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SECTION

EV CONTROL SYSTEM

EVC

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Precaution for Technicians Using Medical Electric

INFOID:000000007071848

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

INFOID:000000007079401

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"

INFOID:000000007080038

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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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:

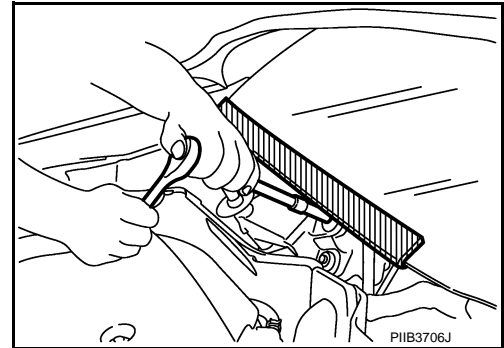
Always observe the following items for preventing accidental activation.

- 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.



Precaution for Removing 12V Battery

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

NOTE:

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

High Voltage Precautions

INFOID:000000006977079

WARNING:

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

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- Be sure to wear insulating protective equipment consisting of glove, shoes and face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.

CAUTION:

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

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

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

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

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

Person in charge: _____
DO NOT TOUCH! REPAIR IN PROGRESS. HIGH VOLTAGE DANGER:
DANGER: HIGH VOLTAGE REPAIR IN PROGRESS. DO NOT TOUCH! Person in charge: _____
Copy this page and put it after folding on the roof of the vehicle in service.

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General Precautions

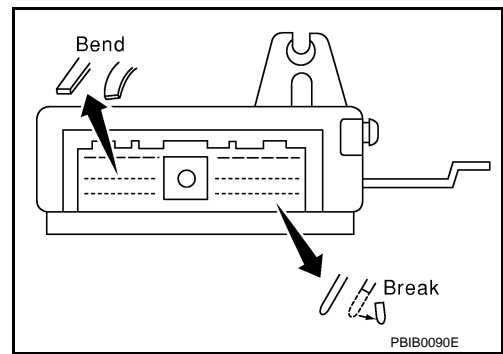
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- Never disassemble VCM and DC/DC junction box.
- If the 12V battery is disconnected, the diagnostic information will be lost within 3 minutes.

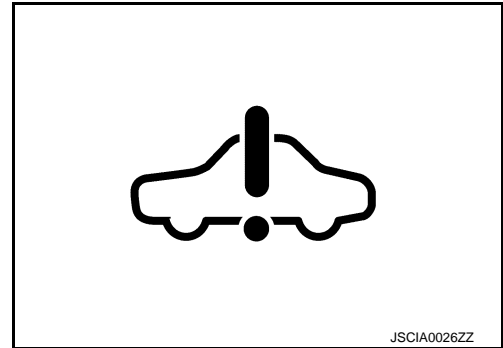
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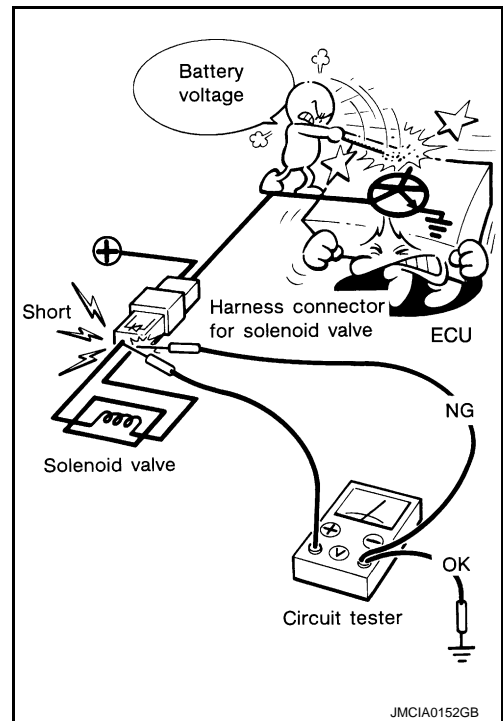
- When connecting or disconnecting harness connectors into or from VCM, take care not to damage pin terminals (bend or break).
Check that there are not any bends or breaks on VCM pin terminal, when connecting harness connectors.



- 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.

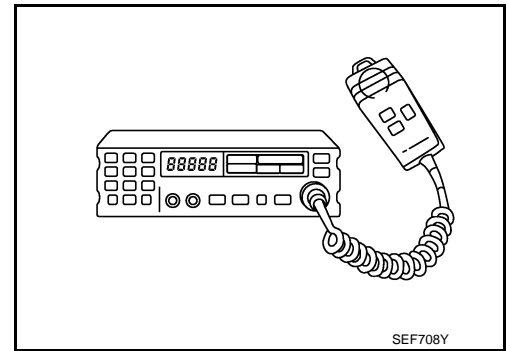


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- When installing C.B. ham radio or a mobile phone, be sure to observe the following as it may adversely affect electronic control systems depending on installation location.
- Keep the antenna as far as possible from the electronic control units.
- 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 ratio can be kept smaller.
- Be sure to ground the radio to vehicle body.



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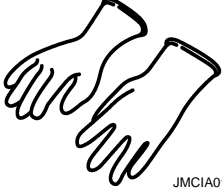
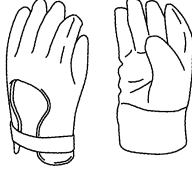

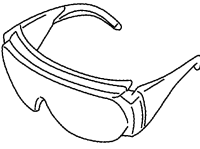
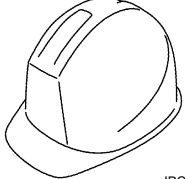
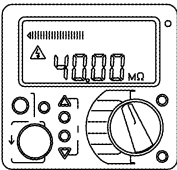
< PREPARATION >

PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000006977081

Tool name		Description
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	 <p>JMCIA0149ZZ</p>	Removing and installing high voltage components
Leather gloves [Use leather gloves that can fasten the wrist tight]	 <p>JPCIA0066ZZ</p>	<ul style="list-style-type: none"> • Removing and installing high voltage components • Protect insulated gloves
Insulated safety shoes	 <p>JPCIA0011ZZ</p>	Removing and installing high voltage components
Safety glasses [ANSI Z87.1]	 <p>JPCIA0012ZZ</p>	<ul style="list-style-type: none"> • Removing and installing high voltage components • To protect eye from the spatter on the work to electric line
Insulated helmet	 <p>JPCIA0013ZZ</p>	Removing and installing high voltage components
Insulation resistance tester (Multi tester)	 <p>JPCIA0014ZZ</p>	Measuring voltage and insulation resistance

A
B
EVC

D
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

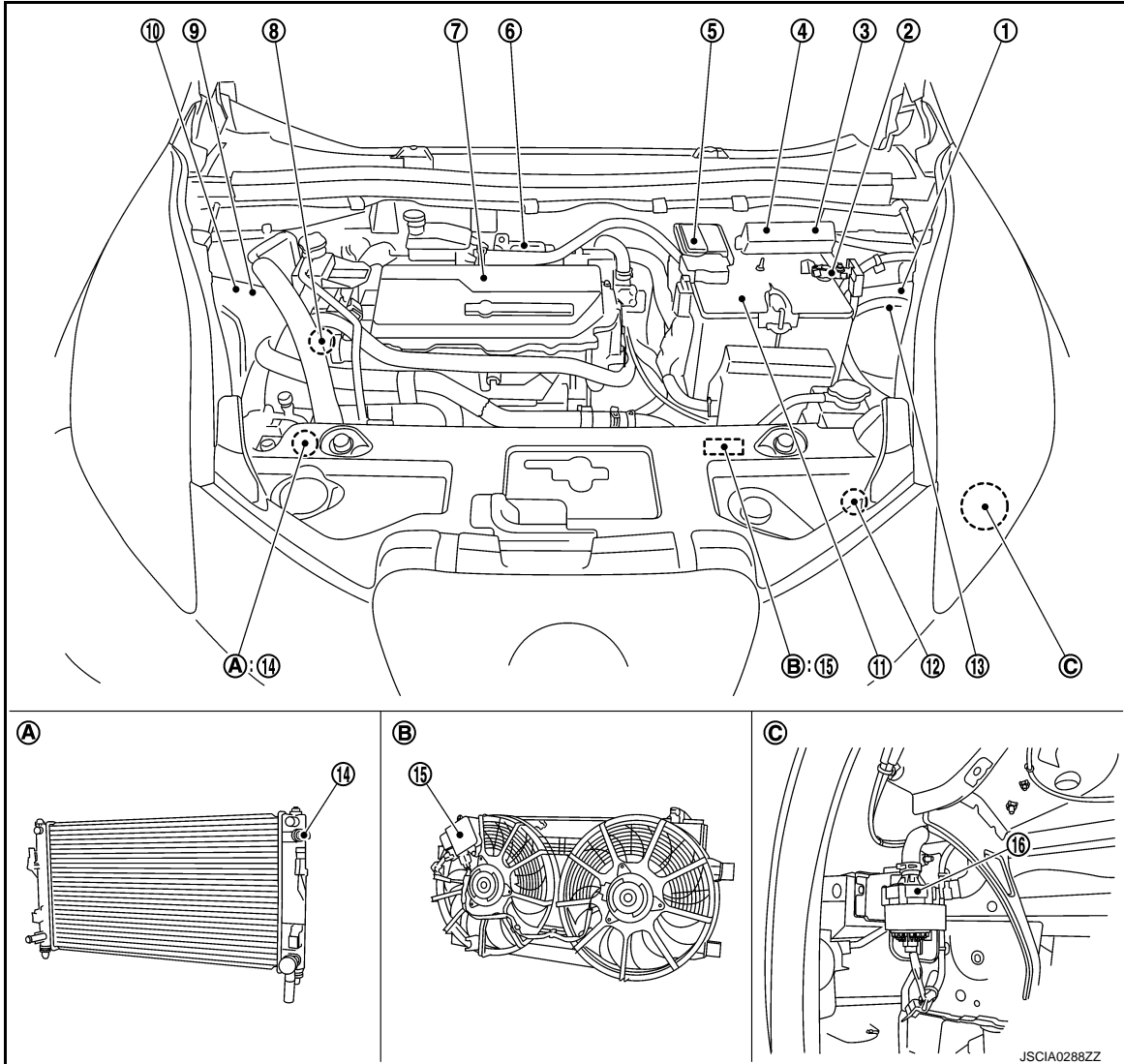
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:000000006977082

