer to EVC-113, "VCM: Diagnosis Procedure"

Is inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.INTERVIEW THE CUSTOMER

Interview the customer to see if there is a removal history of 12V battery terminals.

NOTE

DTC "P31C4" may be detected when 12V battery terminal is disconnected.

Is there a removal history of 12V battery terminals?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(P)With CONSULT

- 1. Reconnect all harness connector disconnected.
- 2. Turn power switch ON.
- 3. Erase DTC.
- 4. Perform DTC confirmation procedure again.

P31C4 VCM TIMER

< DTC/CIRCUIT DIAGNOSIS >

Is DTC "P31C4"	detected again?
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YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

P31C5, P31C6 VCM

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C5	VCM	VCM malfunction is detected	VCM
P31C6	VOIVI	VOW Manufaction is detected	VOIVI

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-278, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Turn power switch OFF and wait at least 20 seconds.
- 2. Turn power switch ON and wait at least 60 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-278, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539305

1.CHECK VCM-I

(P)With CONSULT

- Erase DTC.
- Turn power switch OFF and wait at least 20 seconds.
- Disconnect 12V battery negative terminal and wait at least 1 minute. Refer to <u>EVC-10</u>, "<u>Precautions for Removing Battery Terminal</u>".
- Reconnect 12V battery negative terminal.
- 5. Turn power switch ON and wait at least 5 minutes.
- Check DTC.

Is DTC "P31C5" or P31C6" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> GO TO 2.

2.CHECK VCM-II

(I) With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON and wait at least 60 seconds.
- Check DTC.

Is DTC "P31C5" or P31C6" detected again?

P31C5, P31C6 VCM

< DTC/CIRCUIT DIAGNOSIS >

YES	>> Replace VCM. Refer to EVC-377, "Removal and Installation".
NO	>> INSPECTION END

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P31C7 VCM

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C7	VCM	VCM malfunction is detected	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-280, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-II

(I) With CONSULT

- 1. Set timer charge start time to 5 minutes later.
- 2. Turn power switch OFF.
- 3. Connect EVSE (With AC power input) and wait until battery charge starts.
- 4. Wait at least 10 minutes after starting timer charge.
- 5. Turn the power switch ON while charging.
- 6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-280, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539307

1. CHECK VCM-I

(P)With CONSULT

- Erase DTC.
- 2. Turn power switch OFF and wait at least 20 seconds.
- 3. Disconnect 12V battery negative terminal and wait at least 1 minute. Refer to EVC-10, "Precautions for Removing Battery Terminal".
- Reconnect 12V battery negative terminal.
- 5. Turn power switch ON and wait at least 6 minutes.
- 6. Check DTC.

Is DTC "P31C7" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE AGAIN

(II) With CONSULT

Perform confirmation procedure again. Refer to EVC-280, "DTC Logic".

Is DTC "P31C7" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

Revision: 2014 June EVC-280 2011 LEAF

NO >> INSPECTION END

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P31C8, P31C9 NORMAL CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31C8, P31C9 NORMAL CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P31C8 or P31C9 is displayed with DTC P3101, first perform diagnosis for DTC P3101.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C8	ON BOARD CHARGER	VCM received normal charge relay (-) stuck signal from on-board charger.	Harness or connectors Normal charge relay
P31C9	SYSTEM	VCM received normal charge relay (+) stuck signal from on-board charger.	On-board charger

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 180 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-282, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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

INFOID:0000000007539309

- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.

1. PERFORM SELF-DIAGNOSIS OF ON-BOARD CHARGER

Perform self-diagnosis of on-board charger.

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 2.

P31C8, P31C9 NORMAL CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).

2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 4).

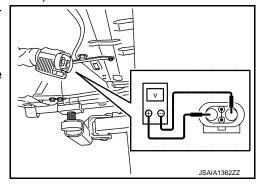
 Measure voltage between high voltage harness connector terminals.

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 500 V or higher.

>> GO TO 3.

3.CHECK NORMAL CHARGE RELAY

- 1. Remove DC/DC-J/B.
- 2. Check the continuity between DC/DC-J/B connector terminals.

Check Item	DC/DC J/B		Continuity	
Check item	Terminals			
Normal charge relay (+)	(+) 24 27		Not existed	
Normal charge relay (-)	25	28	Not existed	

Is the inspection result normal?

NO

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> Replace DC/DC-J/B. Refer to EVC-369, "Removal and Installation".

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P31CA, P31CB QUICK CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31CA, P31CB QUICK CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P31CA or P31CB is displayed with DTC P3101, first perform diagnosis for DTC P3101.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31CA	ON BOARD CHARGER	VCM received quick charge relay (-) stuck signal from on board charger.	Harness or connectors Quick charge relay
P31CB	SYSTEM	VCM received quick charge relay (+) stuck signal from on board charger.	On-board charger

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Start quick charging and wait at least 30 seconds.
- 2. Stop quick charging and wait at least 30 seconds.
- 3. Turn power switch ON.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-284, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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.

INFOID:0000000007539311

- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.
- 1. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

1. Erase DTC.

P31CA, P31CB QUICK CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

2. Perform the DTC confirmation procedure again using a quick charger other than the one that is used for the initial confirmation procedure. Refer to EVC-284, "DTC Logic".

Is DTC "P31CA" or "P31CB" detected again?

YES >> GO TO 2.

NO >> INSPECTION END (Quick charger malfunction)

2.perform self-diagnosis of on-board charger

Perform self-diagnosis of on-board charger.

Are any DTC detected?

YES >> Perform diagnosis procedure of detected DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 3.

${f 3.}$ PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- 1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, <u>"Removal and Installation"</u> (TYPE 1), <u>EVB-395</u>, <u>"Removal and Installation"</u> (TYPE 2), <u>EVB-626</u>, <u>"Removal and Installation"</u> (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 4.

CHECK QUICK CHARGE RELAY

- 1. Remove DC/DC-J/B.
- Check the continuity between DC/DC-J/B connector terminals.

Check Item	DC/DC J/B		Continuity	
Check item	Terminals		Continuity	
Quick charge relay (+)	34 27		Not existed	
Quick charge relay (-)	33	28	Not existed	

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Replace DC/DC-J/B. Refer to EVC-369, "Removal and Installation".

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P31D4 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D4 PRE-CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D4	PRE CHARGE RELAY	After operating the power switch from OFF to READY, a break occurs in the pre-charge relay drive circuit or resistance remains extremely high for 0.2 seconds or more.	Harness or connectors Li-ion battery J/B VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- Turn power switch OFF and wait at least 60 seconds.
- 2. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-286, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539313

1. CHECK PRE-CHARGE RELAY GROUND CIRCUIT

- Turn power switch OFF.
- Disconnect Li-ion battery harness connector.
- 3. Check the continuity between Li-ion battery harness connector and ground.

Li-ion	battery	Ground	Continuity	
Connector	Terminal	Glound		
B24	10	Ground	Existed	

Is inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-I

Check the resistance between Li-ion battery connector terminals.

Li-ion		
+	-	Resistance
Terr		
10	11	Less than 5 k Ω

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-176, "Exploded view" (TYPE 1), EVB-402, "Exploded view" (TYPE 2),

P31D4 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

EVB-648, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 3) or EVB-888, "BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 4).

3. CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-II

- 1. Disconnect VCM harness connector.
- 2. Check continuity between VCM harness connector and Li-ion battery harness connector.

+		-		
VCM		Li-ion battery		Continuity
Connector	Terminal	Connector	Terminal	
E63	105	B24	11	Existed

3. Also check harness for short to power.

Is inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

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P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D5 PRE-CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P31D5 is displayed with DTC P0AA2, P31D4, P31DB, or P31DD, perform diagnosis for DTC P0AA2, P31D4, P31DB, or P31DD.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D5	PRE CHARGE RELAY	 The voltage of the traction motor inverter is 100 V or more immediately before starting charging or immediately before READY. The voltage of the traction motor inverter is 100 V or more when only the system main relay 2 is ON. 	 Harness or connectors Battery J/B Traction motor inverter VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and perform test drive.
- 2. Turn power switch OFF and wait at least for 60 seconds.
- 3. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-288, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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.

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- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.

1.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

(P)With CONSULT

Perform self-diagnosis of traction motor inverter.

P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is DTC detected?

YES >> Perform detected DTC diagnosis procedure. Refer to TMS-36, "DTC Index".

NO >> GO TO 2.

2.CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check the voltage between Li-ion battery harness connector and ground.

	+ Li-ion battery			Voltage
Check item			_	
	Connector	Terminal		
System main relay 1		17		
System main relay 2	B24	14	ground	0 V
Pre-charge relay		11		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check harness for short to power.

3. PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or <u>EVB-866</u>, "Removal and Installation" (TYPE 4).

2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).

 Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 4.

4. CHECK ELECTRIC COMPRESSOR

1. Disconnect electric compressor high voltage harness connector.

Check the short circuit between electric compressor terminals.

Electric c		
+	-	Resistance
Terminal		
7	8	$3~\text{k}\Omega$ or more

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P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 6. NO >> GO TO 5.

5. CHECK DC/DC JUNCTION BOX

- Remove DC/DC junction box. Refer to <u>EVC-369</u>. "Removal and Installation".
- 2. Check the continuity between DC/DC junction box connector terminals.

DC/D		
+	_	Continuity
Terminal		
18	24	Existed

Is the inspection result normal?

YES >> Replace electric compressor. Refer to <u>HA-46</u>, "Removal and Installation". And then, GO TO 10.

NO >> Replace electric compressor and DC/DC junction box. And then, GO TO 10. Refer to HA-46, <a href="mailto:"/"Removal and Installation" (DC/DC-J/B).

6. CHECK PTC ELEMENTS HEATER

- 1. Disconnect PTC elements heater high voltage harness connector.
- 2. Check the short circuit between PTC elements heater terminals.

PTC elem		
+	_	Resistance
Terminal		
7	8	$3 \text{ k}\Omega$ or more

Is the inspection result normal?

YES >> GO TO 8.

NO >> GO TO 7.

7. CHECK DC/DC JUNCTION BOX

- 1. Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- 2. Check the continuity between DC/DC junction box connector terminals.

DC/D		
+ -		Continuity
Terminal		
30	24	Existed

Is the inspection result normal?

NO

YES >> Replace PTC elements heater. Refer to <u>HA-68, "Removal and Installation"</u>. And then, GO TO 10.

>> Replace PTC elements heater and DC/DC junction box. And then, GO TO 10. Refer to <u>HA-68.</u> "Removal and Installation" (PTC elements heater), <u>EVC-369</u>, "Removal and Installation" (DC/DC-J/B).

8. CHECK TRACTION MOTOR INVERTER

- 1. Disconnect DC/DC junction box high voltage harness connector (H15).
- Check the short circuit between DC/DC junction box harness connector terminals.

DC/DC-J/B			
Connector	+	_	Resistance
Connector	Terr	minal	
H15	35	36	$3~\text{k}\Omega$ or more

P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace traction motor inverter. Refer to <u>TMS-116, "Removal and Installation"</u>. And then, GO TO 10.

9. CHECK HIGH VOLTAGE HARNESS

- 1. Remove DC/DC junction box.
- 2. Check the short circuit between high voltage harness terminals.

Connected to:	Connector	+	_	Resistance
	Connector	Terr	Terminal	
Electric compressor	H2	18	19	
Li-ion battery	H4	24	25	$3 \text{ k}\Omega$ or more
PTC elements heater	H9	30	31	

Is the inspection result normal?

YES >> GO TO 10.

NO >> Replace malfunctioning harness. And then, GO TO 10.

10. REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to <u>EVB-176</u>, "<u>Exploded view</u>" (TYPE 1), <u>EVB-402</u>, "<u>Exploded view</u>" (TYPE 2), <u>EVB-648</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 3) or <u>EVB-888</u>, "<u>BATTERY JUNCTION BOX AND BATTERY HARNESS</u>: <u>Exploded View</u>" (TYPE 4).

>> INSPECTION END

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< DTC/CIRCUIT DIAGNOSIS >

P31D6 F/S RELAY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D6	F/S RELAY	VCM detected the F/S relay stuck	Harness or connectorsIPDM E/RVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-292, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539317

1. CHECK F/S RELAY OUTPUT VOLTAGE-I

- 1. Turn power switch OFF.
- 2. Check the voltage between IPDM E/R harness connector and ground.

+			
IPDN	/I E/R	_	Voltage
Connector	terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 2.

2.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-I

Check the voltage between IPDM E/R harness connector and ground.

+			
IPDN	И E/R	_	Voltage
Connector	terminal		
E15	60	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-II

1. Disconnect VCM harness connector.

P31D6 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

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

+			
IPDM E/R		_	Voltage
Connector	terminal		
E15	60	Ground	12V battery volt- age

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check harness for short to ground, between VCM harness connector and IPDM E/R harness connector.

4. CHECK F/S RELAY OUTPUT VOLTAGE-II

- 1. Disconnect IPDM E/R harness connector.
- 2. Check the voltage between IPDM E/R harness connector and ground.

+			
IPDN	M E/R	_	Voltage
Connector	terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> GO TO 5.

5. CHECK F/S RELAY OUTPUT VOLTAGE-III

- 1. Disconnect VCM harness connector.
- 2. Check the voltage between IPDM E/R harness connector and ground.

+			
IPDM E/R		_	Voltage
Connector	terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Check harness for short to power, between VCM harness connector and IPDM E/R harness connector.