MOTOR ROOM COMPARTMENT



A. Radiator assembly

B. Cooling fan assembly

C: Front fender protector LH remove condition

Component Parts Description

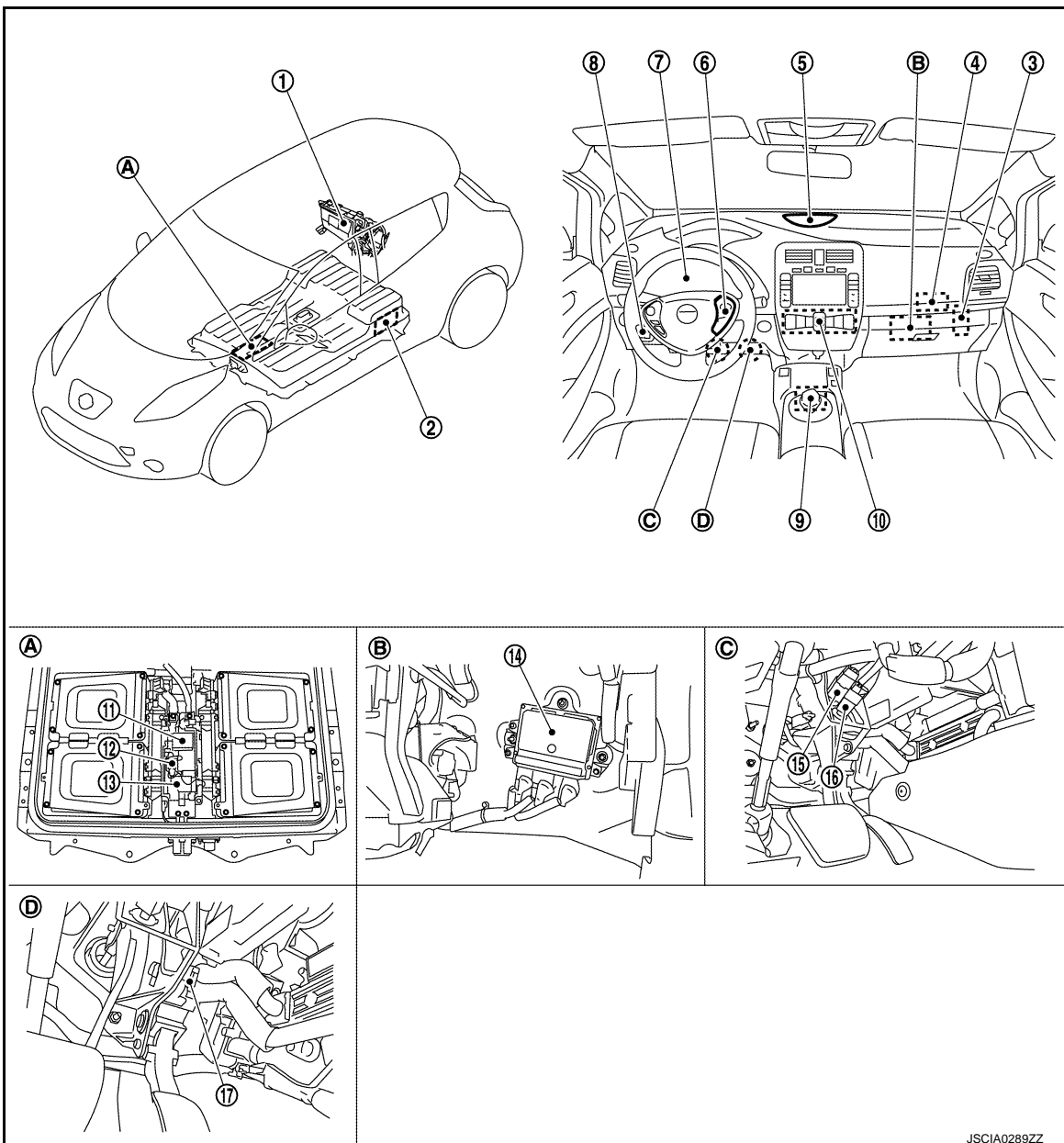
No.	Component parts	Function
1	F/S relay (IPDM E/R)	EVC-16. "F/S Relay"
2	Battery Current Sensor (With Battery Temperature Sensor)	EVC-19. "Battery Current Sensor (With Battery Temperature Sensor)"
3	M/C relay	EVC-16. "M/C Relay"
4	Reverse lamp relay	EVC-17. "Reverse Lamp Relay"
5	Electrically-driven intelligent brake unit	BR-10. "Electrically-driven Intelligent Brake"
6	DC/DC-J/B	EVC-18. "DC/DC Junction Box"

COMPONENT PARTS

< SYSTEM DESCRIPTION >

No.	Component parts	Function
7	Traction Motor Inverter	TMS-12, "Traction Motor Inverter"
8	Electric water pump 1	EVC-20, "Electric Water Pump"
9	F/S CHG relay	EVC-16, "F/S CHG Relay"
10	A/C relay	EVC-17, "A/C Relay"
11	12V battery	PG-8, "12V Battery"
12	Refrigerant pressure sensor	EVC-17, "Refrigerant Pressure Sensor"
13	SSOFF relay (IPDM E/R)	EVC-17, "SSOFF Relay"
14	Water temperature sensor	EVC-19, "Coolant Temperature Sensor"
15	Cooling fan control module	EVC-20, "Cooling Fan Control Module"
16	Electric water pump 2	EVC-20, "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

COMPONENT PARTS

< SYSTEM DESCRIPTION >

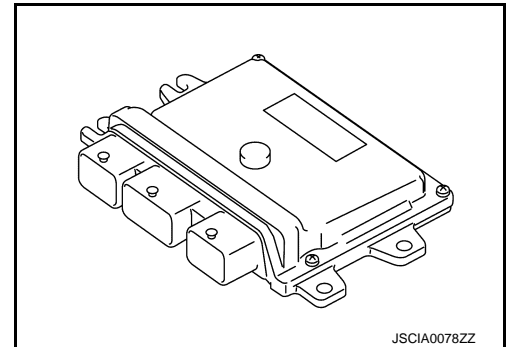
Component Parts Description

No.	Component parts	Function
1	On-board charger	VC-9, "On-board Charger"
2	Li-ion battery controller	EVB-12, "Li-ion Battery Controller"
3	TCU (telematics communication unit)	AV-143, "TCU"
4	VSP control unit	VSP-8, "Approaching Vehicle Sound For Pedestrians (VSP) Control Unit"
5	Charging status indicator	VC-11, "Charging Status Indicator"
6	ASCD steering switch	EVC-18, "ASCD Steering Switch"
7	Combination meter	EVC-20, "Combination Meter"
8	Immediate charging switch	VC-10, "Immediate Charging Switch"
9	Electric shift control module	TM-27, "Electric Shift Control Module"
10	A/C auto amp.	HAC-12, "A/C Auto Amp."
11	System main relay 2	EVC-17, "System Main Relay 2"
12	Pre-charge relay	EVC-17, "Pre-charge Relay"
13	System main relay 1	EVC-17, "System Main Relay 1"
14	VCM (vehicle control module)	EVC-16, "VCM"
15	Stop lamp switch	EVC-18, "Stop Lamp Switch"
16	ASCD brake switch	EVC-18, "ASCD Brake Switch"
17	Accelerator pedal position sensor	EVC-17, "Accelerator Pedal Position Sensor"

VCM

INFOID:000000006977083

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.



M/C Relay

INFOID:000000006977084

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

INFOID:000000006977085

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

INFOID:000000006977086

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

COMPONENT PARTS

< SYSTEM DESCRIPTION >

SSOFF Relay

INFOID:000000006977087

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

INFOID:000000006977088

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

INFOID:000000006977089

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

INFOID:000000006977090

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

INFOID:000000006977091

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

INFOID:000000006977092

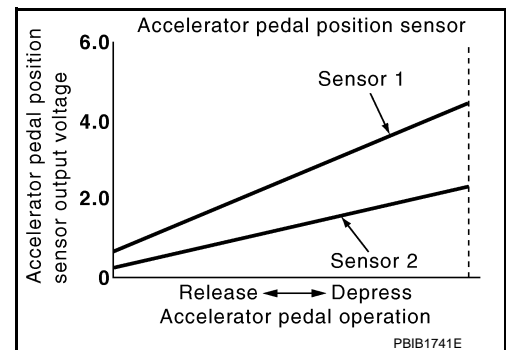
When VCM receives a reverse range information from the electric shift control module, VCM activates the reverse lamp relay to turn on the reverse lamp.

Accelerator Pedal Position Sensor

INFOID:000000006977093

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 full close position of the acceleration pedal from the accelerator pedal position sensor signal.