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P31D7 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D7 F/S RELAY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D7	F/S RELAY	VCM detected the F/S relay open	Harness or connectorsIPDM E/RVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-294, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539319

1. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #64 fuse.
- 3. Make sure that fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

2.CHECK 12V BATTERY POWER SUPPLY

- 1. Insert the fuse which pulled out.
- 2. Disconnect IPDM E/R harness connector (E9).
- 3. Check the voltage between IPDM E/R harness connector and ground.

+ IPDM E/R		_	Voltage	
Connector	Terminal			
E9	2	Ground	12V battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check 12V battery power supply routing circuit.

3.CHECK F/S RELAY OUTPUT VOLTAGE

- Reconnect IPDM E/R harness connector (E9).
- Turn power switch ON.
- 3. Check the voltage between IPDM E/R harness connector and ground.

P31D7 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

+ IPDM E/R		-	Voltage	
Connector	terminal			
E15	55	Ground	12V battery voltage	

Is the inspection result normal?

>> GO TO 9. YES NO >> GO TO 4.

4. CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-I

Check the voltage between IPDM E/R harness connector and ground.

+			Maltana
IPDM E/R		_	Voltage (Approx.)
Connector	terminal		, , ,
E15	60	Ground	0 V

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 5.

5. CHECK F/S RELAY DRIVE CIRCUIT

1. Turn power switch OFF.

- 2. Disconnect VCM harness connector and IPDM E/R harness connector.
- Check continuity between VCM harness connector and IPDM E/R harness connector.

	+		_	
V	СМ	IPDI	M E/R	Continuity
Connector	Terminal	Connector	Terminal	
E62	73	E15	60	Existed

Is inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

$\mathsf{6}.$ CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+			
V	VCM		Continuity
Connector	Terminal		
E62	4	Ground	Existed
E02	8		
E63	111	Giodila	
	112	-	

Is inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

>> Repair or replace error-detected parts. NO

7.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-II

- Turn power switch OFF.
- 2. Disconnect IPDM E/R harness connector (E15).
- Check the voltage between IPDM E/R connector and ground.

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P31D7 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		
IPDM E/R	_	Voltage
terminal		
60	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

8. CHECK F/S RELAY OUTPUT CIRCUIT-I

- 1. Disconnect VCM harness connector.
- 2. Check harness for short to ground, between IPDM E/R harness connector and VCM harness connector.

+			
IPDM E/R		_	Continuity
Connector	terminal		
E15	55	Ground	Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

NO >> Repair or replace error-detected parts.

9. CHECK F/S RELAY OUTPUT CIRCUIT-II

- Turn power switch OFF.
- 2. Disconnect VCM harness connector and IPDM E/R harness connector.
- 3. Check continuity between VCM harness connector and IPDM E/R harness connector.

	+		_	
V	СМ	IPDN	/I E/R	Continuity
Connector	Terminal	Connector	Terminal	
E62	77	E15	55	Existed

Is inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

P31DB SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

P31DB SYSTEM MAIN RELAY +

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DB	HV BATT MAIN RELAY +	System main relay 1 drive circuit remains short to ground for 2.5 seconds or more.	Harness or connectors Li-ion battery J/B VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Set the vehicle to READY and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-297, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK SYSTEM MAIN RLY 1 DRIVE CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check continuity between Li-ion battery connector terminal and ground.

+		
Li-ion battery	_	Continuity
terminals		
17	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK SYSTEM MAIN RLY 1 DRIVE CIRCUIT-II

1. Disconnect VCM harness connector.

Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

	+		
Li-ion battery		_	Continuity
Connector	terminal		
B24	17	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

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P31DC SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

P31DC SYSTEM MAIN RELAY -

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DC	HV BATT MAIN RELAY –	System main relay 2 drive circuit remains short to ground for 2.5 seconds or more.	Harness or connectors Li-ion battery J/B VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Set the vehicle to READY and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-298. "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539323

1. CHECK SYSTEM MAIN RLY 2 DRIVE CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check continuity between Li-ion battery connector terminal and ground.

+		Out in it
Li-ion battery	_	Continuity
terminals		
14	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK SYSTEM MAIN RLY 2 DRIVE CIRCUIT-II

- 1. Disconnect VCM harness connector.
- Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

	+			
Li-ion battery		_	Continuity	
Connector	terminal			
B24	14	Ground	Not existed	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

P31DD PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31DD PRE-CHARGE RELAY

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31DD	PRE CHARGE RELAY (Pre-charge relay circuit range/performance)	Pre-charge relay drive circuit remains short to ground for 2.5 seconds or more.	Harness or connectors (Pre-charge relay drive circuit is shorted) Pre-charge relay

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

- Set the vehicle to READY and wait at least 5 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-299, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539325

1. CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Disconnect Li-ion battery harness connector.
- 3. Check continuity between Li-ion battery connector terminal and ground.

+		
Li-ion battery	_	Continuity
terminals		
11	Ground	Not existed

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Is the inspection result normal?

YES >> GO TO 2.

NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-II

- 1. Disconnect VCM harness connector.
- 2. Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

+			
Li-ion battery		_	Continuity
Connector	terminal		
B24	11	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

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P31DE SYSTEM MAIN RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31DE SYSTEM MAIN RELAY

DTC Logic

DTC DETECTION LOGIC

NOTE:

This DTC shows a forced system main relay disconnection by fail-safe.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DE	HV BATT MAIN RELAY	When the system main relay is shut off, VCM accumulates high voltage current value, and the accumulated value reaches the specified value.	 Li-ion battery J/B Li-ion battery system A/C system DC/DC-J/B Traction motor system VCM system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(I) With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- 2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-300, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539327

1. PERFORM SELF-DIAGNOSIS OF VCM

(P)With CONSULT

Perform self-diagnosis of VCM.

Is DTC detected other than P31DE?

YES >> Perform diagnosis procedure of detected DTC and then replace battery J/B. Refer to EVB-176, "Exploded view" (TYPE 1), EVB-402, Exploded view" (TYPE 2), EVB-648, BATTERY JUNCTION BOX AND BATTERY HARNESS: Exploded View" (TYPE 4).

NO >> Replace Li-ion battery J/B. Refer to EVB-402, EVB-402, E

< DTC/CIRCUIT DIAGNOSIS >

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description INFOID:0000000007539328

The high voltage connector connection detecting circuit monitors the connection status of the high voltage

The high voltage connector connection detecting circuit is composed of 2 circuits: the input side and output side. When the high voltage connector is connected, the input side and outputs side are connected via the contacts inside the high voltage connector, forming the circuit.

DTC Logic INFOID:0000000007539329

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E0	HV SYSTEM INTERLOCK ERROR (High voltage harness con- nection detecting circuit low input)	VCM detects an excessively low voltage of the high voltage harness connection detecting circuit for 2.5 seconds during READY. VCM detects an excessively low voltage of the high voltage harness connection detecting circuit for 0.5 seconds during power switch ON.	Harness or connectors (High voltage harness connection detection circuit is open or shorted.) High voltage harness connectors Quick charge port

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- Turn power switch ON at least 5 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-301, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Set the vehicle to READY at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

>> Proceed to EVC-301, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.

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< DTC/CIRCUIT DIAGNOSIS >

- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield 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 EVC-11, "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.
- Erase DTC after the work is completed.

1.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector terminals

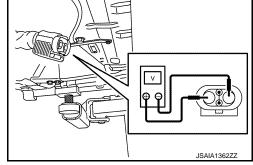
DANGER:

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 500 V or higher.

>> GO TO 2.

2.CHECK HIGH VOLTAGE HARNESS CONNECTOR INSTALLATION CONDITION

Check high voltage harness connectors installation condition visually and tactually. **CAUTION:**

When reconnecting the high voltage harness connector, insert it slowly and directly.

Is the inspection result normal?
YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3.CHECK FUSE

Pull out #73 fuse and check that the fuse is not fusing.

Is the inspection result normal?

YES-1 (With quick charge port)>>GO TO 4.

YES-2 (Without quick charge port)>>GO TO 8.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY-I

- 1. Insert the fuse which pulled out.
- 2. Disconnect quick charge port harness connector (+) side.
- 3. Reconnect 12V battery cable.

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< DTC/CIRCUIT DIAGNOSIS >

- 4. Turn power switch ON.
- 5. Check the voltage between quick charge port and ground.

+				
Quick charge port		_	Voltage	
Connector	Terminal			
H13	12	Ground	12V battery power supply	

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

${f 5.}$ CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Remove M/C relay.
- Check the continuity between quick charge port harness connector and M/C relay harness connector terminal.

+		_		
Quick ch	arge port	M/C relay		Continuity
Connector	Terminal	Connector	Terminal	
H13	12	E65	5	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

6.CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-II

- 1. Disconnect quick charge port harness connector (-) side.
- 2. Check the continuity between quick charge port harness connectors.

+		_		
	Quick charge port			Continuity
Connector	Terminal	Connector	Terminal	
H13	13	H14	15	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7.CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-III

- 1. Disconnect DC/DC junction box harness connector.
- Check the continuity between quick charge port harness connector and DC/DC junction box harness connector.

+		-		
Quick ch	arge port	DC/DC J/B		Continuity
Connector	Terminal	Connector	Terminal	
H14	16	F11	6	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 10.

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

8.CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY-II

- 1. Insert the fuse which pulled out.
- 2. Disconnect DC/DC junction box harness connector.
- 3. Reconnect 12V battery cable.
- 4. Turn power switch ON.
- 5. Check the voltage between DC/DC junction box and ground.

	+		
DC/D	OC J/B	_	Voltage
Connector	Terminal		
F11	6	Ground	12V battery power supply

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

$\mathbf{9}.$ CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-IV

- 1. Turn power switch OFF.
- 2. Remove M/C relay.
- 3. Check the continuity between DC/DC harness connector and M/C relay harness connector terminal.

+		-		
DC/D	OC J/B	M/C relay		Continuity
Connector	Terminal	Connector	Terminal	
F11	6	E65	5	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

10.check connection detection circuit-v

- 1. Disconnect VCM harness connector.
- 2. Check the continuity between VCM harness connector and DC/DC junction box harness connector.

	+		_		
	V	CM	DC/DC J/B		Continuity
	Connector	Terminal	Connector	Terminal	
•	E61	23	F11	5	Existed

Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

11. CHECK HIGH VOLTAGE HARNESS CONNECTOR

- 1. Remove DC/DC junction box. Refer to EVC-369, "Removal and Installation".
- 2. Check the continuity between following connector terminals.

< DTC/CIRCUIT DIAGNOSIS >

	High voltage harness			
Harness	Connector	+	_	Continuity
пашезз	Connector	Teri	Terminal	
To A/C compressor	H2	22	23	
To Li-ion battery	H4	38	39	
To on-board charger	H7	40	41	
To PTC elements heater	H9	42	43	Existed
To Quick charge port*	H11	44	45	
To traction motor inverter	H15	46	47	

^{*:} With Quick charge port models

Is the inspection result normal?

YES >> Replace DC/DC junction box. Refer to EVC-369, "Removal and Installation".

NO >> Replace malfunctioning high voltage harness.

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< DTC/CIRCUIT DIAGNOSIS >

P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

VCM receives high voltage harness connector connection malfunction information via EV system CAN communication sent from Li-ion battery controller. When Li-ion battery controller detects the connection malfunction of high voltage harness or detects the connection detecting system malfunction, Li-ion battery controller sends a high voltage harness connector connection malfunction information to VCM.

DTC Logic (INFOID:000000007539332

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E1	HV SYSTEM INTERLOCK ERROR (High voltage harness con- nection malfunction)	VCM receives the connection malfunction signal via EV system CAN communication sent from Li-ion battery controller.	Harness and connector (Connection detecting circuit within Li-ion battery) High voltage harness Service plug

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE-I

(I) With CONSULT

- 1. Turn power switch ON at least 5 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-306, "Diagnosis Procedure".

NO >> GO TO 3.

3.PERFORM CONFIRMATION PROCEDURE-II

(P)With CONSULT

- 1. Set the vehicle to READY at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-306, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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.

INFOID:0000000007539333

- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

< DTC/CIRCUIT DIAGNOSIS >

- 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 EVC-11, "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.
- Erase DTC after the work is completed.

CHECK SELF-DIAGNOSTIC RESULT IN LBC

Check self-diagnostic result in "HV BAT".

Are any DTC detected?

YES >> Check the DTC. Refer to EVB-50, "DTC Index" (TYPE 1), EVB-268, "DTC Index" (TYPE 2), EVB-502, "DTC Index" (TYPE 3) or EVB-734, "DTC Index" (TYPE 4).

NO >> GO TO 2.

2. PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Disconnect high voltage harness connector from front side of Li-ion battery. Refer to <u>EVB-169</u>, <u>"Removal and Installation"</u> (TYPE 1), <u>EVB-395</u>, <u>"Removal and Installation"</u> (TYPE 2), <u>EVB-626</u>, <u>"Removal and Installation"</u> (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

>> GO TO 3.

3.check high voltage harness connector installation

Check high voltage harness connectors installation condition visually and tactually.

CAUTION:

When reconnecting the high voltage harness connector, insert it slowly and directly.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK SERVICE PLUG

Check service plug connector terminals.

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< DTC/CIRCUIT DIAGNOSIS >

Service	ce plug	
Terminal		Continuity
+	_	
3	4	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace service plug.

5. CHECK HIGH VOLTAGE HARNESS CONNECTOR

- 1. Disconnect high voltage harness connector from Li-ion battery.
- 2. Check high voltage harness connector visually and tactually.

Is the inspection result normal?

YES >> Check a circuit within the battery.

NO >> Replace high voltage harness.

< DTC/CIRCUIT DIAGNOSIS >

P31E2 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

VCM receives high voltage harness connector connection malfunction information via EV system CAN communication sent from on-board charger. When on-board charger detects the connection malfunction of high voltage harness or detects the connection detecting system malfunction, on-board charger sends a high voltage harness connector connection malfunction information to VCM.

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E2	HV SYSTEM INTERLOCK ERROR (High voltage harness con- nection malfunction)	VCM receives the connection malfunction signal via EV system CAN communication sent from on-board charger.	High voltage harnessOn-board chargerVCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM CONFIRMATION PROCEDURE-I

(P)With CONSULT

- Turn power switch ON at least 5 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-309, "Diagnosis Procedure".

NO >> GO TO 3.

3. PERFORM CONFIRMATION PROCEDURE-II

(P)With CONSULT

- Set the vehicle to READY at least 10 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-309, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

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< DTC/CIRCUIT DIAGNOSIS >

- 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 EVC-11, "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.
- Erase DTC after the work is completed.

1.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

Check self-diagnostic result in on-board charger.

Are any DTC detected?

YES >> Check the DTC. Refer to VC-27, "DTC Index".

NO >> GO TO 2.

2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

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

- Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, <u>"Removal and Installation"</u> (TYPE 1), <u>EVB-395</u>, <u>"Removal and Installation"</u> (TYPE 2), <u>EVB-626</u>, <u>"Removal and Installation"</u> (TYPE 3) or <u>EVB-866</u>, <u>"Removal and Installation"</u> (TYPE 4).
- 2. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, "Removal and Installation" (TYPE 1), EVB-395, "Removal and Installation" (TYPE 2), EVB-626, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector terminals.

DANGER:

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



Standard : 5 V or less

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CAUTION:

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

>> GO TO 3.

3.check high voltage harness connector installation

Check high voltage harness connectors installation condition visually and tactually. **CAUTION:**

When reconnecting the high voltage harness connector, insert it slowly and directly. Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- 1. Erase DTC.
- Turn power switch OFF and wait at least 20 seconds.
- 3. Perform DTC confirmation procedure again. Refer to EVC-309, "DTC Logic".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P31E7 RESTART INHIBITION

< DTC/CIRCUIT DIAGNOSIS >

P31E7 RESTART INHIBITION

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31E7	RESTART INHIBITION	VCM detects DTC "P0AA6".	VCM detects DTC "P0AA6".

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DTC CONFIRMATION PROCEDURE

1. INSPECTION START

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NOTE:

This DTC is detected when VCM detects DTC "P0AA6". If this DTC detected, perform trouble diagnosis for DTC "P0AA6".

>> Proceed to EVC-311, "Diagnosis Procedure".

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Diagnosis Procedure

Perform trouble diagnosis for DTC "P0AA6". Refer to EVC-157, "DTC Logic".

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P31E8 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31E8 WATER PUMP 1

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31E8	WATER PUMP 1	Electric water pump 1 feedback duty keeps either of the following conditions for 30 seconds. • Less than 2% • 98% or more • Between 13% and 17%	Harness or connectors Electric water pump 1 VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Set the vehicle to READY and wait at least 60 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-312, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539340

1. CHECK SELF-DIAGNOSTIC RESULT IN VCM

Check self-diagnostic result in "EV/HEV".

Is DTC detected other than P31E8?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK WATER PUMP 1 FEEDBACK DUTY-I

(I) With CONSULT

- Set the vehicle to READY.
- 2. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 1 CRNT SPD DUTY".
- 3. Check "W/P 1 CRNT SPD DUTY" value.

Is value more than 98%?

YES >> GO TO 5.

NO >> GO TO 3.

3.CHECK WATER PUMP 1 FEEDBACK DUTY-II

(P)With CONSULT

Check "W/P 1 CRNT SPD DUTY" value.

Is value less than 2%?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK WATER PUMP 1 FEEDBACK DUTY-III

(I) With CONSULT

P31E8 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 1 CRNT SPD DUTY" and "WATER PUMP 1 TRG DUTY".
- Check that "W/P 1 CRNT SPD DUTY" and "WATER PUMP 1 TRG DUTY" agree with the values listed below.

W/P 1 CRNT SPD DUTY	13 – 17%
WATER PUMP 1 TRG DUTY	20 – 80%

Are the above values satisfied?

YES >> GO TO 5.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

${f 5.}$ CHECK WATER PUMP 1 SIGNAL CIRCUIT

- Turn power switch OFF.
- 2. Disconnect electric water pump 1 harness connector and VCM harness connector.
- Check the continuity between electric water pump 1 harness connector and VCM harness connector.

Electric wa	ater pump 1	VCM		Continuity
Connector	Terminals	Connector	Terminals	Continuity
E67	3	E62	62	Existed
£0 <i>1</i>	4	E61	28	LAISIEU

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK FUSE

- Turn power switch OFF.
- 2. Pull out #71 fuse.
- Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace the fuse after repairing the applicable circuit.

.CHECK WATER PUMP 1 INPUT POWER VOLTAGE

- Insert the fuse which pulled out.
- Disconnect water pump 1 harness connector. 2.
- 3. Turn power switch ON.
- Check the voltage between water pump 1 harness connector and ground.

	+		
Electric water pump 1		_	Voltage
Connector	Terminal		
E67	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> Replace electric water pump 1. Refer to HCO-24, "Removal and Installation".

NO >> GO TO 8.

$oldsymbol{\delta}.$ CHECK WATER PUMP 1 INPUT POWER CIRCUIT-I

- Turn power switch OFF.
- Pull out #71 fuse.
- Check the continuity between electric water pump 1 harness connector and fuse terminal.

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P31E8 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

+			
Electric water pump 1		_	Continuity
Connector	Terminal		
E67	1	#71 fuse termi- nal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK WATER PUMP 1 INPUT POWER CIRCUIT-II

- 1. Remove M/C relay.
- 2. Check the continuity between M/C relay harness connector and fuse terminal.

+			
M/C relay		_	Continuity
Connector	Terminal		
E65	5	#71 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

P31E9 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31E9 WATER PUMP 1

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31E9	WATER PUMP 1	Electric water pump 1 feedback duty keeps between 83% and 91% for 30 seconds.	Harness or connectorsElectric water pump 1VCM

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Set the vehicle to READY and wait at least 60 seconds.
- 3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-315, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.CHECK DTC

Perform self-diagnosis of VCM.

Is DTC detected other than P31E9?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK WATER PUMP 1 FEEDBACK DUTY

(P)With CONSULT

On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 1 CRNT SPD DUTY".

Is value between 83% and 91%?

YES >> GO TO 3.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

3. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #71 fuse.
- Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

f 4.CHECK WATER PUMP 1 INPUT POWER VOLTAGE

- Insert the fuse which pulled out.
- 2. Disconnect water pump 1 harness connector.
- Turn power switch ON.
- 4. Check the voltage between water pump 1 harness connector and ground.

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P31E9 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

+ Electric water pump 1		_	Voltage
Connector	Terminal		
E67	1	Ground	12V battery volt- age

Is the inspection result normal?

YES >> Replace electric water pump 1. Refer to HCO-24, "Removal and Installation".

NO >> GO TO 5.

5. CHECK WATER PUMP 1 INPUT POWER CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Pull out #71 fuse.
- 3. Check the continuity between electric water pump 1 harness connector and fuse terminal.

+			
Electric water pump 1		_	Continuity
Connector	Terminal		
E67	1	#71 fuse termi- nal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK WATER PUMP 1 INPUT POWER CIRCUIT-II

- 1. Remove M/C relay.
- 2. Check the continuity between M/C relay harness connector and fuse terminal.

+			
M/C relay		_	Continuity
Connector	Terminal		
E65	5	#71 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

P31EA WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31EA WATER PUMP 2

DTC Logic INFOID:0000000007539343

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause	
P31EA	WATER PUMP 2	Electric water pump 2 feedback duty keeps either of the following conditions for 30 seconds. • Less than 2% • 98% or more • Between 13% and 17%	Harness or connectors Electric water pump 2 VCM	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 60 seconds.
- Set the vehicle to READY and wait at least 60 seconds.
- Check DTC.

Is DTC detected?

>> Proceed to EVC-317, "Diagnosis Procedure". YES

NO >> INSPECTION END

Diagnosis Procedure

 $oldsymbol{1}$.CHECK SELF-DIAGNOSTIC RESULT IN VCM

Check self-diagnostic result in "EV/HEV".

Is DTC detected other than P31EA?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK WATER PUMP 2 FEEDBACK DUTY-I

(P)With CONSULT

- Set the vehicle to READY.
- On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 2 CRNT SPD DUTY".
- Check "W/P 2 CRNT SPD DUTY" value.

Is value more than 98%?

YES >> GO TO 5.

NO >> GO TO 3.

3.CHECK WATER PUMP 2 FEEDBACK DUTY-II

(P)With CONSULT

Check "W/P 2 CRNT SPD DUTY" value.

Is value less than 2%?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK WATER PUMP 2 FEEDBACK DUTY-III

(P) With CONSULT

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P31EA WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 2 CRNT SPD DUTY" and "WATER PUMP 2 TRG DUTY".
- Check that "W/P 2 CRNT SPD DUTY" and "WATER PUMP 2 TRG DUTY" agree with the values listed below.

W/P 2 CRNT SPD DUTY	13 – 17%
WATER PUMP 2 TRG DUTY	20 – 80%

Are the above values satisfied?

YES >> GO TO 5.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

${f 5.}$ CHECK WATER PUMP 2 SIGNAL CIRCUIT

- Turn power switch OFF.
- 2. Disconnect electric water pump 2 harness connector and VCM harness connector.
- 3. Check the continuity between electric water pump 2 harness connector and VCM harness connector.

Electric wa	Electric water pump 2		VCM	
Connector	Terminals	Connector	Terminals	Continuity
E67	3	E62	62	Existed
⊑ 07	4	E61	28	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK FUSE

- Turn power switch OFF.
- 2. Pull out #72 fuse.
- 3. Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Replace the fuse after repairing the applicable circuit.

7. CHECK WATER PUMP 2 INPUT POWER VOLTAGE

- 1. Insert the fuse which pulled out.
- 2. Disconnect water pump 2 harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between water pump 2 harness connector and ground.

+ Electric water pump 2		_	Voltage
Connector	Terminal		vollago
E68	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> Replace electric water pump 2. Refer to <u>HCO-24, "Removal and Installation"</u>.

NO >> GO TO 8.

8. CHECK WATER PUMP 2 INPUT POWER CIRCUIT-I

- 1. Turn power switch OFF.
- 2. Pull out #72 fuse.
- 3. Check the continuity between electric water pump 2 harness connector and fuse terminal.

P31EA WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

+ Electric water pump 2		_	Continuity
Connector	Terminal		
E68	1	#72 fuse termi- nal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK WATER PUMP 2 INPUT POWER CIRCUIT-II

- 1. Remove M/C relay.
- 2. Check the continuity between M/C relay harness connector and fuse terminal.

+			
M/C relay		_	Continuity
Connector	Terminal		
E65	5	#72 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

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P31EB WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31EB WATER PUMP 2

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31EB	WATER PUMP 2	Electric water pump 2 feedback duty keeps between 83% and 91% for 30 seconds.	Harness or connectors Electric water pump 2 VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Set the vehicle to READY and wait at least 60 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-320, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539346

1. CHECK DTC

Perform self-diagnosis of VCM.

Is DTC detected other than P31EB?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK WATER PUMP 2 FEEDBACK DUTY

(P)With CONSULT

On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 2 CRNT SPD DUTY".

Is value between 83% and 91%?

YES >> GO TO 3.

NO >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

3. CHECK FUSE

- Turn power switch OFF.
- Pull out #72 fuse.
- Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK WATER PUMP 2 INPUT POWER VOLTAGE

- 1. Insert the fuse which pulled out.
- Disconnect water pump 2 harness connector.
- Turn power switch ON.
- 4. Check the voltage between water pump 2 harness connector and ground.

P31EB WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

+ Electric water pump 2		_	Voltage
Connector	Terminal		
E68	1	Ground	12V battery voltage

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Is the inspection result normal?

>> Replace electric water pump 2. Refer to HCO-24, "Removal and Installation". YES

NO >> GO TO 5.

5. CHECK WATER PUMP 2 INPUT POWER CIRCUIT-I

- Turn power switch OFF.
- 2. Pull out #72 fuse.
- 3. Check the continuity between electric water pump 2 harness connector and fuse terminal.

+			
Electric water pump 2		_	Continuity
Connector	Terminal		
E68	1	#72 fuse termi- nal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK WATER PUMP 2 INPUT POWER CIRCUIT-II

Remove M/C relay.

Check the continuity between M/C relay harness connector and fuse terminal.

+			
M/C relay		_	Continuity
Connector	Terminal		
E65	5	#72 fuse termi- nal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts. **EVC**

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P31EC WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31EC WATER PUMP 1

DTC Logic

DTC DETECTION LOGIC

NOTE:

This DTC may be detected where there is the mixing of air into coolant.

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31EC	WATER PUMP 1	Electric water pump 1 feedback duty keeps between 3% and 7% for 30 seconds.	Harness or connectorsElectric water pump 1VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

- 1. Turn power switch OFF and wait at least 60 seconds.
- 2. Set the vehicle to READY and wait at least 60 seconds.
- 3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-322, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539348

1.CHECK DTC

Perform self-diagnosis of VCM.

Is DTC detected other than P31EC?

YES >> Perform diagnosis procedure of detected DTC Refer to EVC-84, "DTC Index".

NO >> GO TO 2.