Refrigerant Pressure Sensor

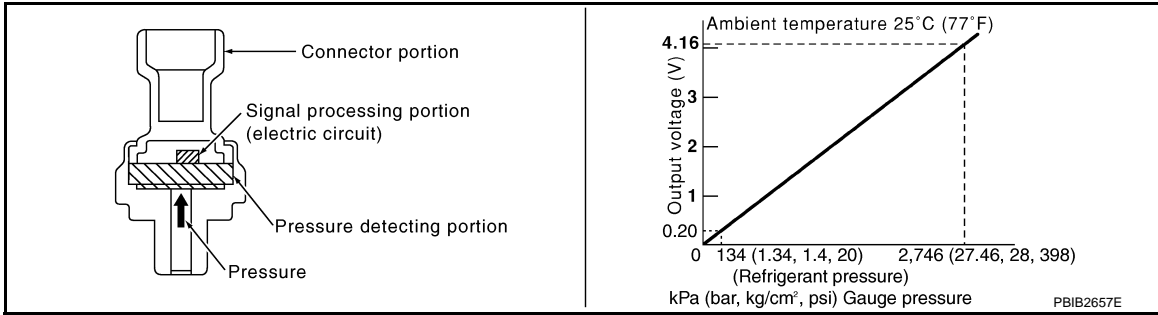
INFOID:000000006977094

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

COMPONENT PARTS

< SYSTEM DESCRIPTION >

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

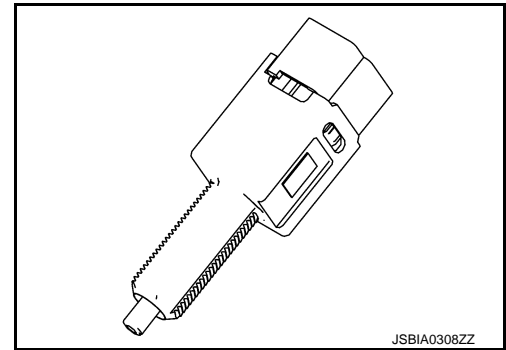


Stop Lamp Switch

INFOID:000000006977095

The stop lamp switch is installed to the brake pedal bracket. The switch detects 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

INFOID:000000006977096

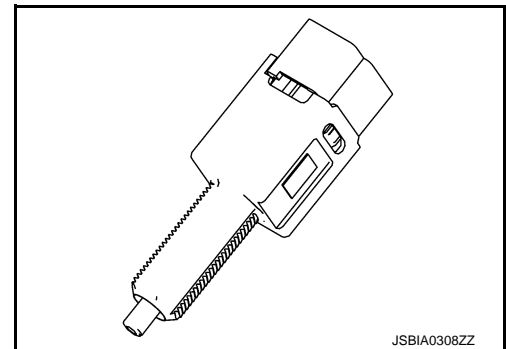
ASCD steering switch has various values of electrical resistance for each button. VCM reads voltage variation of switch, and determines which button is operated.

ASCD Brake Switch

INFOID:000000006977097

The ASCD brake switch is installed to the brake pedal bracket. The switch detects 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.



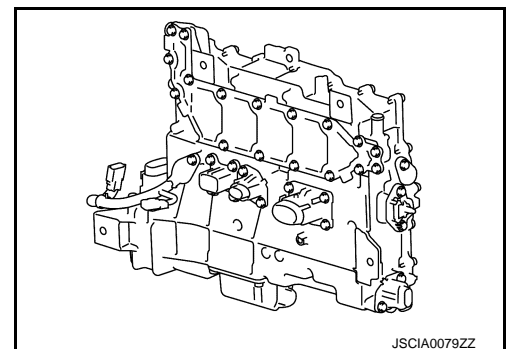
DC/DC Junction Box

INFOID:000000006977098

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

COMPONENT PARTS

< 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)

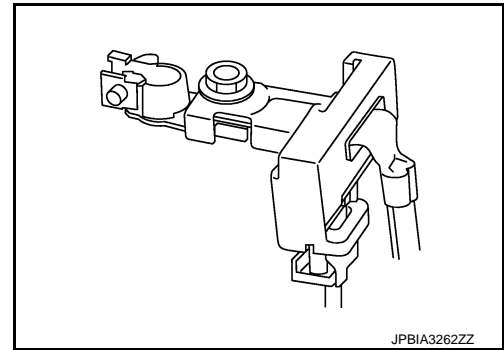
INFOID:000000006977099

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 discharge.



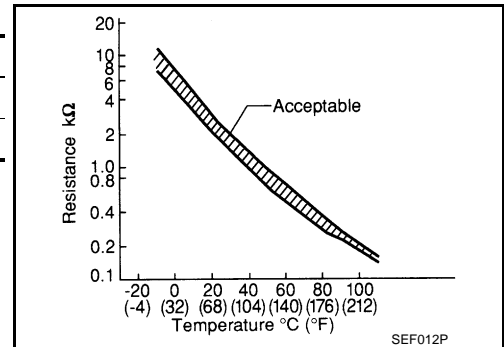
BATTERY TEMPERATURE SENSOR

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>

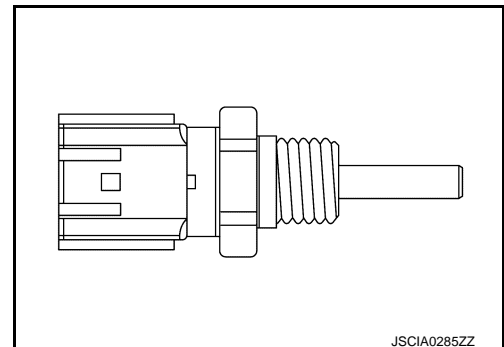
Temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)
25 (77)	3.333	1.9 - 2.1
90 (194)	0.969	0.222 - 0.258



Coolant Temperature Sensor

INFOID:000000006977100

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.

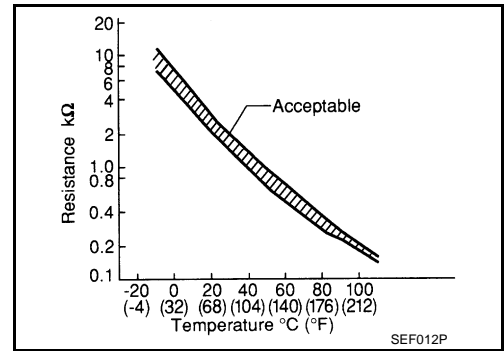


COMPONENT PARTS

< SYSTEM DESCRIPTION >

<Reference value>

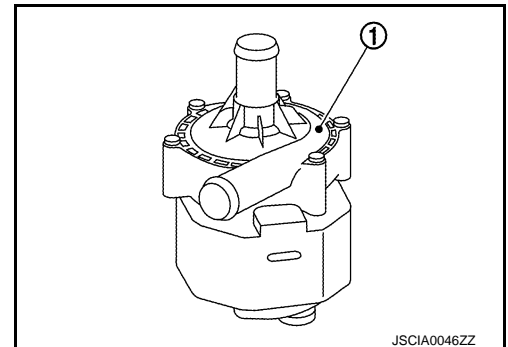
Coolant temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)
-10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.35 - 2.73
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



Electric Water Pump

INFOID:000000006977101

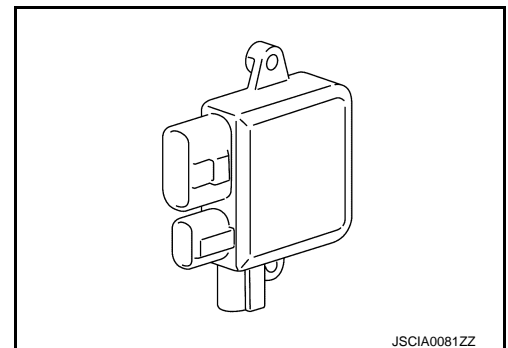
The electric water pump (1) feeds coolant by pressure, which circulates in the high voltage system cooling circuit. The high voltage system cooling circuit includes two cooling pumps. They are controlled by VCM independently so that the amount of pressure feed is adjusted according to the vehicle speed 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.



Cooling Fan Control Module

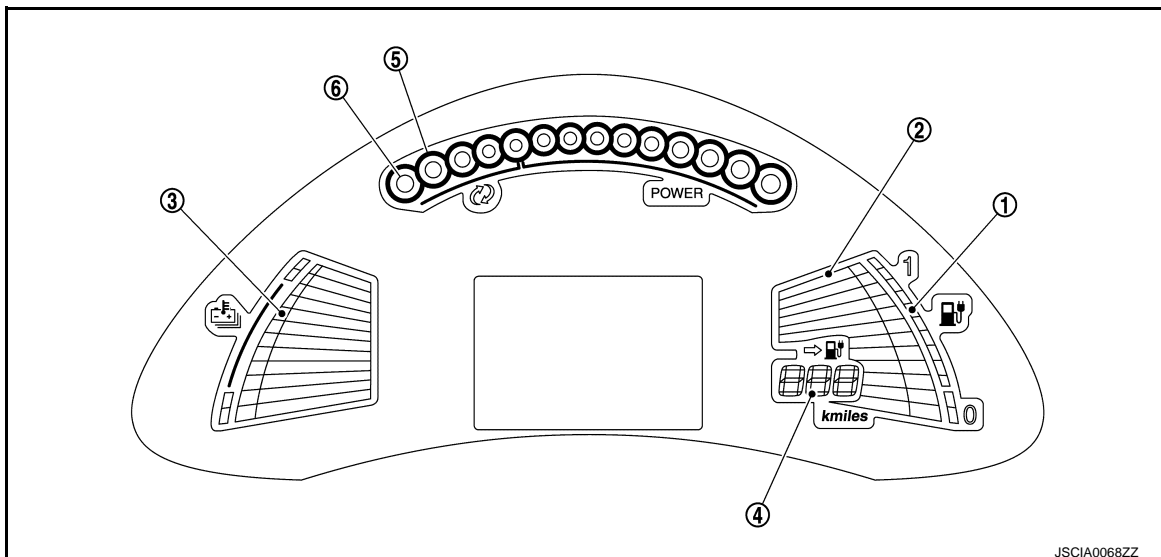
INFOID:000000006977102

The cooling fan control module is mounted on top of 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.



Combination Meter

INFOID:000000006977103



COMPONENT PARTS

< SYSTEM DESCRIPTION >

VCM controls the following items inside 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 will also decrease.

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 a 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

INFOID:000000006977104

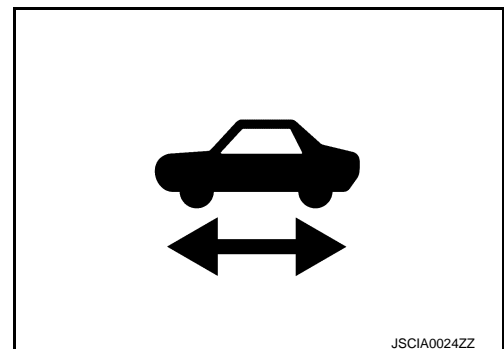
VCM controls the following warning lamps and indicator lamps.

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

COMPONENT PARTS

< SYSTEM DESCRIPTION >

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

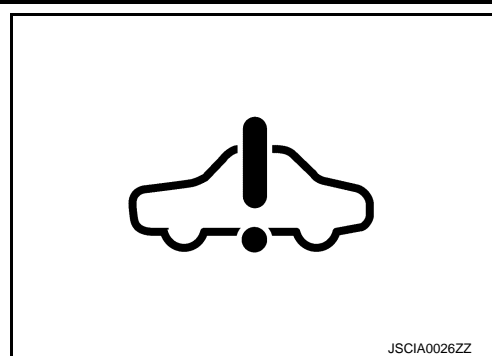
If VCM detects a malfunction or receives an EV system warning lamp request signal from any of other ECUs, it transmits an EV system warning lamp request signal to the combination meter via CAN communication.