2.CHECK WATER PUMP 1 FEEDBACK DUTY

On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "W/P 1 CRNT SPD DUTY".

Is value between 3% and 7%?

YES >> GO TO 3.

NO >> GO TO 4.

3. CHECK COOLANT

- 1. Turn power switch OFF.
- Check that the coolant is free from air mixture.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Perform the air bleeding. Refer to HCO-11, "Draining and Refilling".

4. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

(I) With CONSULT

- Turn power switch ON and erase DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-322, "DTC Logic"</u>.

Is DTC "P31EC" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P31ED WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31ED WATER PUMP 2

DTC Logic

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31ED	WATER PUMP 2	Electric water pump 2 feedback duty keeps between 3% and 7% for 30 seconds.	Harness or connectorsElectric water pump 2VCM
TC CC	NFIRMATION PROC	CEDURE	
1.PREC	CONDITIONING		
		rait at least 20 seconds.	
wake s	sure that 12V battery vo	orage is 11 v or more.	
	>> GO TO 2.		
2.perf	ORM DTC CONFIRMA	ATION PROCEDURE	
		wait at least 60 seconds.	
	the vehicle to READY a ck DTC.	and wait at least 60 seconds.	
	letected?		
		3. "Diagnosis Procedure".	
NO	>> INSPECTION END		
Diagno	sis Procedure		INFOID:0000000007539350
1. CHE	CK DTC		
Perform	self-diagnosis of VCM.		
	letected other than P31		
YES NO	>> Perform diagnosis process p	procedure of detected DTC Refer to EVC-84, "DTC Inc	<u>lex"</u> .
	CK WATER PUMP 2 FE	EDBACK DUTY	
		ct "EV/HEV" >> "DATA MONITOR" >> "W/P 2 CRNT SF	PD DUTY".
ls value	between 3% and 7%?		
	>> GO TO 3.		
NO	>> GO TO 4. CK COOLANT		
	power switch OFF.		
	ck that the coolant is fro	ee from air mixture.	
	spection result normal?		
YES	>> GO TO 4.		

NO >> Perform the air bleeding. Refer to <u>HCO-11, "Draining and Refilling"</u>.

4. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT 1. Turn power sw

- Turn power switch ON and erase DTC.
- Perform DTC confirmation procedure again. Refer to <u>EVC-323, "DTC Logic"</u>.

Is DTC "P31ED" detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P31EE REFRIGERANT PRESSURE SENSOR

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC P31EE is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to EVC-121, "DTC Logic".

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31EE	REFRIGERANT PRES- SURE SENSOR (Refrigerant pressure sensor circuit range/performance)	 Signal voltage from refrigerant pressure sensor remains Approx. 0 V for 2.5 seconds or more Signal voltage from refrigerant pressure sensor remains Approx. 4.7 V or more for 2.5 seconds or more 	Harness or connectors (Refrigerant pressure sensor circuit is open or shorted.) Refrigerant pressure sensor VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2. PERFORM CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON at least 20 seconds.
- 2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-324, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539352

1. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY-I

- Turn power switch OFF.
- 2. Disconnect refrigerant pressure sensor harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between refrigerant pressure sensor harness connector terminals.

Refr			
Connector	+	_	Voltage (Approx.)
Connector	terminal		, , ,
E49	3	1	5 V

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 2.

2.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY-II

Check the voltage between refrigerant pressure sensor harness connector and ground.

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P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

+			Maltana
Refrigerant pr	Refrigerant pressure sensor		Voltage (Approx.)
Connector Terminal			(11 /
E49	3	Ground	5 V

В

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Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

3.check refrigerant pressure sensor power supply circuit

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between refrigerant pressure sensor and VCM harness connector.

+		_		
Refrigerant pr	essure sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E49	3	E62	33	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check power supply circuit for sensor power supply. Refer to EVC-121, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT

- Turn power switch OFF.
- Disconnect VCM harness connector.
- 3. Check the continuity between refrigerant pressure sensor and VCM harness connector.

+		_		
Refrigerant pr	essure sensor	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E49	1	E62	35	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

5.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

	+			
VCM		_	Continuity	
Connector	Terminal			
E61	4			
LOT	8	Ground	Existed	
E63	111	Giodila	Existed	
E03	112			

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK INTERMITTENT INCIDENT

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P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

- YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".
- NO >> Repair or replace error-detected parts.

7.replace refrigerant pressure sensor

- 1. Replace refrigerant pressure sensor. Refer to <u>HA-59, "REFRIGERANT PRESSURE SENSOR : Removal and Installation"</u>.
- 2. Reconnect all harness connector disconnected.
- 3. Turn power switch ON and erase DTC.
- 4. Perform DTC confirmation procedure again. Refer to EVC-324, "DTC Logic".

Is the DTC detected again?

- YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".
- NO >> INSPECTION END

P31F0 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P31F0 DC/DC CONVERTER

DTC Logic INFOID:0000000007539353

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31F0	DC/DC CONVERTER COMM LINE (DC/DC converter signal error)	VCM detects abnormal signal of DC/DC converter temperature for 2.5 seconds or more.	Harness or connectors (DC/DC converter temperature signal circuit) VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

(P)With CONSULT

- 1. Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

YES >> Proceed to EVC-327, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1. CHECK DC/DC CONVERTER TEMPERATURE

- (P)With CONSULT
- 1. On the CONSULT screen, select "EV/HEV" >> "DATA MONITOR" >> "DC/DC CONV TEMP STATUS".
- Check that "DC/DC CONV TEMP STATUS" indicates a value other than "7".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> GO TO 2.

2.CHECK VCM GROUND CIRCUIT

- Turn power switch OFF.
- Disconnect VCM harness connector.
- Check the continuity between VCM harness connector and ground.

+				
VCM		_	Continuity	
Connector	Terminal			
E61	4	Ground	Existed	
	8			
E63	111	Ground	Existed	
	112			

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

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INFOID:0000000007539354

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P31F0 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

$3. {\sf CHECK} \ {\sf DC/DC} \ {\sf CONVERTER} \ {\sf TEMPERATURE} \ {\sf SIGNAL} \ {\sf CIRCUIT}$

- 1. Disconnect DC/DC junction box harness connector.
- 2. Check the continuity between VCM harness connector and DC/DC junction box harness connector.

+		_		
V	CM	DC/DC J/B		Continuity
Connector	Terminal	Connector	Terminal	
E62	67	F11	8	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace error-detected parts.

4. CHECK DC/DC JUNCTION BOX GROUND

- 1. Visually and tactually check DC/DC junction box negative terminal.
- 2. Disconnect DC/DC junction box negative terminal.
- 3. Check the continuity between DC/DC junction box negative terminal and ground.

+ DC/DC J/B	_	Continuity
Terminal		
Negative terminal	Ground	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace error-detected parts.

CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P31F2 AV INFORMATION MISMATCH

< DTC/CIRCUIT DIAGNOSIS >

P31F2 AV INFORMATION MISMATCH

DTC Logic

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31F2	AV SET INFORMATION (Timer malfunction)	 VCM detects a difference between VCM timer information and AV control unit timer information for 250 seconds. Setting of timer charge does not succeed for 5 seconds after VCM receives a timer charge set signal. 	AV control unit VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-I

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Turn power switch ON.
- Change the timer charge setting 1 on navigation display and wait at least 6 minutes.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-330, "Diagnosis Procedure".

NO >> GO TO 3.

3.perform dtc confirmation procedure-ii

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Turn power switch ON.
- 3. Change the timer charge setting 2 on navigation display and wait at least 6 minutes.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-330, "Diagnosis Procedure".

NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-III

(P)With CONSULT

- 1. Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- 3. Change the timer air conditioner setting 1 on navigation display and wait at least 6 minutes.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-330, "Diagnosis Procedure".

NO >> GO TO 5.

${f 5.}$ PERFORM DTC CONFIRMATION PROCEDURE-IV

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Turn power switch ON.
- 3. Change the timer air conditioner setting 2 on navigation display and wait at least 6 minutes.
- 4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-330, "Diagnosis Procedure".

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P31F2 AV INFORMATION MISMATCH

< DTC/CIRCUIT DIAGNOSIS >

NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000007539356

1. REPLACE AV CONTROL UNIT

- 1. Replace AV control unit. Refer to AV-119, "Removal and Installation".
- 2. Perform DTC confirmation procedure again. Refer to EVC-329, "DTC Logic".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> INSPECTION END

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

COOLING FAN

Component Function Check

INFOID:0000000007539357

1. CHECK COOLING FAN FUNCTION

(II) WITH CONSULT

- 1. Turn power switch ON.
- 2. Perform "COOLING FAN" in "ACTIVE TEST" mode with CONSULT.
- 3. Check that cooling fan speed varies according to the percentage.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EVC-331, "Diagnosis Procedure".

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Diagnosis Procedure

INFOID:0000000007539358

1. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY

- 1. Turn power switch OFF.
- 2. Disconnect cooling fan control module harness connector.
- 3. Turn power switch ON.
- 4. Check the voltage between cooling fan control module harness connector and ground.

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	+		
Cooling fan o	ontrol module	_	Voltage
Connector	Terminal		
E19	3	Ground	12V battery volt- age

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 2.

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2.CHECK 12V BATTERY POWER SUPPLY

- 1. Turn power switch OFF.
- 2. Remove cooling fan relay.
- 3. Check the voltage between cooling fan relay harness connector and ground.

•	+			
Cooling fan relay		_	Voltage	
Connector	Terminal			
E18	3	Ground	12V battery voltage	

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Is the inspection result normal?

YES >> GO TO 3.

NO >> Check power supply circuit for battery power supply.

3.CHECK M/C RELAY OUTPUT VOLTAGE-I

1. Turn power switch ON.

2. Check the voltage between cooling fan relay harness connector and ground.

+ Cooling fan relay			Valtage	
Connector	Terminal	_	Voltage	
E18	1	Ground	12V battery voltage	

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 4.

4.CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #73 fuse.
- 3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace the fuse after repairing the applicable circuit.

5. CHECK M/C RELAY OUTPUT VOLTAGE-II

- 1. Turn power switch ON.
- 2. Check the voltage between fuse harness connector and ground.

+	_	Voltage
#73 fuse terminal	Ground	12V battery volt- age

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6. CHECK M/C RELAY OUTPUT CIRCUIT

- 1. Turn power switch OFF.
- 2. Remove M/C relay.
- 3. Check the continuity between M/C relay harness connector terminal and fuse harness connector.

	+		
M/C	relay	_	Continuity
Connector	Terminal		
E65	5	#73 fuse termi- nal	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check M/C relay routing circuit. Refer to EVC-335, "Diagnosis Procedure".

NO >> Repair or replace error-detected parts.

7.CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

- 1. Turn power switch OFF.
- Check the continuity between cooling fan relay harness connector and fuse terminal.

	+		
Cooling fan relay		_	Continuity
Connector	Terminal		
E18	1	#73 fuse termi- nal	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

8.CHECK COOLING FAN RELAY GROUND CIRCUIT

1. Turn power switch OFF.

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

Check the continuity between cooling fan relay harness connector and ground.

+			
Cooling fan relay		_	Continuity
Connector	Terminal		
E18	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9.CHECK COOLING FAN CONTROL MODULE INPUT POWER VOLTAGE

Check the continuity between cooling fan relay harness connector and cooling fan control module harness connector.

+		_		
Cooling fan o	control module	Cooling fan relay		Continuity
Connector	Terminal	Connector	Terminal	
E19	3	E18	5	Existed

Is the inspection result normal?

YES >> GO TO 10.

>> Repair or replace error-detected parts. NO

10.CHECK COOLING FAN RELAY

Refer to EVC-334, "Component Inspection (Cooling Fan Relay)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Replace cooling fan relay.

11. CHECK COOLING FAN RELAY GROUND CIRCUIT

Turn power switch OFF.

Check the continuity between cooling fan control module harness connector and ground.

+				
Cooling fan control module		_	Continuity	
Connector	Terminal			
E19	1	Ground	Existed	

Is the inspection result normal?

YES >> GO TO 12.

NO >> Repair or replace error-detected parts.

12.CHECK COOLING FAN MOTOR 1 AND 2

Check cooling fan motor. Refer to EVC-334, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 13.

>> Replace malfunctioning cooling fan motor. Refer to HCO-20, "Exploded View". NO

13. CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

- Disconnect VCM harness connector.
- 2. Check the continuity between cooling fan control module harness connector and VCM harness connector.

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+				
Cooling fan o	control module	VCM		Continuity
Connector	Terminal	Connector Terminal		
E19	2	E62	59	Existed

3. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 14.

NO >> Repair or replace error-detected parts.

14. REPLACE COOLING FAN CONTROL MODULE

- 1. Replace cooling fan control module. Refer to HCO-20, "Exploded View".
- 2. Erase the DTC.
- Perform component function check. Refer to <u>EVC-331</u>, "Component Function Check".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace VCM. Refer to EVC-377, "Removal and Installation".

Component Inspection (Cooling Fan Motor)

INFOID:0000000007539359

1. CHECK COOLING FAN MOTOR

- Turn power switch OFF.
- 2. Disconnect cooling fan control module harness connectors.
- Supply cooling fan control module harness connector terminals with 12V battery voltage as per the following, and check operation.

Cooling fan control module				
Motor	Connector	Tern	ninal	Operation
	Connection	+	_	
1	E301	4	5	Cooling fan operates.
2	E302	6	7	Cooling fair operates.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning cooling fan motor. Refer to HCO-20, "Exploded View".

Component Inspection (Cooling Fan Relay)

INFOID:0000000007539360

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1. CHECK COOLING FAN RELAY

- Turn power switch OFF.
- 2. Remove cooling fan relay.
- 3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

--3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.

M/C RELAY

Diagnosis Procedure

INFOID:0000000007539361

1. CHECK BATTERY POWER SUPPLY-I

- 1. Turn power switch OFF.
- 2. Disconnect M/C relay.
- 3. Check the voltage between M/C relay harness connector and ground.

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+			
M/C relay		_	Voltage
Connector	Terminal		
E65	2	Ground	12V battery volt-
	3	Glound	age

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Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 2.

2.CHECK FUSIBLE LINK

- 1. Remove #G fusible link.
- 2. Check that the fusible link is not fusing.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Replace the fusible link after repairing the applicable circuit.

3. CHECK BATTERY POWER SUPPLY-II

Check the voltage between fusible link harness connector and ground.

+	_	Voltage
#G fusible link terminal	Ground	12V battery volt- age

Is the inspection result normal?

YES >> GO TO 4.

NO >> Check power supply circuit for battery power supply.

4.CHECK BATTERY POWER SUPPLY CIRCUIT-I

1. Check the continuity between M/C relay harness connector and fusible link harness connector.

IV

+	M/C relay		Continuity
	Connector	Terminal	
#G fusible link	E65	2	Existed
terminal		3	LAISIGU

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2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

5. CHECK M/C RELAY

Check M/C relay. Refer to EVC-336, "Component Inspection (M/C Relay)".

Is the inspection result normal?

YES >> GO TO 6.

M/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Replace M/C relay.

6. CHECK M/C RELAY CONTROL SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between M/C relay harness connector and VCM harness connector.

	+		_	
M/C	relay	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E65	1	E62	78	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

7. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+			
VCM		_	Continuity
Connector	Terminal		
E61	4		Existed
LOT	8	Ground	
E63	111	Giodila	
	112		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (M/C Relay)

INFOID:0000000007539362

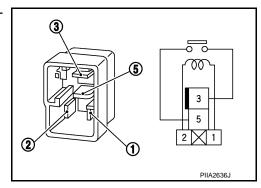
1. CHECK M/C RELAY

- 1. Turn power switch OFF.
- 2. Remove M/C relay.
- 3. Check the continuity between M/C relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
5 and 5	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END NO >> Replace M/C relay.



F/S CHG RELAY

< DTC/CIRCUIT DIAGNOSIS >

F/S CHG RELAY

Diagnosis Procedure

INFOID:0000000007539363

1. CHECK F/S CHG RELAY POWER SUPPLY-I

- Turn power switch OFF.
- Remove F/S CHG relay. 2.
- 3. Turn power switch ON.
- Check the voltage between F/S CHG relay harness connector and ground.

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+ F/S CHG relay		_	Voltage
Connector	Terminal		
E64	2	Ground	12V battery voltage

Е

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

F

2.CHECK F/S CHG RELAY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

IPDM E/R		_	Voltage
Connector	Terminal		
E15	55	Ground	12V battery volt- age

Is the inspection result normal?

YES >> GO TO 3.

>> Check F/S relay routing circuit. Refer to EVC-294, "Diagnosis Procedure". NO

3.check f/s chg relay power supply circuit

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- Turn power switch OFF.
- Disconnect IPDM E/R harness connector.
- Check the continuity between F/S CHG relay harness connector and IPDM E/R harness connector.

	+		_	
F/S CH	lG relay	IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E64	2	E15	55	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

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YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

f 4.CHECK 12V BATTERY POWER SUPPLY-I

Check the voltage between F/S CHG relay harness connector and ground.

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F/S CHG RELAY

< DTC/CIRCUIT DIAGNOSIS >

+ F/S CHG relay		_	Voltage
Connector	Terminal		
E64	3	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8. NO >> GO TO 5.

5. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #33 fuse.
- Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace the fuse after repairing the applicable circuit.

6.CHECK 12V BATTERY POWER SUPPLY-II

Check the voltage between #33 fuse harness connector and ground.

+	_	Voltage
#33 fuse terminal	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> Check power supply circuit for battery power supply.

7.CHECK BATTERY POWER SUPPLY CIRCUIT

1. Check the continuity between F/S CHG relay harness connector and #33 fuse harness connector.

+	F/S CHG relay		Continuity
	Connector	Terminal	
#33 fuse termi- nal	E64	3	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

8.CHECK F/S CHG RELAY

Check F/S CHG relay. Refer to EVC-339, "Component Inspection (F/S CHG Relay)".

Is the inspection result normal?

YES >> GO TO 9.

NO >> Replace F/S CHG relay.

9. CHECK F/S CHG RELAY CONTROL SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between F/S CHG relay harness connector and VCM harness connector.

F/S CHG RELAY

< DTC/CIRCUIT DIAGNOSIS >

	+		_	
F/S CH	lG relay	V	CM	Continuity
Connector	Terminal	Connector	Terminal	
E64	1	E62	75	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+			
VCM		_	Continuity
Connector	Terminal		
E61	4	Ground	Existed
E01	8		
E63	111	Giouna	
	112		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (F/S CHG Relay)

1. CHECK F/S CHG RELAY

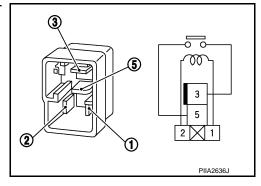
- 1. Turn power switch OFF.
- 2. Remove F/S CHG relay.
- 3. Check the continuity between F/S CHG relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
3 and 3	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace F/S CHG relay.



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SSOFF RELAY

Diagnosis Procedure

INFOID:0000000007539365

1. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #43 fuse.
- 3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace the fuse after repairing the applicable circuit.

2.CHECK BATTERY POWER SUPPLY-I

- 1. Insert the fuse which pulled out.
- 2. Check the voltage between IPDM E/R harness connector and ground.

+			
IPDM E/R		_	Voltage
Connector	Terminal		
E14	41	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3. CHECK BATTERY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

+			
IPDM E/R		_	Voltage
Connector	Terminal		
E9	2	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4. CHECK FUSIBLE LINK

- 1. Disconnect fusible link #D.
- 2. Check that the fusible link is not fusing.

Is the inspection result normal?

YES >> Check power supply circuit for battery power supply.

NO >> Replace the fusible link after repairing the applicable circuit.

${f 5.}$ CHECK SSOFF RELAY CONTROL CIRCUIT FOR SHORT TO GROUND

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check harness for short to ground, between IPDM E/R harness connector and VCM harness connector.

+			
IPDM E/R		_	Continuity
Connector	Terminal		
E14	41	Ground	Existed

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

SSOFF RELAY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

6.CHECK SSOFF RELAY CONTROL SIGNAL

- Turn power switch ON.
- Check the voltage between IPDM E/R harness connector and ground.

+ Voltage IPDM E/R (Approx.) Connector Terminal E14 41 0 V Ground

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 7.

7.check ssoff relay control signal circuit

- Turn power switch OFF.
- Disconnect VCM harness connector. 2.
- 3. Check the continuity between IPDM E/R harness connector and VCM harness connector.

	+		_	
IPDI	M E/R	V	СМ	Continuity
Connector	Terminal	Connector	Terminal	
E14	41	E61	7	Existed

Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace error-detected parts.

8.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+			
IPDM E/R		_	Continuity
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111	Giodila	
	112		

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

10.check ssoff relay output voltage

Check the voltage between IPDM E/R harness connector and ground.

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EVC-341 Revision: 2014 June

SSOFF RELAY

< DTC/CIRCUIT DIAGNOSIS >

+				
IPDM E/R		_	Voltage	
Connector	Terminal			
E14	36	Ground	12V battery volt- age	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace IPDM E/R. Refer to PCS-30, "Removal and Installation".

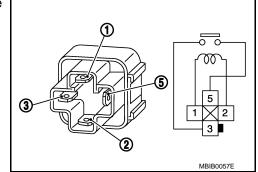
Component Inspection (SSOFF Relay)

INFOID:0000000007539366

1. CHECK SSOFF RELAY

- 1. Turn power switch OFF.
- 2. Remove SSOFF relay.
- 3. Check the continuity between SSOFF relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
3 and 5	No current supply	Not existed



Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace SSOFF relay.

REVERSE LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

REVERSE LAMP RELAY

Component Function Check

INFOID:0000000007539367

INFOID:0000000007539368

1. CHECK REVERSE LAMP RELAY FUNCTION

- 1. Turn power switch ON.
- 2. Shift the selector lever in R position.
- 3. Check that the reverse lamp turns ON.

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to EVC-343, "Diagnosis Procedure".

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Diagnosis Procedure

1. CHECK POWER ON POWER SUPPLY-I

- 1. Shift the selector lever in P position.
- 2. Turn power switch OFF.
- 3. Remove reverse lamp relay.
- 4. Turn power switch ON.
- Check the voltage between reverse lamp relay harness connector and ground.

Reverse lamp relay		_	Voltage
Connector	Terminal		
E27	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 2.

2.CHECK POWER ON POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

+				
IPDM E/R		_	Voltage	
Connector	Terminal			
E15	58	Ground	12V battery volt- age	

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 3.

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3. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #56 fuse.
- Check that the fuse is not fusing.

Is the inspection result normal?

YES >> Check power supply circuit for ignition power supply.

NO >> Replace the fuse after repairing the applicable circuit.

4. CHECK POWER ON POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- Disconnect IPDM E/R harness connector.
- Check the continuity between reverse lamp relay harness connector and IPDM E/R harness connector.

Revision: 2014 June EVC-343 2011 LEAF

REVERSE LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		_		
Reverse	amp relay	IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E27	1	E15	58	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

5.CHECK POWER ON POWER SUPPLY-II

Check the voltage between reverse lamp relay harness connector and ground.

	+		
Reverse lamp relay		_	Voltage
Connector	Terminal		
E27	3	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 7.

NO >> GO TO 6.

6.CHECK POWER ON POWER SUPPLY CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect IPDM E/R harness connector.
- 3. Check the continuity between reverse lamp relay harness connector and IPDM E/R harness connector.

+		_		
Reverse	Reverse lamp relay		IPDM E/R	
Connector	Terminal	Connector	Terminal	
E27	3	E15	58	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

7. CHECK REVERSE LAMP RELAY

Refer to EVC-345, "Component Inspection (Reverse Lamp Relay)".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace reverse lamp relay.

8.check reverse lamp relay control signal circuit

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- Check the continuity between reverse lamp relay harness connector and VCM harness connector.

+		_		
Reverse	amp relay	VCM		Continuity
Connector	Terminal	Connector	Terminal	
E27	2	E62	80	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

REVERSE LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

9. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+			
VCM		_	Continuity
Connector	Terminal		
E61	4	Ground	Existed
LOI	8		
E63	111	Glound	LXISIEU
	112		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Repair or replace error-detected parts.

Component Inspection (Reverse Lamp Relay)

1. CHECK REVERSE LAMP RELAY

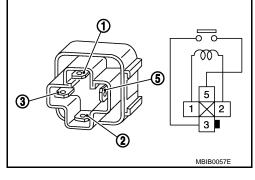
- Turn power switch OFF.
- 2. Remove reverse lamp relay.
- 3. Check the continuity between reverse lamp relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
5 and 5	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reverse lamp relay.



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< DTC/CIRCUIT DIAGNOSIS >

A/C RELAY

Diagnosis Procedure

INFOID:0000000007539370

1. CHECK A/C RELAY POWER SUPPLY-I

- 1. Turn power switch OFF.
- 2. Remove A/C relay.
- 3. Turn power switch ON.
- 4. Check the voltage between A/C relay harness connector and ground.

_		+		
_	A/C relay		_	Voltage
	Connector	Terminal		
	E52	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> GO TO 2.

2.CHECK A/C RELAY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

	+			
IPDN	ЛE/R	_	Voltage	
Connector	Terminal			
E14	36	Ground	12V battery voltage	

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check SSOFF relay routing circuit. Refer to EVC-340, "Diagnosis Procedure".

3.CHECK A/C RELAY POWER SUPPLY CIRCUIT

- Turn power switch OFF.
- Disconnect IPDM E/R harness connector.
- 3. Check the continuity between A/C relay harness connector and IPDM E/R harness connector.

+		_		
A/C	relay	IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E52	1	E14	36	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

4. CHECK 12V BATTERY POWER SUPPLY

Check the voltage between A/C relay harness connector and ground.

+				
A/C relay		_	Voltage	
Connector	Terminal			
E52	3	Ground	12V battery volt-	
L32	6	Glound	age	

A/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 5.

5. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #32 fuse.
- 3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace the fuse after repairing the applicable circuit.

6.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

Check the continuity between A/C relay harness connector and fuse terminal.

+ A/C relay				
		_	Continuity	
Connector	Terminal			
E52	3	#32 fuse termi-	Existed	
LJZ	6	nal	LXISIGU	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-51, "Intermittent Incident".

NO >> Repair or replace error-detected parts.

7.CHECK A/C RELAY

Refer to EVC-348, "Component Inspection (A/C Relay)".

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace A/C relay.

8. CHECK A/C RELAY CONTROL SIGNAL CIRCUIT

- 1. Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between A/C relay harness connector and VCM harness connector.

	+		-	
A/C	relay	VCM		Continuity
Connector	Terminal	Connector Terminal		
E52	2	E61	5	Existed

4. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

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IPDI	IPDM E/R		Continuity	
Connector	Terminal			
E61	4			
LOT	8	Ground	Existed	
E63	111	Glound		
	112			

Is the inspection result normal?