The EV system warning lamp operates as per the following.

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 turn OFF soon after the system returns to normal.)

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

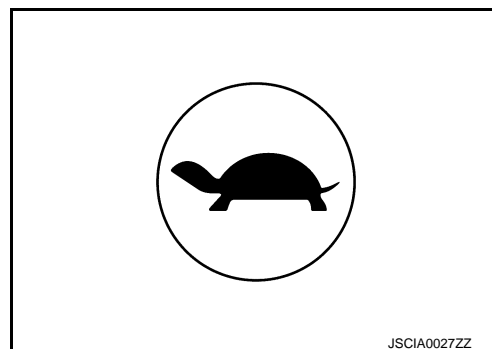


POWER LIMITATION INDICATOR LAMP

The output limit indicator turns on when the vehicle output is limited. When the vehicle 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 per the following.

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

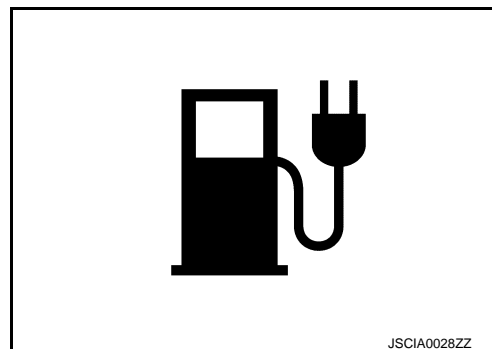


LOW BATTERY CHARGE WARNING LAMP

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 per the following.

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 illuminating	ON ⇒ OFF
Except above	OFF

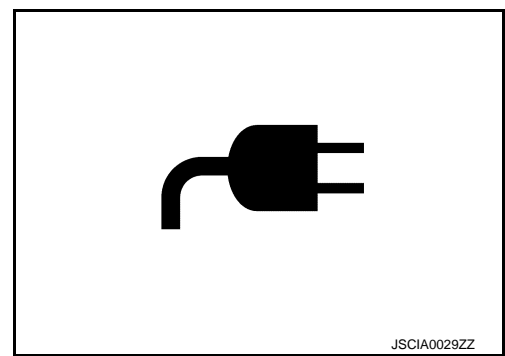


PLUG IN INDICATOR LAMP

COMPONENT PARTS

< 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 on-board charger. The plug in indicator lamp operates as per the following.



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

NOTE:

- When the quick charge connector is connected, the indicator lamp is turned ON by turning ON the quick charger start switch.
- When EVSE is connected, the indicator lamp turns ON immediately. The indicator lamp turns OFF after the lapse of 10 seconds with non-operating state.

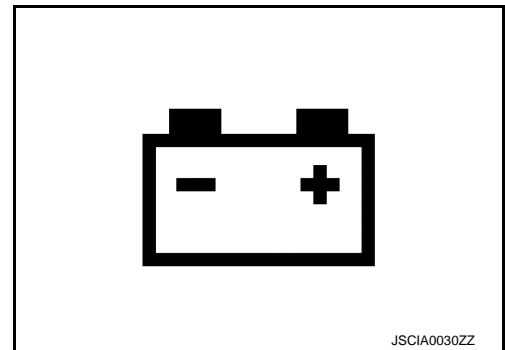
12V BATTERY CHARGE WARNING LAMP

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 canceled.
- 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 per the following.



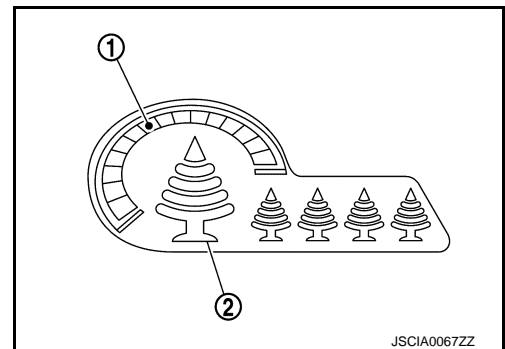
Condition	Illumination status
When turn power switch ON	ON (bulb check)⇒OFF⇒ON
When 12V battery voltage lowers	ON
Except above	OFF

ECO Indicator

INFOID:000000006977105

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

For information regarding control, refer to [EVC-47. "ECO INDICATOR CONTROL : System Description"](#).



Information Display

INFOID:000000006977106

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

COMPONENT PARTS

< SYSTEM DESCRIPTION >

Display item	Display content
Cruise set indicator	Displays the setting status of ASCD.
Shift position indicator	Displays the current shift position.
Remove charge connector warning	If a plug is connected to a charge port when a READY operation is performed, a warning is issued.
DC/DC converter warning	Displays the voltage of 12V battery becomes lower.
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.

Approaching Vehicle Sound for Pedestrians (VSP)

INFOID:000000006977107

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)

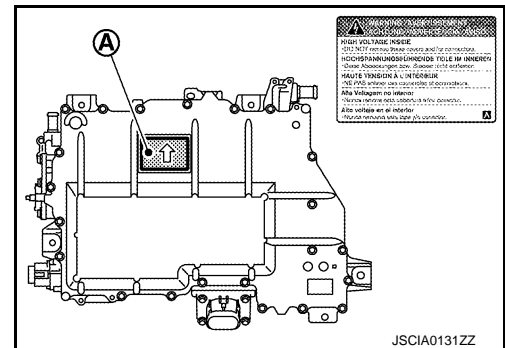
High Voltage Warning Label

INFOID:000000006977108

- The high voltage warning label is stuck on the rear side (A) of DC/DC-J/B.

← : Direction of the label

- When replacing DC/DC-J/B, make sure to stick it on original position.



SYSTEM

< SYSTEM DESCRIPTION >

SYSTEM

ELECTRIC POWER TRAIN SYSTEM

ELECTRIC POWER TRAIN SYSTEM : System Description

INFOID:000000006977109

CONTROL OUTLINE

EV depends on electric power as the only source of power for system operation.

The power stored in the lithium-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

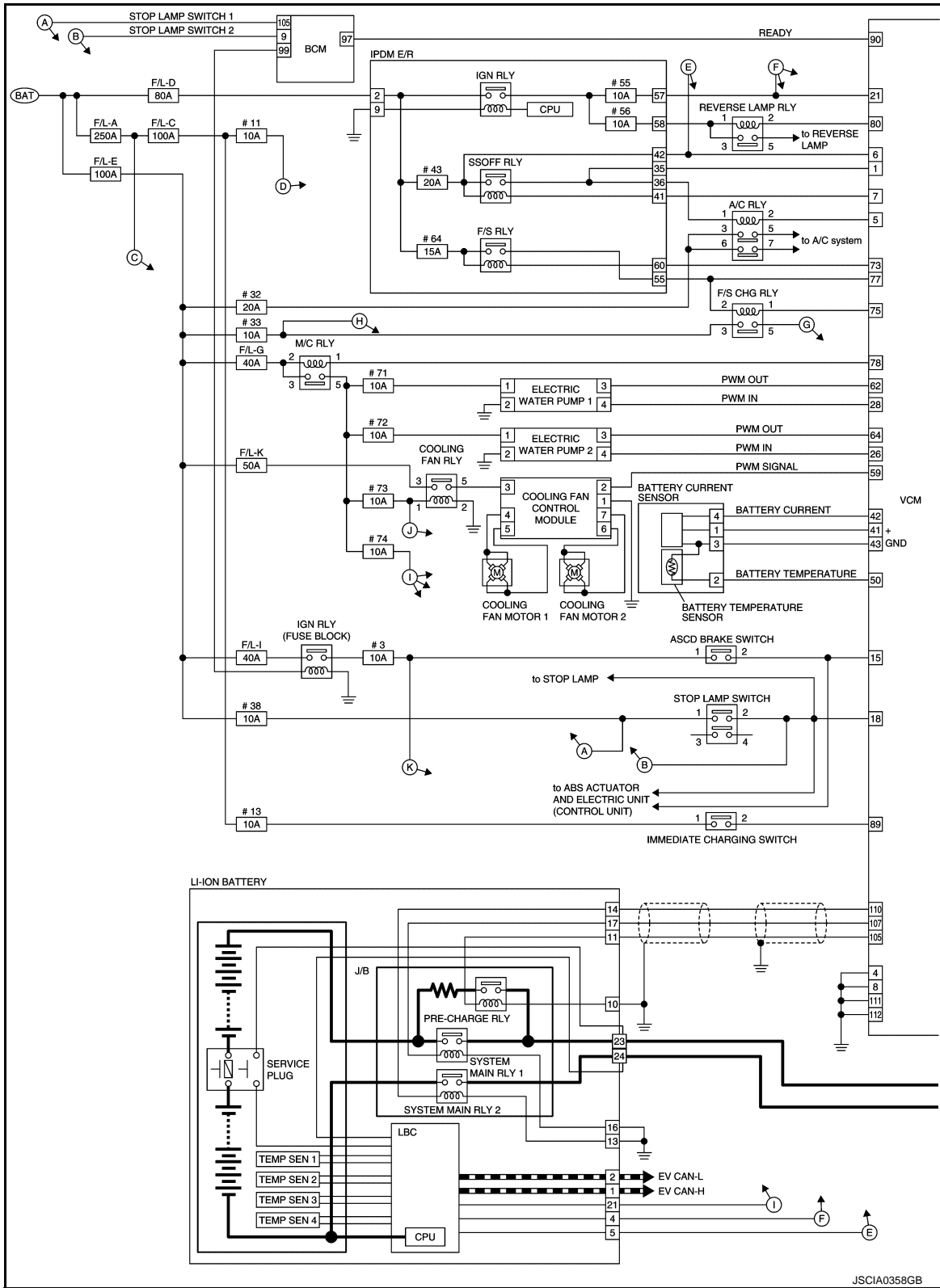
Control	Reference
EV system start-up control	EVC-31. "EV SYSTEM START UP CONTROL : System Description"
High voltage power supply control	EVC-34. "HIGH VOLTAGE POWER SUPPLY CONTROL : System Description"
Motor power control	EVC-35. "MOTOR POWER CONTROL : System Description"
Motor regeneration control	EVC-36. "MOTOR REGENERATION CONTROL : System Description"
Li-ion battery charge control	EVC-36. "LI-ION BATTERY CHARGE CONTROL : System Description"
Cooperative Regenerative brake control	BR-12. "System Description"
High voltage system cooling control	EVC-39. "HIGH VOLTAGE SYSTEM COOLING CONTROL : System Description"
Air conditioner control	EVC-43. "AIR CONDITIONER CONTROL : System Description"
Power voltage variable control	EVC-44. "POWER VOLTAGE VARIABLE CONTROL SYSTEM : System Description"
Automatic 12V battery charge control	EVC-45. "AUTOMATIC 12V BATTERY CHARGE CONTROL : System Description"
Power cut off control	EVC-45. "POWER CUT OFF CONTROL : System Description"
ASCD (automatic speed control device)	EVC-46. "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"
ECO indicator control	EVC-47. "ECO INDICATOR CONTROL : System Description"