YES >> INSPECTION END

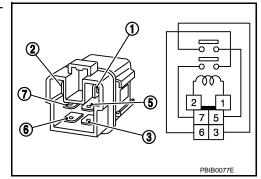
NO >> Repair or replace error-detected parts.

Component Inspection (A/C Relay)

1. CHECK A/C RELAY

- 1. Turn power switch OFF.
- 2. Remove A/C relay.
- 3. Check the continuity between A/C relay terminals under the following conditions.

Conditions	Terminals	Continuity	
12 V direct current supply between terminals 1 and 2	3-5	Existed	
12 v direct current supply between terminals 1 and 2	6 – 7	LXISIGU	
No current supply	3 – 5	Not existed	
no current supply	6 – 7	INOL EXISTED	



INFOID:0000000007539371

Is the inspection result normal?

YES >> INSPECTION END NO >> Replace A/C relay.

CHARGING STATUS INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

CHARGING STATUS INDICATOR

Component Function Check

INFOID:0000000007539372

$oldsymbol{1}$.CHECK CHARGING STATUS INDICATOR FUNCTION

(P)With CONSULT

- Turn power switch ON.
- Select "CHARGE STAT INDICATOR 1" of "ACTIVE TEST" mode in "EV/HEV" with CONSULT.
- Activate the charging status indicator 1 and check that the indicator illuminates.
- Check charging status indicator 2 and 3 in the same way.

Is the inspection result normal?

>> INSPECTION END YES

>> Proceed to EVC-349, "Diagnosis Procedure". NO

Diagnosis Procedure

INFOID:0000000007539373

1. CHECK CHARGING STATUS INDICATOR CONTROL CIRCUIT

(P)With CONSULT

- Turn power switch OFF.
- Disconnect charging status indicator.
- Check the voltage between charging status indicator harness connector terminals.

	Cł			
Items	Connector	+	_	Voltage
	Connector	Terminal		
Charging status indicator 1			1	
Charging status indicator 2	M101	4	2	0 V
Charging status indicator 3			3	

- Turn power switch ON.
- Select "CHARGE STAT INDICATOR 1" of "ACTIVE TEST" mode in "EV/HEV" with CONSULT.
- Activate the charging status indicator 1. 6.
- 7. Check the voltage between charging status indicator harness connector terminals.
- Check charging status indicator 2 and 3 in the same way.

	Charging status indicator				
Items	Connector	+	_	Voltage	
	Connector	Terminal			
Charging status indicator 1			1		
Charging status indicator 2	M101	4	2	12V battery volt- age	
Charging status indicator 3			3	agu	

Is the inspection result normal?

YES >> Replace charging status indicator. Refer to VC-128, "Removal and Installation".

NO >> GO TO 2.

2.CHECK CHARGING STATUS INDICATOR POWER SUPPLY

Check the voltage between charging status indicator harness connector and ground.

	+		
Charging sta	atus indicator	_	Voltage
Connector	Terminal		
M101	4	Ground	12V battery voltage

Is the inspection result normal?

EVC-349 Revision: 2014 June 2011 LEAF

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CHARGING STATUS INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> GO TO 5. NO >> GO TO 3.

3. CHECK FUSE

- 1. Turn power switch OFF.
- 2. Pull out #11 fuse and check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repair the applicable circuit.

4. CHECK CHARGING STATUS INDICATOR POWER SUPPLY CIRCUIT

1. Check the continuity between charging status indicator and the fuse terminal.

+			
Charging status indicator		_	Continuity
Connector	Terminal		
M101	4	#11 fuse terminal	Existed

2. Also check harness for short to ground and short to power.

Is the inspection result normal?

YES >> Check power supply circuit for battery power supply.

NO >> Repair or replace error-detected parts.

${f 5.}$ CHECK CHARGING STATUS INDICATOR GROUND CIRCUIT

- Turn power switch OFF.
- 2. Disconnect VCM harness connector.
- 3. Check the continuity between charging status indicator harness connector and VCM harness connector.

		+		-	
Items	Charging sta	atus indicator	VCM		Continuity
	Connector	Terminal	Connector	Terminal	
Charging status indicator 1		1		86	
Charging status indicator 2	M101	2	E63	85	Existed
Charging status indicator 3		3		92	

4. Also check harness for short to ground and short to battery.

Is the inspection result normal?

YES >> GO TO 6.

NO >> Repair or replace error-detected parts.

6.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

	+			
V	VCM		Continuity	
Connector	Terminal			
	4	Ground	Existed	
E63	8			
L03	111			
	112			

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

CHARGING STATUS INDICATOR

< DTC/CIRCUIT DIAGNOSIS >

7. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-51, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-377, "Removal and Installation".

NO >> Repair or replace error-detected parts.

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IMMEDIATE CHARGING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

IMMEDIATE CHARGING SWITCH

Diagnosis Procedure

INFOID:0000000007539374

1. CHECK IMMEDIATE CHARGING SWITCH ILLUMINATION FUNCTION

- 1. Turn power switch ON.
- 2. Turn ON the headlamp.
- 3. Check that the immediate charging switch illumination lights up.

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 2.

2. CHECK IMMEDIATE CHARGING SWITCH ILLUMINATION POWER SUPPLY

Check the voltage between immediate charging switch and ground.

	+		
Immediate charging switch		_	Voltage
Connector	Terminal		
M65	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 3.

3.CHECK FUSE

- Turn power switch OFF.
- 2. Turn OFF the headlamp.
- 3. Pull out #47 fuse.
- 4. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Replace the fuse after repair the applicable circuit.

4.CHECK IMMEDIATE CHARGING SWITCH ILLUMINATION POWER SUPPLY CIRCUIT

- Disconnect immediate charging switch harness connector.
- 2. Check the continuity between immediate charging switch harness connector and fuse harness connector.

	+		
Immediate ch	narging switch	_	Continuity
Connector	Terminal		
M65	3	#47 fuse termi- nal	Existed

Is the inspection result normal?

YES >> Check power supply circuit.

NO >> Repair or replace error-detected parts.

${f 5}.$ CHECK IMMEDIATE CHARGING SWITCH GROUND CIRCUIT

- Turn power switch OFF.
- Turn OFF the headlamp.
- 3. Disconnect immediate charging switch harness connector.
- 4. Check the continuity between immediate charging switch harness connector and ground.

IMMEDIATE CHARGING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

	+		
Immediate ch	narging switch	_	Continuity
Connector	Terminal		
M65	4	Ground	Existed

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Is the inspection result normal?

YES >> Replace immediate switch. Refer to <u>VC-127</u>, "Removal and Installation".

NO >> Repair or replace error-detected parts.

6.check immediate charging switch power supply

- 1. Turn power switch OFF.
- 2. Turn OFF the headlamp.
- 3. Disconnect immediate charging switch harness connector.
- 4. Check the voltage between immediate charging switch harness connector and ground.

	+		
Immediate ch	narging switch	_	Voltage
Connector	Terminal		
M65	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 9.

NO >> GO TO 7.

7 . CHECK FUSE

- 1. Pull out #13 fuse.
- Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Replace the fuse after repair the applicable circuit.

f 8.CHECK IMMEDIATE CHARGING SWITCH POWER SUPPLY CIRCUIT

Check the continuity between immediate charging switch harness connector and fuse harness connector.

+			
Immediate charging switch		_	Continuity
Connector	Terminal		
M65	1	#13 fuse termi- nal	Existed

Is the inspection result normal?

YES >> Check power supply circuit.

NO >> Repair or replace error-detected parts.

9. CHECK IMMEDIATE CHARGING SWITCH SIGNAL CIRCUIT

- Disconnect VCM harness connector.
- 2. Check the continuity between immediate charging switch harness connector and VCM harness connector.

+				
Immediate ch	narging switch	VCM		Continuity
Connector	Terminal	Connector	Terminal	
M65	1	E63	89	Existed

3. Also check harness for short to ground and short to power.

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IMMEDIATE CHARGING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK IMMEDIATE CHARGING SWITCH

Perform component inspection. Refer to <u>EVC-354</u>, "Component Inspection (Immediate Charging Switch)". <u>Is the inspection result normal?</u>

YES >> INSPECTION END

NO >> Replace immediate charging switch. Refer to VC-127, "Removal and Installation".

Component Inspection (Immediate Charging Switch)

INFOID:0000000007539375

1. CHECK IMMEDIATE CHARGING SWITCH

- 1. Turn power switch OFF.
- 2. Disconnect immediate charging switch harness connector.
- 3. Check the continuity between immediate charging switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Immediate	Released	Not existed
r and 2	charging switch	Pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace immediate charging switch. Refer to VC-127, "Removal and Installation".

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

EV CONTROL SYSTEM

Symptom Index

NOTE:

- Perform self-diagnoses with CONSULT before performing the symptom diagnosis.
- If any DTC is detected, perform the corresponding diagnosis.

Symptom	Reference page
READY status cannot be achieved.	EVC-356, "READY Status Cannot Be Achieved"
Unable to travel.	EVC-357, "Unable to Travel"
Low electrical consumption	EVC-358, "Low Electrical Consumption"
Power switch does not turn OFF.	EVC-359, "Power Switch Does Not Turn OFF"
No regeneration	EVC-360, "No Regeneration"
Decelerating force changes	EVC-361, "Decelerating Force Changes"
Normal charge does not start.	EVC-362, "Normal Charge Does Not Start"
Timer charge and remote control charge does not start.	EVC-364, "Timer Charge and Remote Charge Does Not Start"
Immediate charge does not start.	EVC-364, "Immediate Charge Does Not Start"
Normal charge is not completed.	EVC-364, "Normal Charge Is Not Completed"
Quick charge does not start.	EVC-365, "Quick Charge Does Not Start"
Quick charge is not completed.	EVC-365, "Quick Charge Is Not Completed"
Full charge cannot be achieved.	EVC-366, "Full Charge Cannot Be Achieved"
Timer air conditioner does not start.	EVC-366, "Timer Air Conditioner Does Not Start"
Remote air conditioner does not start.	EVC-367, "Remote Air Conditioner Does Not Start"

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< SYMPTOM DIAGNOSIS >

READY Status Cannot Be Achieved

INFOID:0000000007539377

	Sympto	m	Possible cause	Action
			Abnormal stop lamp switch.	EVC-187, "Component Function Check"
		BCM does not output a	Abnormal stop lamp switch signal line.	Check the signal line between stop lamp switch and BCM.
		READY signal.	Abnormal power switch	PCS-65, "Component Function Check"
			Abnormal power switch signal line.	and VCM.
Э́д.		A READY signal is not input to VCM.	Abnormal READY signal line	Check the signal line between BCM and VCM.
oe achieve	READY condition are not	VCM recognizes that the selector lever is in a range other than P and N.	Electric shift control system error.	Perform self-diagnosis of Electric shift control module.
READY status cannot be achieved.	cha nec Fail RE/	VCM recognizes that the charge connector is connected.	 Abnormal normal charge connector connection de- tection circuit. Abnormal quick charge connector connection de- tection circuit. 	Perform self-diagnosis of On-board charger.
REA		Fail-safe of VCM prohibits READY.	EV control system error.	Perform self-diagnosis of VCM.
		VCM recognizes that Li-ion battery remaining energy is	Li-ion battery remaining energy is low.	Charge Li-ion battery.
		low.	Abnormal LBC.	Perform self-diagnosis of LBC.
,		VCM recognizes that steering lock is not released.	Abnormal steering lock mechanism.	Check steering lock system.
	The READY to drive indicator lamp does not turn ON despite READY state.		Abnormal combination meter.Abnormal LED.Abnormal VCM.	Perform ACTIVE TEST of VCM to check the READY to drive indicator lamp. Refer to EVC-55, "CONSULT Function".

< SYMPTOM DIAGNOSIS >

Unable to Travel

	Sympton	m	Possible cause	Action
	Drive force is not generated.	VCM recognizes that the accelerator pedal is not depressed.	Abnormal accelerator pedal position sensor.	EVC-190, "Diagnosis Procedure"
		VCM recognizes that brake pedal is depressed.	Abnormal stop lamp switch.Abnormal stop lamp switch signal line.	EVC-180, "Diagnosis Procedure"
		An output limit request signal of TCS/VDC/ABS is receiced.	TCS/VDC/ABS system error.	Perform self-diagnosis of ABS actuator and electric unit (control unit).
avel.		Traction motor inverter requests the output limit.	Traction motor system error.	Check the "POWER LIMIT CAUSE"
Jnable to travel.		LBC requests the output limit.	LBC system error.	in DATA MONITOR item of VCM.
Unab		Fail-safe of VCM prohibits READY.	EV control system error.	Perform self-diagnosis of VCM.
		Motor output is not conveyed to drive wheels.	Abnormal reduction gear.	Check reduction gear.
		Brake applied.	Brake dragging.	Check for brake dragging.
	Braking force is generated.	A brake signal is input to ABS actuator and electric unit (control unit).	Abnormal stop lamp switch signal line.	Check the signal line between stop lamp switch and ABS actuator and electric unit (control unit).
	braking force is generated.	Parking lock is ON.	 Abnormal electric shift control module. Abnormal parking actua- tor. 	Perform self-diagnosis of Electric shift control module.