SYSTEM

< SYSTEM DESCRIPTION >

ELECTRIC POWER TRAIN SYSTEM : Schematic

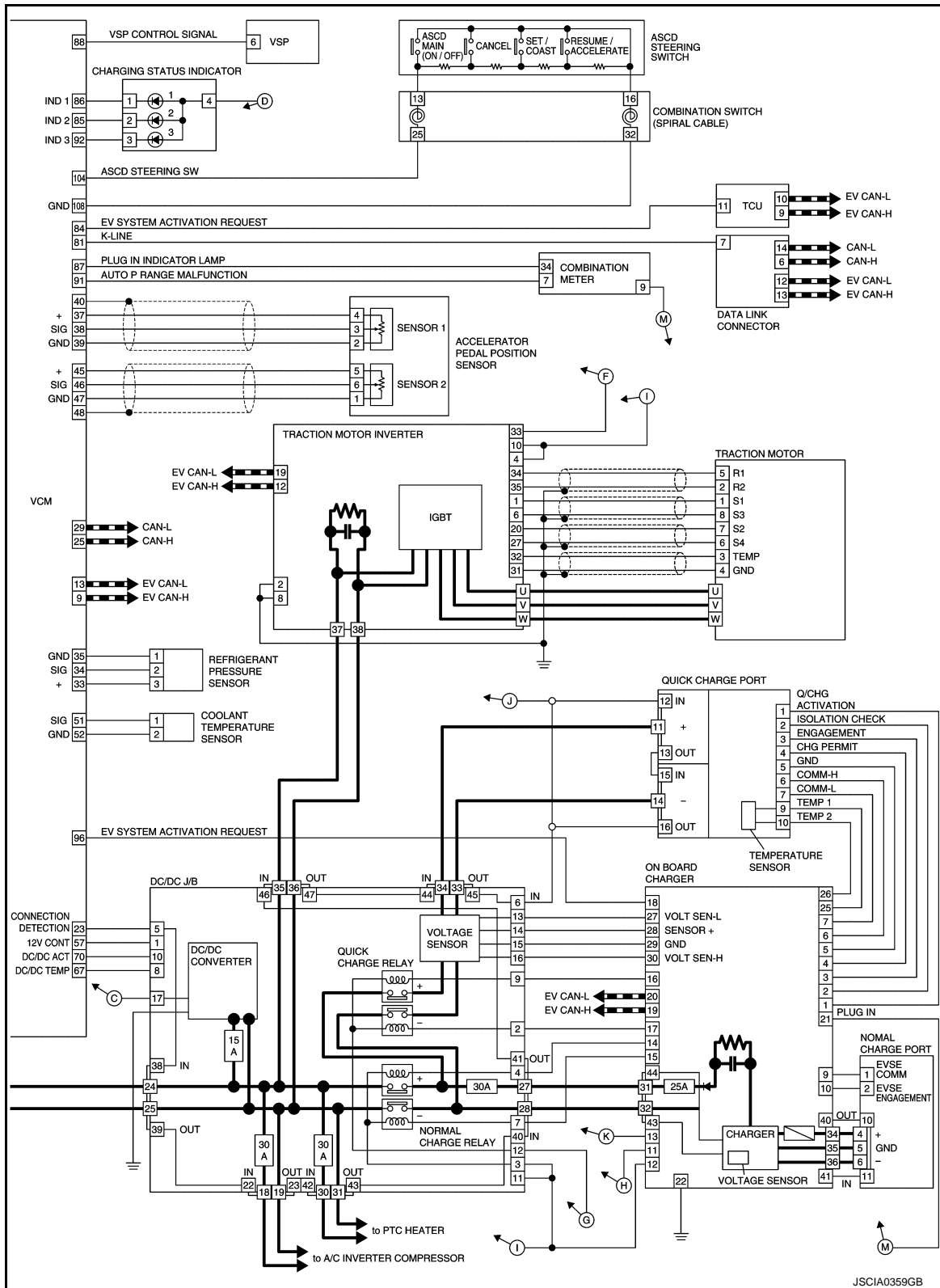
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SYSTEM

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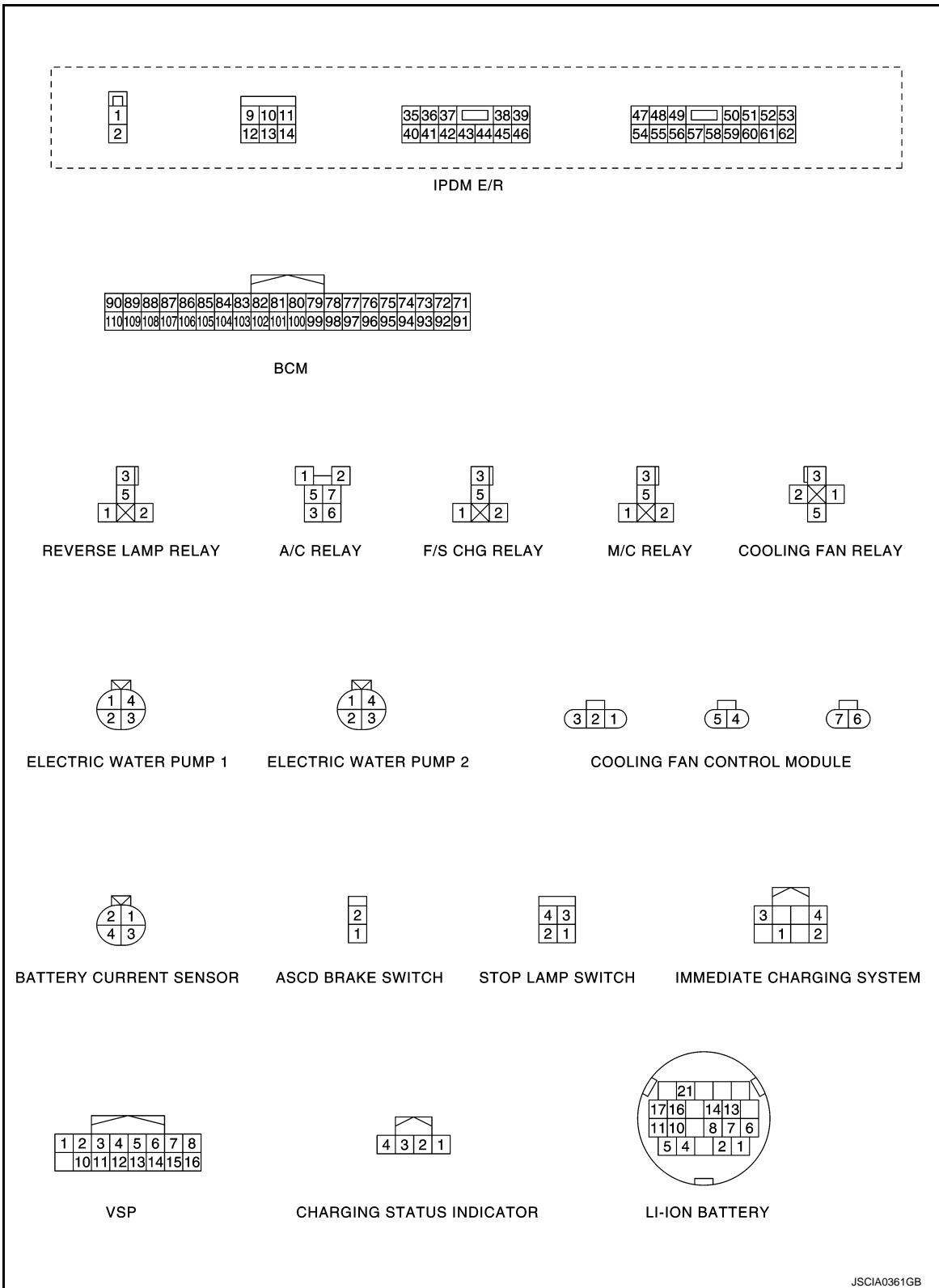