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Low Electrical Consumption

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	Sympto	m	Possible cause	Action
		Dunning registence of tires	Low tire pressure.	Adjust tire pressure.
		Running resistance of tires is high.	Tire size is not of standard size.	Install standard-size tires.
	Traction motor requires a large amount of power.	Parking brake is applied.	Abnormal electric parking brake control module. Abnormal parking brake actuator.	Perform self-diagnosis of Electric parking brake control module.
		Parking brake is applied.	Brake dragging.	Check reduction dragging.
		Sliding resistance of reduction gear is high.	Abnormal reduction gear.	Check reduction gear.
		Electric compressor re-	The set temperature is low.	Adjust the set temperature.
	Air conditioner requires a power.	quires a large amount of power.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
	large amount of power.	PTC elements heater re-	The set temperature is high.	Adjust the set temperature.
		quires a large amount of power.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
_	Auxiliaries requires a large a	mount of power.	High-capacity auxiliaries is connected.	Check vehicle condition.
ımptior	Low efficient Li-ion battery.		Incorrect service plug connection.	Check installation condition of the service plug.
Low electrical consumption		Battery charge level at full charge is low.	Low Li-ion battery cell capacity.	Perform inspection according to the diagnosis procedure of DTC P33E6 of EV battery control system. Refer to EVB-146. "Diagnosis Procedure" (TYPE 1), EVB-365. "Diagnosis Procedure" (TYPE 2), EVB-602. "Diagnosis Procedure" (TYPE 3), EVB-835. "Diagnosis Procedure" (TYPE 4).
			Li-ion battery charged with its temperature low.	check reduction dragging. Check reduction gear. Adjust the set temperature. Perform self-diagnosis of A/C auto amp. Adjust the set temperature. Perform self-diagnosis of A/C auto amp. Adjust the set temperature. Perform self-diagnosis of A/C auto amp. Check vehicle condition. Check installation condition of the service plug. Perform inspection according to the diagnosis procedure of DTC P33E6 of EV battery control system. Refer to EVB-146, "Diagnosis Procedure" (TYPE 1), EVB-365, "Diagnosis Procedure" (TYPE 2), EVB-602, "Diagnosis Procedure" (TYPE 3), EVB-835, "Diagnosis Procedure"
	Available driving range becomes shorter.		Abnormal Li-ion battery.	diagnosis by symptom. Refer to EVB-167. "Diagnosis Procedure" (TYPE 1), EVB-393. "Diagnosis Procedure" (TYPE 2), EVB-624. "Diagnosis Procedure" (TYPE 3), EVB-864. "Diagnosis Procedure"
			Low Li-ion battery cell capacity.	diagnosis procedure of DTC P33E6 of EV battery control system. Refer to EVB-146. "Diagnosis Procedure" (TYPE 1), EVB-365. "Diagnosis Procedure" (TYPE 2), EVB-602, "Diagnosis Procedure" (TYPE 3), EVB-835. "Diagnosis Procedure"

< SYMPTOM DIAGNOSIS >

Power Switch Does Not Turn OFF

INFOID:0000000007539380

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	Sympto	om	Possible cause	Action	
			Short circuit between the power ON power supply circuit of VCM and power.	Check the power ON power supply circuit.	В
	VCM recognizes that the	Power is continuously sup- plied to the power ON power	Abnormal IPDM E/R.	Perform self-diagnosis of IPDM E/R.	EV
	power switch is not OFF.	supply terminal of VCM.	Abnormal BCM.	Perform self-diagnosis of BCM.	
ÄF.			Abnormal power switch.	PCS-65. "Component Function Check"	D
E			Abnormal SSOFF relay.	EVC-340, "Diagnosis Procedure"	
Power switch does not turn OFF.	An EV system activation requeived from TCU.	An EV system activation request signal is continuously received from TCU.		EVC-274, "Diagnosis Procedure"	E F
	An EV system activation request signal is continuously received from On-board charger.		 Abnormal EV system activation request signal circuit between VCM and On-board charger. Abnormal On-board charger. 	EVC-272, "Diagnosis Procedure"	G
	Immediate charging switch signal is continuously received.		 Abnormal immediate charging switch signal cir- cuit. Abnormal immediate charging switch. 	VC-105, "Diagnosis Procedure"	I

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No Regeneration

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	Sympton	m	Possible cause	Action
		Drive motor inverter limits	Fail-safe of traction motor inverter.	TMS-32, "Fail-Safe"
		output.	The temperature of traction motor or traction motor inverter is high.	Check the "POWER LIMIT CAUSE" in the DATA MONITOR item of VCM.
			Fail-safe of LBC.	EVB-45, "Fail-safe" (TYPE 1), EVB-263, "Fail-safe" (TYPE 2), EVB-497, "Fail-safe" (TYPE 3), EVB-729, "Fail-safe" (TYPE 4).
	The amount of regeneration		Damaged bus bar (connecting part of Li-ion battery module).	Check bus bar.
	is limited.	LBC limits output. Degradation in l	Degradation in Li-ion bat- tery temperature sensor characteristics.	Check the "POWER LIMIT CAUSE" in the DATA MONITOR item of
			The temperature of Li-ion battery is too high/low.	VCM.
ration			Li-ion battery is fully charged.	Normal operation.
No regeneration		ABS actuator and electric unit (control unit) limits output.	ABS operates.	Normal operation.
2		Electrically-driven intelligent brake unit limits output.	Fail-safe of electrically-driven intelligent brake unit.	BR-26, "Fail-Safe"
		ABS actuator and electric unit (control unit) limits output.	VDC operates.	Normal operation.
	The regeneration prohibit conditions are satisfied.	_	Vehicle speed is 14 km/h (9 MPH) or less.	Normal operation.
		_	Accelerator pedal is depressed.	Normal operation.
			Under full braking.	Normal operation.
	The amount of the state of	Selector lever range position is changed.	Range changes from ECO to D.Range changes to N.	Normal operation.
	The amount of target regeneration changes.	_	Brake applied during sharp turn.	Normal operation.
		_	Slip detected during ECO mode.	Normal operation.

< SYMPTOM DIAGNOSIS >

Decelerating Force Changes

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	Sympto	m	Possible cause	Action	
Deceleration G changes.			Fail-safe of traction motor inverter.	TMS-32, "Fail-Safe"	
		Traction motor inverter limits output.	The temperature of traction motor or traction motor inverter is high.	Check the "POWER LIMIT CAUSE" in the DATA MONITOR of VCM.	E
	The amount of regeneration	LBC limits output.	Fail-safe of LBC.	EVB-45, "Fail-safe" (TYPE 1), EVB-263, "Fail-safe" (TYPE 2), EVB-497, "Fail-safe" (TYPE 3), EVB-729, "Fail-safe" (TYPE 4).	
	is limited.		Damaged bus bar (connecting part of Li-ion battery module).	Check bus bar.	
מממומו			Degradation in Li-ion battery temperature	Check the "POWER LIMIT CAUSE"	
Š			The temperature of Li-ion battery is too high/low.	in the DATA MONITOR of VCM.	
			Li-ion battery is fully charged.	Normal operation.	
	The amount of target regen-	Selector lever range position is changed.	Range changes from D to ECO or from ECO to D.	Normal operation.	
	eration changes.	_	Accelerator pedal is depressed.	Normal operation.	

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Normal Charge Does Not Start

	Sympto	m	Possible cause	Action
		VCM recognizes that the selector lever is in a range other than P range.	Electric shift system error.	Perform self-diagnosis of Electric shift control module.
		_	Power switch is not OFF.	Normal operation.
		_	VCM receives a charge stop request signal from onboard charger.	Check to see if charge stop conditions are satisfied. Refer to EVC-40. "LI-ION BATTERY CHARGE CONTROL: Normal Charge Control".
		VCM recognizes that quick charge connector and nor-	Abnormal connection detection circuit of quick charge port.	Check quick charge port.
		mal charge connector are connected simultaneously.	Abnormal on-board charger.	Perform self-diagnosis of On-board charger.
	Normal charge start condi-	VCM prohibits charging.	Fail-safe of VCM.	EVC-79, "Fail-Safe"
	tions are not satisfied.	VCM recognizes that nor- mal charge connector is not	Abnormal connection detection circuit of normal charge port.	Check normal charge port.
		connected.	Abnormal on-board charger.	Perform self-diagnosis of on-board charger.
		VCM recognizes that a PWM signal is not received from EVSE.	AC power, no input. (Disconnect from outlet)	Check outlet.
			AC power, no input. (Blackout)	Check AC power.
			EVSE does not transmit a PWM signal.	Perform self-diagnosis of on-board charger.
			Abnormal on-board charger.	
		_	Timer charge is set.	 Cancel timer charge setting. Turn ON the immediate charging switch.
	Judged as fully-charged.	_	Li-ion battery is fully charged.	Normal operation.
·	EVSE does not activate.		EVSE detects electric leak- age	 Plug EVSE alone into an outlet (AC source) and check that the "Fault" lamp on EVSE does not blink. If the lamp blinks, replace EVSE. Check that no electric leakage exists between EVSE control box and on-board charger or in the on-board charger itself.
			EVSE has a malfunction	Plug EVSE alone into an outlet (AC source) and check that the "Fault" lamp of EVSE does not turn ON. If the lamp turns ON, replace EVSE.
				Plug EVSE alone into an outlet (AC source) and check that the "Ready" lamp of EVSE turns ON. If the lamp does not turn ON, replace EVSE.
			EVSE communication line has a malfunction	Plug EVSE alone into an outlet (AC source) and check that the "Fault" lamp on EVSE does not blink. If the lamp blinks, replace EVSE.

< SYMPTOM DIAGNOSIS >

Timer Charge and Remote Charge Does Not Start

INFOID:0000000007539384

	Sympto	m	Possible cause	Action
start.	The timer charge start conditions are not satisfied.	_	Timer charge is not set.	Set timer charge.
does not		Remote charge request is not sent to the Information Center (Nissan CARWINGS Data Center).	The request is sent from an out of service area.	Send a remote charge request in a service area.
Timer charge or remote charge	The remote charge start conditions are not satisfied.	Remote control charge request is not sent from the Information Center (Nissan CARWINGS Data Center).	The vehicle is located an out of service area.	Send a remote charge request in a service area.

Immediate Charge Does Not Start

INFOID:0000000007539385

	Sympton	m	Possible cause	Action
art.		_	Timer charge is set.	Turn ON the immediate charging switch.
not start.			Power switch is ON.	Turn power switch OFF.
Immediate charge does no	Immediate charge start condition are not satisfied.	The operation of immediate charging switch does not start immediate charge.	A lapse of more than 15 minutes to connect the charge connector after operating the immediate charging switch.	Connect charge connector within 15 minutes after operating the immediate charging switch.
			Abnormal immediate charging switch. Abnormal immediate charging switch signal circuit.	EVC-352, "Diagnosis Procedure"

Normal Charge Is Not Completed

	Symptom	Possible cause	Action
ed.	Normal charge is not completed despite full charge.	Abnormal LBC.	Perform self-diagnosis of LBC.
Normal charge is not completed.	Timer charge is not completed.	Timer charge end time is not set.	Set timer charge end time.

< SYMPTOM DIAGNOSIS >

Quick Charge Does Not Start

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	Sympton	m	Possible cause	Action
		VCM recognizes that the selector lever is in a range other than P range.	Electric shift system error.	Perform self-diagnosis of electric shift control module.
		_	Power switch is not OFF.	Normal operation.
ند		_	VCM receives a charge stop request signal from onboard charger.	Check that charging condition is normal.
Quick charge does not start.	Quick charge start conditions are not satisfied.	VCM recognizes that the quick charge connector and the normal charge connector are simultaneously connected.	Abnormal connection detection circuit of normal charge port.	Check normal charge port.
ge doe			Abnormal on-board charger.	Perform self-diagnosis of on-board charger.
char		VCM prohibits charging.	Fail-safe of VCM.	EVC-79, "Fail-Safe"
Quick		VCM recognizes that the quick charge connector is not connected.	Abnormal connection detection circuit of quick charge port.	Check quick charge port.
			Abnormal on-board charger.	Perform self-diagnosis of on-board charger.
	Quick charger does not permit quick charge.	Quick charger detects insulation resistance degradation in high voltage circuit.	Insulation resistance degradation between DC/DC-J/B and quick charger.	 Check DC/DC-J/B. Check high voltage harness. Check quick charge port. Check quick charger.

Quick Charge Is Not Completed

INFOID:0000000007539388

	Symptom	Possible cause	Action
ed.	Charging is not completed despite full charge.	Abnormal LBC.	Perform self-diagnosis of LBC.
Quick charge is not completed.	VCM does not receive a quick charge stop request signal.	Quick charger communication error.	Perform self-diagnosis of on-board charger.

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Full Charge Cannot Be Achieved

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	Sympto	om	Possible cause	Action
			The setting of the timer charge charging rate is 80%.	Set charging rate to 100%
	_	_	Implementation of quick charge under a low Li-ion battery level.	Perform quick charge again.
		Power consumption is large	A/C power consumption is large.	Refer to EVC-358, "Low Electrical
	Charge power is low or	during charge.	Power consumption of auxiliaries is large.	Consumption".
Full charge cannot be achieved.	charging stops.	Charge power is limited.	Charge Insulation Resistance Loss Protection Control is active (except for VCM group A and B)*.	Perform inspection according to the diagnosis procedure of DTC P3141. Refer to EVC-225, "DTC Logic".
	Target charge level differs	Indication decreases after the completion of charge.	Temperature change in Liion battery.	Normal operation. NOTE: Charge level depends on Li-ion battery temperature. For meter indication method, refer to MWI-26, "LI-ION BATTERY AVAILABLE CHARGE GAUGE: System Description".
	from the meter indication.	Meter indication does not reach max.	LED malfunction	MWI-50, "On Board Diagnosis Function"
		Charge level shown by the quick charger differs from meter indication.	NOTE: Charge level calculation method of meter differs from that of quick charger. This may cause different indica- tion.	Normal operation.
	Charge level is low.	Chargeable electricity is limited.	LBC limits chargeable electricity.	Check "POWER LIMIT CAUSE" of DATA MONITOR item in VCM.