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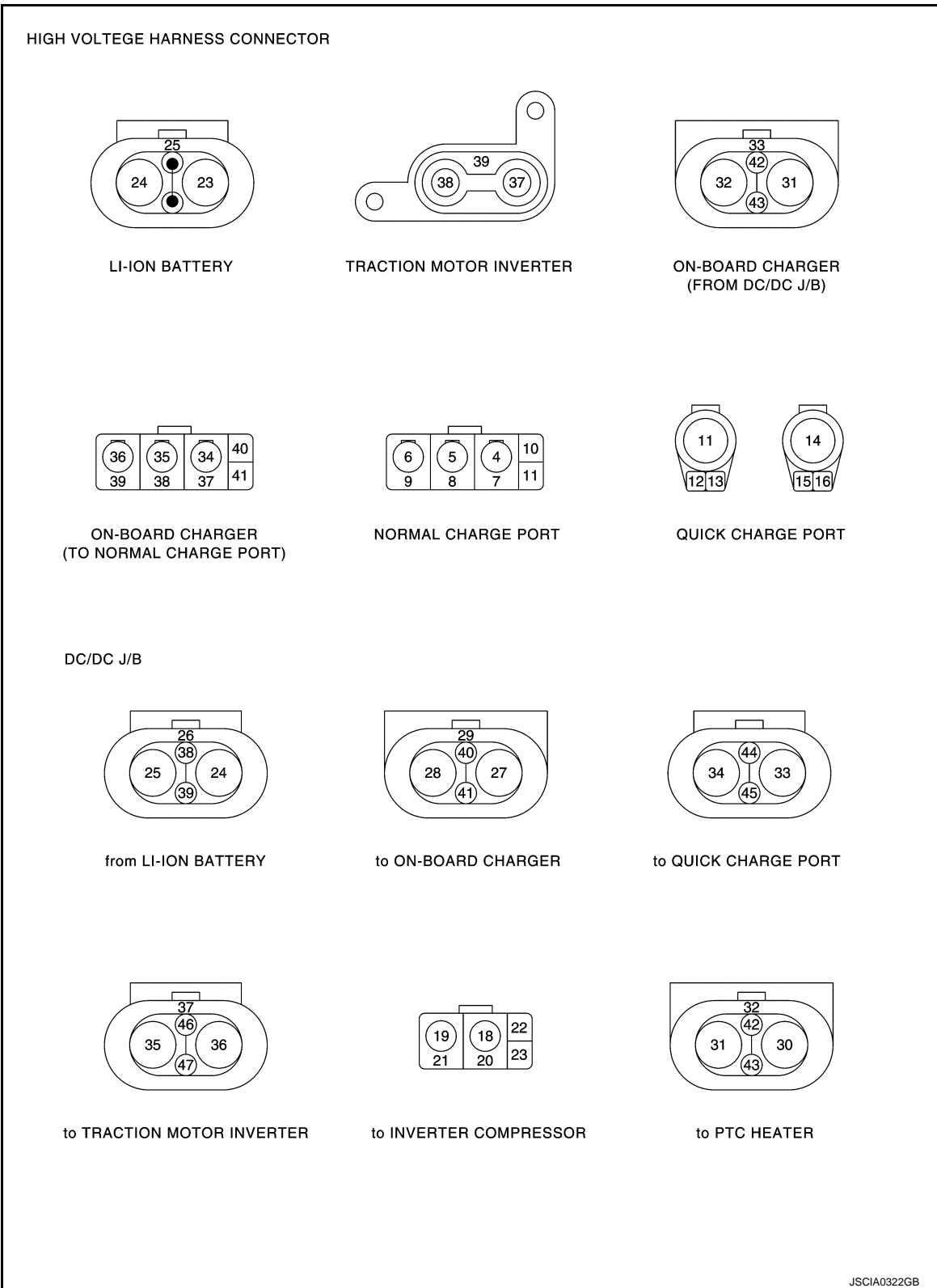
SYSTEM

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SYSTEM

< SYSTEM DESCRIPTION >



EV SYSTEM START UP CONTROL

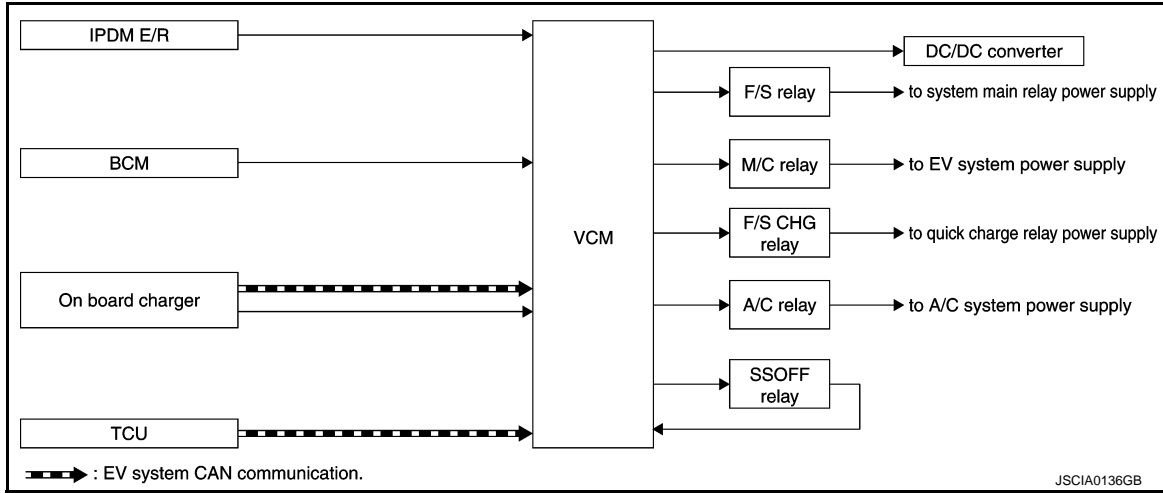
SYSTEM

< SYSTEM DESCRIPTION >

EV SYSTEM START UP CONTROL : System Description

INFOID:000000006977111

SYSTEM DIAGRAM



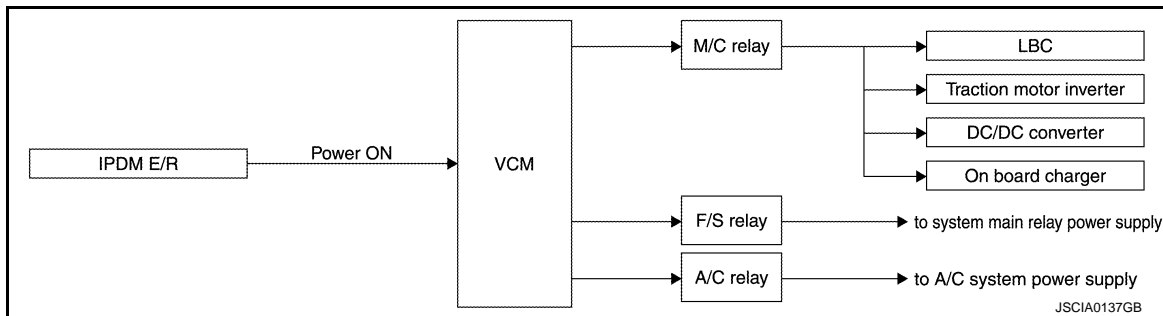
INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form
IPDM E/R	Power ON	VCM	Voltage
BCM	READY signal		
On-board charger	Quick charger connecting signal		EV system CAN
	EVSE connecting signal		
	EV system activation request signal		
TCU	EV system activation request signal	Voltage	
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 control the start/stop of the EV system by activating the relays accordingly. VCM also activates the SSOFF relay so that it can shutoff VCM power when VCM stops (self shutoff).

Power switch ON

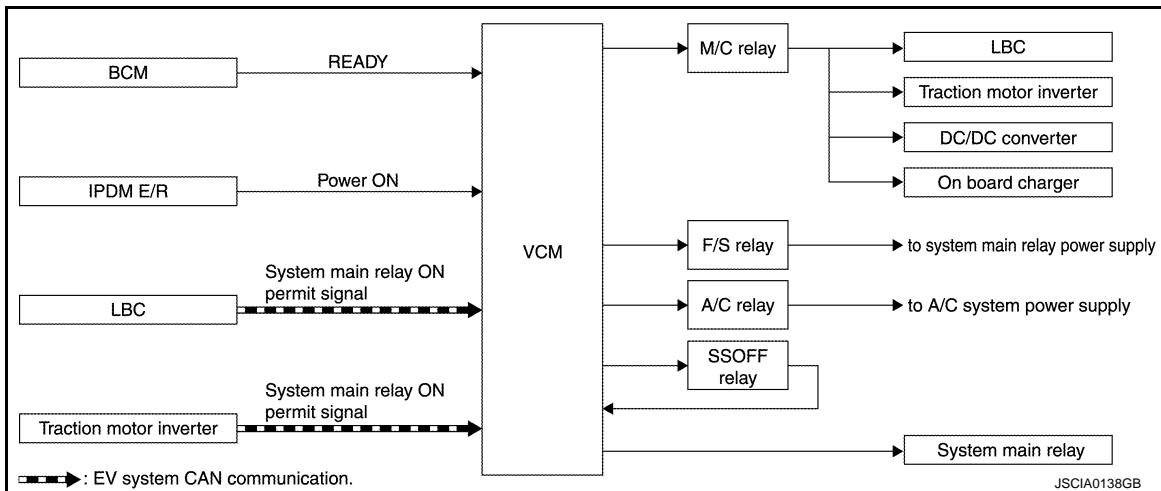


When the power ON power supply from the IPDM E/R enters VCM, VCM turns on the M/C relay to supply power to each ECU in the EV system.

SYSTEM

< SYSTEM DESCRIPTION >

READY



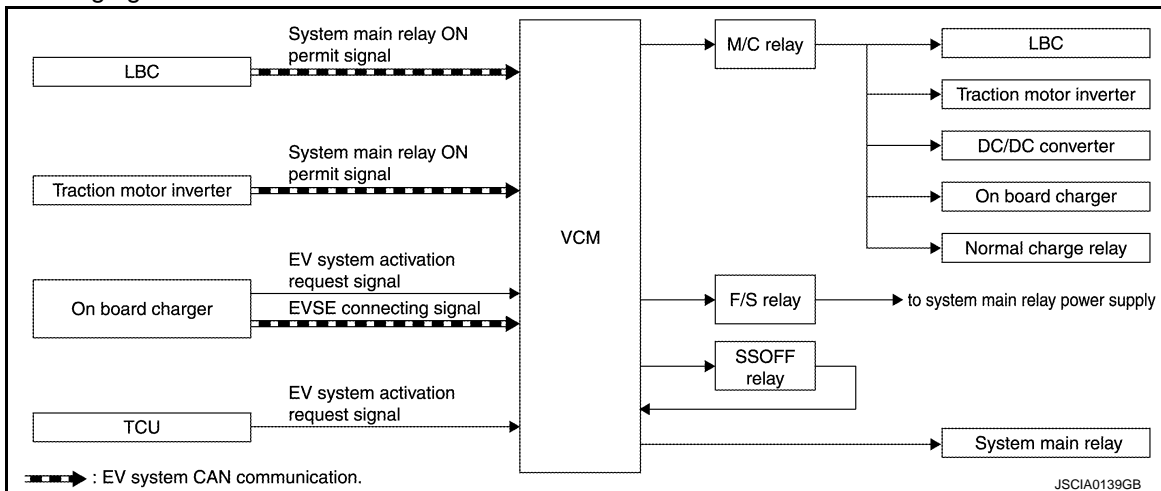
When the driver operates the POWER switch while depressing the brake pedal, VCM turns on the M/C relay to supply power to each ECU in the EV system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

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.