^{*:} For VCM groups, refer to EVC-8, "How to Check VCM Group".

Timer Air Conditioner Does Not Start

	Sympto	m	Possible cause	Action
does not start.			Timer A/C is not set.	Set timer A/C.
	Timer A/C start conditions are not satisfied.		remote A/C is set.	Normal operation. NOTE: If timer A/C and remote A/C are requested simultaneously, remote A/C is prioritized.
A/C o			EVSE is not connected.	Connect EVSE.
Timer A	A/C system does not start.	A/C auto amp. does not recognize timer A/C.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
		_	Abnormal A/C system power supply.	HAC-123, "A/C AUTO AMP. : Diagnosis Procedure"

< SYMPTOM DIAGNOSIS >

Remote Air Conditioner Does Not Start

INFOID:0000000007539391

	Sympto	m	Possible cause	Action
art.	Remote A/C start conditions are not satisfied.	_	Li-ion battery level is low.*	Connect EVSE. Charge Li-ion battery.
s not start.		A remote A/C request signal cannot be received.	Remote A/C request is sent in an out of service area.	Send remote A/C request again in a service area.
Remote A/C does			The vehicle is located in out of service area.	
	A/C system does not start.	A/C auto amp. does not recognize remote A/C.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
		_	Abnormal A/C system power.	HAC-123, "A/C AUTO AMP. : Diagnosis Procedure"

^{*:} Only during no AC power input.

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NORMAL OPERATING CONDITION

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NORMAL OPERATING CONDITION

Description INFOID:000000008525464

NOTE:

Protection control is applied to VCM other than those in Group A or Group B. For VCM groups, refer to <u>EVC-8</u>. "How to Check VCM Group".

CHARGE INSULATION RESISTANCE LOSS PROTECTION CONTROL

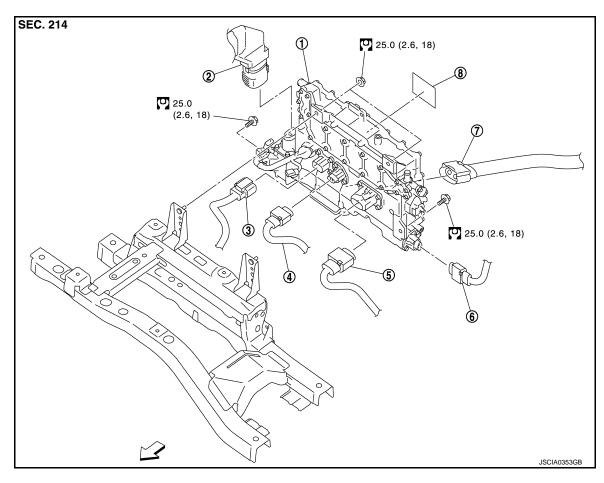
When the insulation resistance of the high voltage circuit decreases while charging due to a temporary cause, VCM limits the charging energy and waits until the insulation resistance state recovers. VCM restarts charging after the recovery of the insulation resistance status. If the situation is not improved after several repetitions of this control, VCM stops charging and detects DTC P3141.

NOTE:

If the insulation resistance status does not recover despite the limitation of charging energy under protection control, DTC P0AA6 is detected.

DC/DC-J/B

Exploded View



- 1. DC/DC-J/B
- 4. PTC elements heater high voltage connector
- 7. Li-ion battery high voltage connector 8.
- : Vehicle front
- : N-m (kg-m, ft-lb)

- Traction motor inverter high voltage 3. connector
- Quick charge port high voltage connector
 - High voltage warning label
- Electric compressor high voltage connector
- On board charger high voltage connector

Removal and Installation

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 disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

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- 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 EVC-11, "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.

REMOVAL

WARNING:

Disconnect high voltage. Refer to GI-31, "How to Disconnect High Voltage".

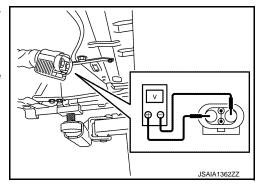
- 1. Check voltage in high voltage circuit. (Check that condenser are discharged.)
- a. Lift up the vehicle and remove the Li-ion battery under covers. Refer to <u>EVB-169</u>, "Removal and Installation" (TYPE 1), <u>EVB-395</u>, "Removal and Installation" (TYPE 2), <u>EVB-626</u>, "Removal and Installation" (TYPE 3) or EVB-866, "Removal and Installation" (TYPE 4).
- b. Disconnect high voltage harness connector from front side of Li-ion battery. Refer to EVB-169, <a href=""Removal and Installation" (TYPE 1), EVB-866, <a href=""Removal and Installation" (TYPE 2), EVB-626, <a href=""Removal and Installation" (TYPE 4).
- Measure voltage between high voltage harness connector 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 500 V or higher.

- Drain coolant from radiator. Refer to <u>HCO-11</u>, "<u>Draining and Refilling</u>".
- Drain heater fluid. Refer to <u>HA-43, "Draining and Refilling"</u>.
- 4. Remove traction motor inverter. Refer to TMS-116, "Removal and Installation".
- 5. Remove cowl top extension. Refer to EXT-19, "Exploded View".
- 6. Disconnect water hoses from the locations indicated below.
- a. Disconnect water hose (1) below the floor.

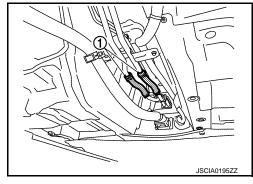
WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- If coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.



b. Disconnect water hose (1) at DC/DC-J/B IN side (top left).

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CALITION.

- Take care that coolant does not contact the high voltage harness connectors.
- If coolant contacts a high voltage harness connector, immediately use an air blow and fully remove the liquid.
- c. Disconnect water hose (1) between electric water pump 2 and water pipe.

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- If coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.
- 7. Remove the 2 water pipe mounting screws so that water pipe is free. Refer to HCO-23, "Exploded View".
- 8. Disconnect 12V system connector and harness clips (A).

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





9. Disconnect 14V output terminal.

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.

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10. Disconnect high voltage connector from the following 5 locations at DC/DC-J/B.

From below the vehicle, disconnect high voltage harness connector (1) from Li-ion battery.

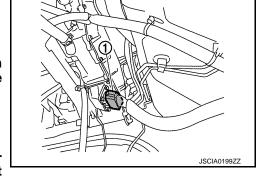
WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





 Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.



High voltage harness connector from Li-: 3 step type ion battery

Disconnect high voltage harness connector (1) for vehicle leftside on board charger.

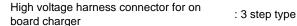
WARNING:

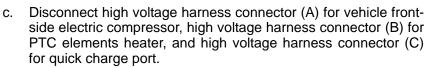
To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





· Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.





WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.







High voltage harness connector for : 2 step type electric compressor

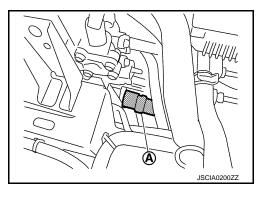
High voltage harness connector for

PTC elements heater

High voltage harness connector for quick charge port

: 3 step type

: 3 step type



 When disconnecting high voltage harness connector for electric compressor, disconnect it by inserting a suitable tool into inspection hole in traction motor inverter member.

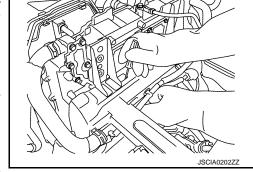
WARNING:

• To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.



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ii. For high voltage harness connector for PTC elements heater and high voltage harness connector for quick charge port, check their positions from the inspection hole and remove by reaching in and feeling with your hand.

WARNING:

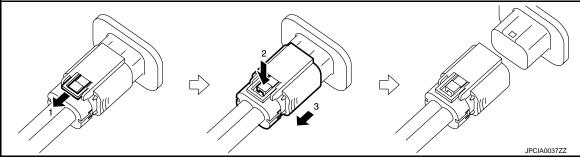
• To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



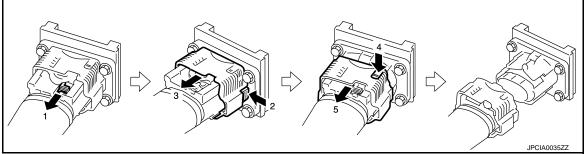


 Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.

• Follow steps shown below to remove a 2-step type high voltage connector.



Follow steps shown below to remove a 3-step type high voltage connector.



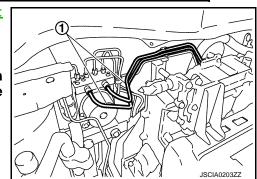
11. Disconnect 2 brake tubes (1). Refer to <u>BR-254, "FRONT Exploded View"</u>.

WARNING:

• To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





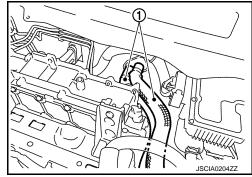


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- Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.
- 12. Disconnect heater hose (1) and move it out of the way to left side of vehicle.

CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- If coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.



B

13. Remove DC/DC-J/B fastening nut (A) and fastening bolt (B).



:Vehicle front

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.





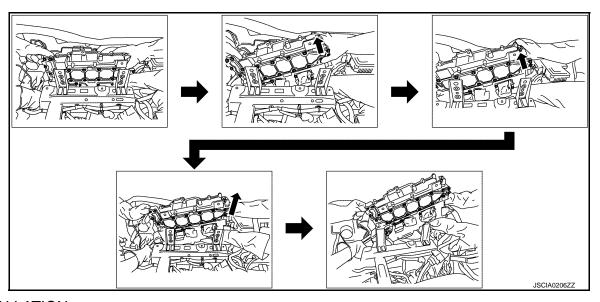
14. Move DC/DC-J/B to rear of vehicle. Then remove DC/DC-J/B, keeping the side on left of vehicle raised so that it does not contact high voltage harness connector for quick charge port or inverter member.

WARNING:

To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.







INSTALLATION

Pay attention to the following and install by following the procedure for removal in the reverse order.

WARNING:

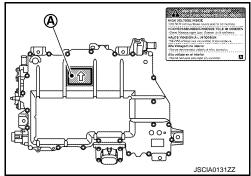
To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



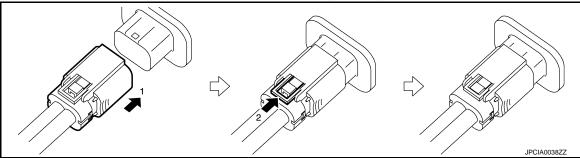


CAUTION:

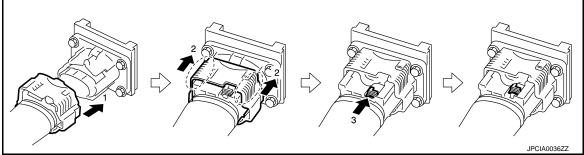
- Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.
- Be sure to perform correct air bleeding after adding coolant. Refer to <u>HCO-11, "Draining and Refilling"</u>.
- If DC/DC-J/B was replaced, apply high voltage warning label at position (A), with the top facing in the direction of the arrow.
- Before applying label, verify that there is no dust or dirt on surface of DC/DC-J/B.



• Follow the procedure below and connect the 2-step type high voltage harness connector.



Follow the procedure below and connect the 3-step type high voltage harness connector.



- After all parts are installed, be sure to check the equipotential.
- DC/DC-J/B: Refer to <u>EVC-375</u>, "Inspection".
- Traction motor inverter: Refer to TMS-122, "Inspection and Adjustment".

Inspection INFOID:0000000007539394

EQUIPOTENTIAL TEST

After installing DC/DC-J/B, measure resistance below.

- Between DC/DC-J/B (aluminum part) and body (ground bolt)
- Between DC/DC-J/B (aluminum part) and traction motor inverter (aluminum part).

WARNING.

Be sure to put on insulating protective gear before beginning work on the high voltage system.



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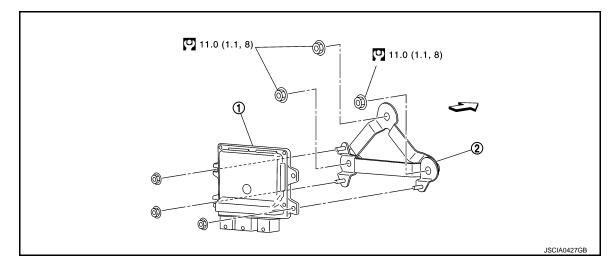
DC/DC-J/B

Standard : Less than 0.1 Ω

If result deviates from standard values, check that no paint, oil, dirt, or other substance is adhering to bolts or conductive mounting parts. If any such substance is adhering, clean the surrounding area and remove the substance.

VCM

Exploded View



- 1. VCM
- VCM bracket
- ⟨ ∀ Vehicle front
- : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000007539399

REMOVAL

CAUTION:

Before replacing VCM, perform "SAVE DATA FOR CPU REPLACE" in "WORK SUPPORT" of CONSULT to save the current VCM data in CONSULT. Refer to EVC-106, "Work Procedure".

- 1. Turn power switch OFF and wait at least 20 seconds.
- 2. Disconnect the 12V battery negative terminal.
- 3. Remove the glove box cover assembly. Refer to IP-13, "Exploded View".
- 4. Disconnect VCM harness connector.
- 5. Remove VCM mounting nuts.
- Remove VCM.
- 7. Remove VCM bracket mounting bolts.
- 8. Remove VCM bracket.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Must be perform additional service when replacing VCM. Refer to EVC-106, "Work Procedure".

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