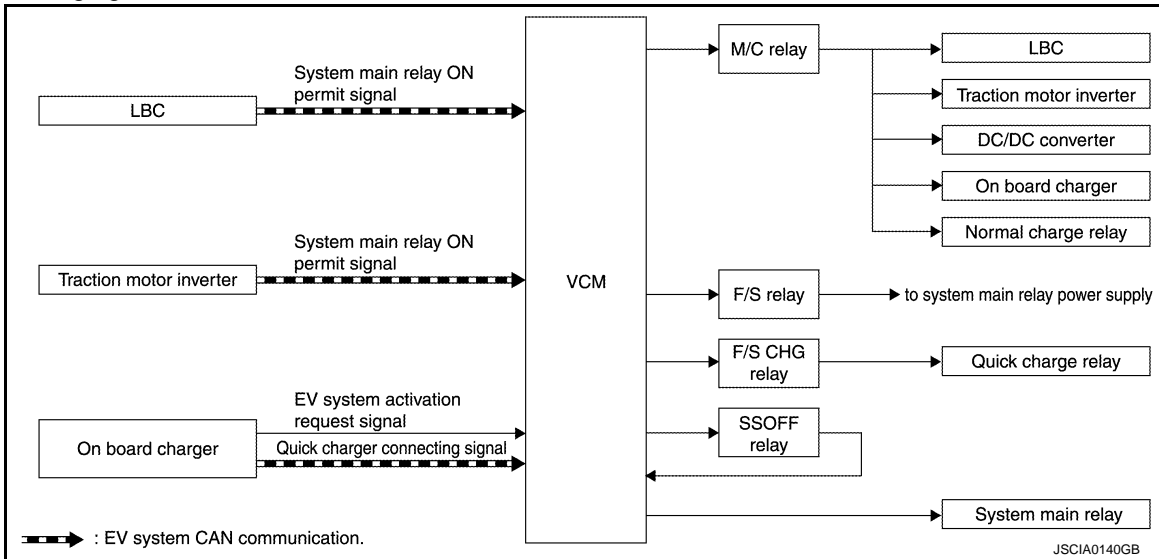
NOTE:

Normal charging does not start with the power switch ON.

SYSTEM

< SYSTEM DESCRIPTION >

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 battery is charged	Timer A/C
			Normal charge	Quick charge		
F/S relay	OFF	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 is charged	Timer A/C	Remote A/C
	Normal charge	Quick charge			
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

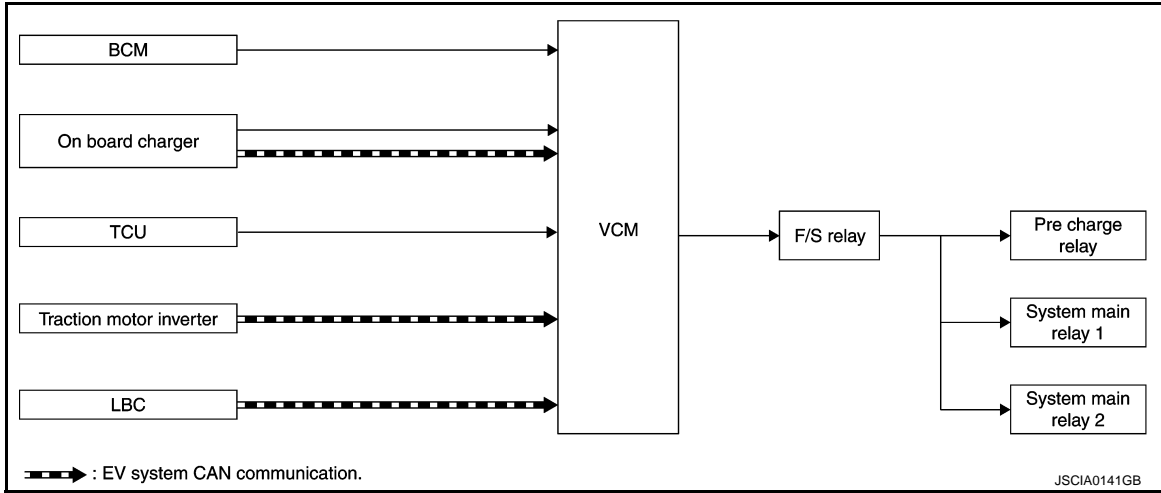
SYSTEM

< SYSTEM DESCRIPTION >

HIGH VOLTAGE POWER SUPPLY CONTROL : System Description

INFOID:000000006977112

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form
BCM	Power switch operation	VCM	Voltage
On-board charger	Quick charger connecting signal		EV system CAN
	EVSE connecting signal		
	EV system activation request signal		
TCU	EV system activation request signal		Voltage
Traction Motor Inverter	High voltage power supply preparation completion signal		EV system CAN
	System main relay ON permit signal		
Li-ion battery controller	High voltage discharge permit signal		
	System main relay ON 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 connector 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 precharge 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 drive motor inverter is fully charged by the applied power, the drive 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

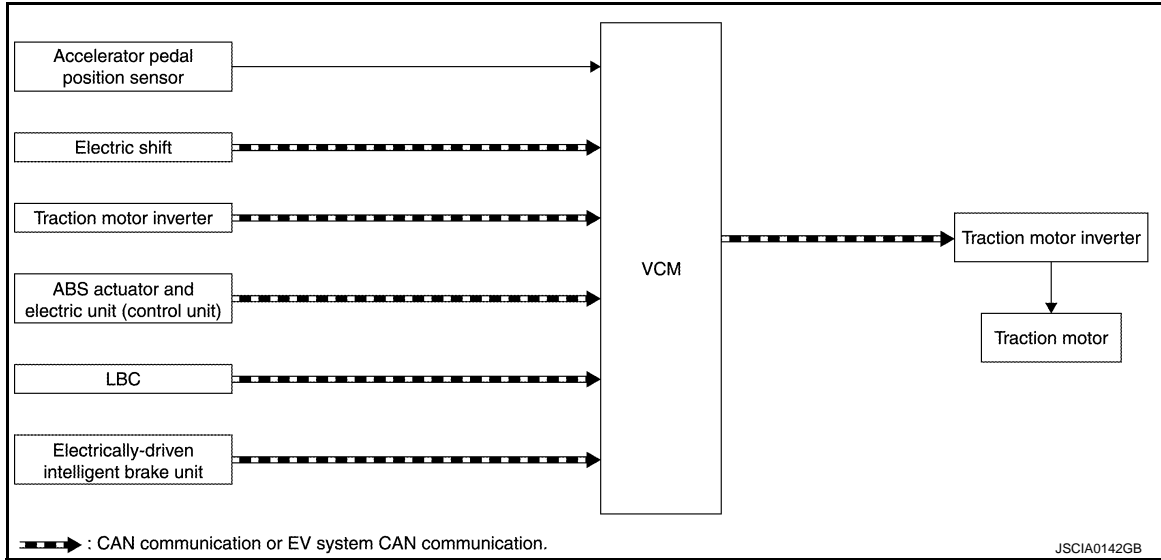
SYSTEM

< SYSTEM DESCRIPTION >

MOTOR POWER CONTROL : System Description

INFOID:000000006977113

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form
Accelerator pedal position sensor	Accelerator pedal position	VCM	Voltage
Electric shift	Shift position signal		EV system CAN
Traction Motor Inverter	Motor speed signal		
	Motor torque limit signal		
ABS actuator and electric unit (control unit)	ABS operation signal		
	VDC operation signal		
	TCS operation signal		
Electrically-driven intelligent 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-14, "OPERATION DESCRIPTION"](#).

OUTPUT LIMIT AND OUTPUT STOP REQUEST LIST

Request ECU	Output limit cause	Power limitation indicator lamp	Condition
Traction Motor Inverter	Traction motor temperature high	ON	When the traction motor or traction motor inverter reached an abnormally high temperature
	Input power low	ON	When the high voltage power input to the traction motor inverter is 240 V or less
	DTC detected	OFF	Refer to TMS-31, "Fail-Safe" .

SYSTEM

< SYSTEM DESCRIPTION >

Request ECU	Output limit cause	Power limitation indicator lamp	Condition
Li-ion battery controller	Li-ion battery remained energy low	ON	When the Li-ion battery cell voltage has dropped
	Li-ion battery temperature high	ON	When the Li-ion battery reached an abnormally high temperature (Reference value: Approx. 55°C)
	Li-ion battery temperature low	ON	When the Li-ion battery reached an abnormally low temperature. (Reference value: Approx. -10°C)
	DTC detected	OFF	Refer to EVB-29, "Fail-safe" .
VCM	Acceleration/brake signal plausibility error	OFF	When the accelerator pedal position sensor signal and stop lamp switch signal are input at the same time
	Power train system protection function	OFF	—
	DTC detected	OFF	Refer to EVC-73, "Fail-Safe" .

MOTOR REGENERATION CONTROL

MOTOR REGENERATION CONTROL : System Description

INFOID:000000006977114

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-14, "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 drive 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-12, "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.

NOTICE:

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:000000006977115

CONTROL OUTLINE

VCM starts up the EV system and starts charging the Li-ion battery when a charging plug connection is detected at either charge port or when the internal timer of VCM demands it. The following charge modes are available.

SYSTEM

< SYSTEM DESCRIPTION >

Methods of charging	Description
Normal charge	Immediate charge
	Timer charge
	Remote charge
Quick charge	VC-13. "System Description"
Regeneration charge	
	EVC-36. "MOTOR REGENERATION CONTROL : System Description"

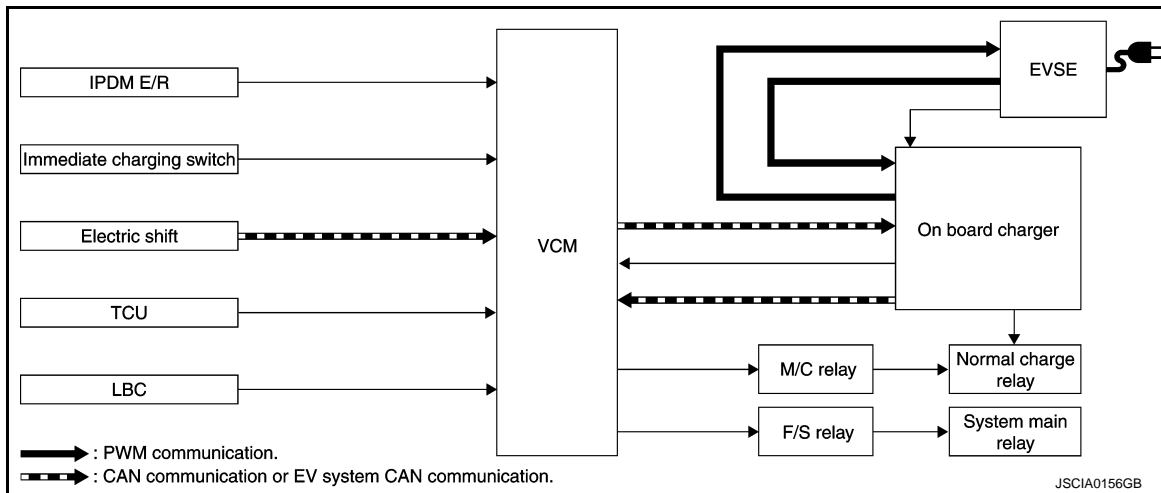
CAUTION:

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

LI-ION BATTERY CHARGE CONTROL : Normal Charge Control

INFOID:000000006977116

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL TABLE

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

BASIC CONTROL

When VCM judges that the system is in a charge mode, VCM activates the F/S relay and M/C relay to allow charging operation.

SYSTEM

< SYSTEM DESCRIPTION >

Then, VCM determine 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, and then VCM 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.

IMMEDIATE CHARGE MODE

When EVSE is connected to the normal charge port, the on-board charger transmits a 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 a 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

When the set time comes, VCM starts up automatically and starts charging.

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 navigatin screen.

REMOTE CHARGE MODE

When TCU transmits a 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.

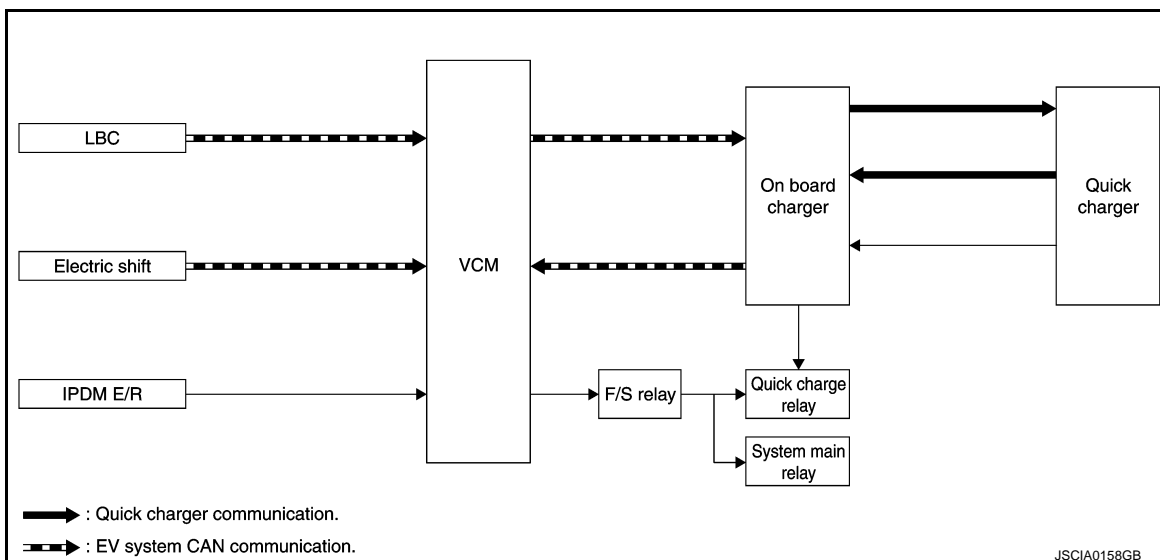
In addition, when the following conditions, VCM temporarily stops the normal charging and enters the wait status.

- 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:000000006977117

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL TABLE

SYSTEM

< SYSTEM DESCRIPTION >

Output sensor/ECU	Signal name	Input ECU/actuator	Signal form
IPDM E/R	power switch	VCM	Voltage
Electric shift	Shift position signal		EV system CAN
Li-ion battery controller	Li-ion battery chargeable power signal	VCM	
	Li-ion battery charge completion signal		
On-board charger	On-board charger chargeable power signal	Quick charger	Voltage
	Quick charger connecting signal		
	EV system activation request signal		
	Charge current request signal		Quick charger communication
Quick charge permit signal			
Quick charger	Diagnosis information signal	On-board charger	Voltage
	Charge start switch		
	Isolation check		EV system CAN
VCM	Maximum charge power signal		

BASIC CONTROL

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

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. And then VCM 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 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 the wait status.

HIGH VOLTAGE SYSTEM COOLING CONTROL

HIGH VOLTAGE SYSTEM COOLING CONTROL : System Description

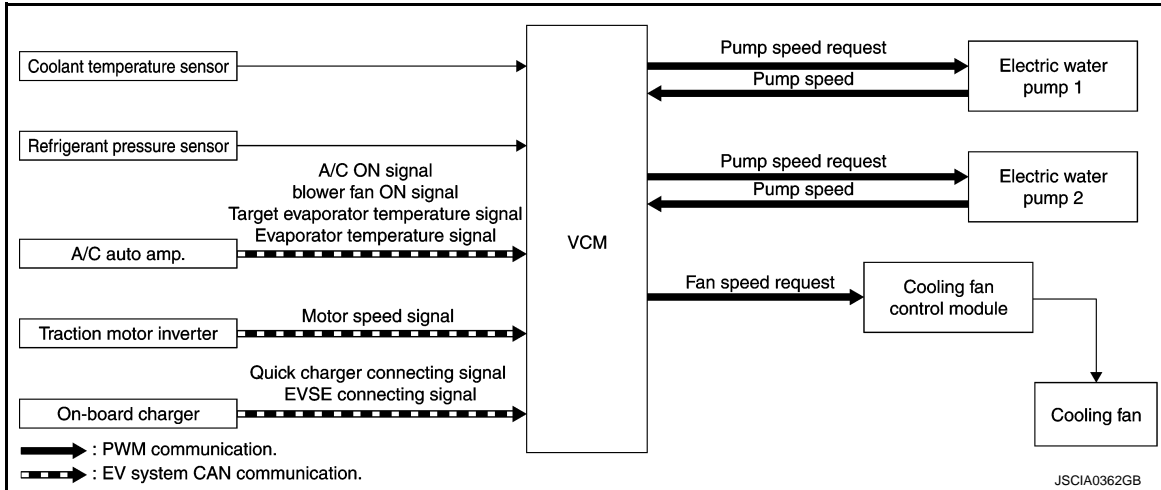
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VCM controls the water pump 1, water pump 2, and cooling fan according to information from various sensors and ECUs.

SYSTEM

< SYSTEM DESCRIPTION >

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 temperature 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 at less than 30°C (86°F). The low vehicle speed and low temperature coolant flow control is switched to the normal control when vehicle speed becomes 30°C (86°F) or more.

Fail-Safe

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 malfunctions	<ul style="list-style-type: none"> • Continues normal control for the malfunctioning pump. • For the normally functioning pump, controls the duty to 80 % during driving or 60 % during charging.
	Both pumps malfunction	Continues normal control.
High pump speed (84 – 90 %)	Only one pump malfunctions	<ul style="list-style-type: none"> • 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 malfunction	For the relevant pump, controls the duty to 10% (stop command).
Pump speed does not match VCM command	Only one pump malfunctions	Continues normal control.
	Both pumps malfunction	

SYSTEM

< SYSTEM DESCRIPTION >

Feedback to VCM (Feedback duty)		Control status
Input signal error or no input (diagnosis on pump side)	Only one pump malfunctions	Operates the pump at the maximum speed (maximum output control triggered by pump self-diagnosis)
	Both pumps malfunction	

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 decides 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 table below.

Coolant temperature request

Unit: %

Coolant temperature	Vehicle speed (km/h)			
	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)			
	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)

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 temperature 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

SYSTEM

< SYSTEM DESCRIPTION >

During pre-air conditioner mode, VCM decides 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 table below.

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

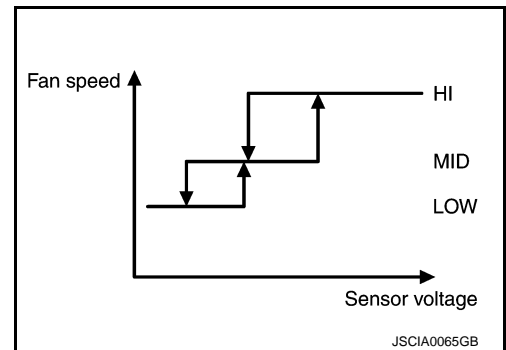
Air conditioner request (MAX)

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

Evaporator temperature correction

Target - actual evaporator temperature 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

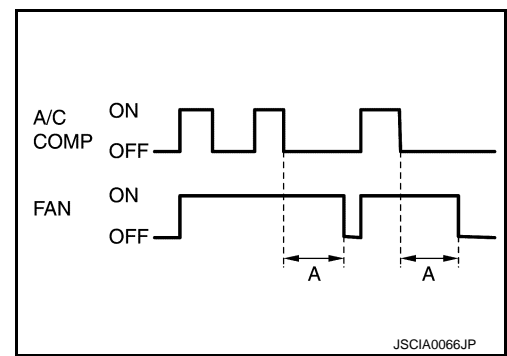
The cooling fan speed control reduces the cooling fan speed fluctuation by having a range for the operating conditions.



SYSTEM

< SYSTEM DESCRIPTION >

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.

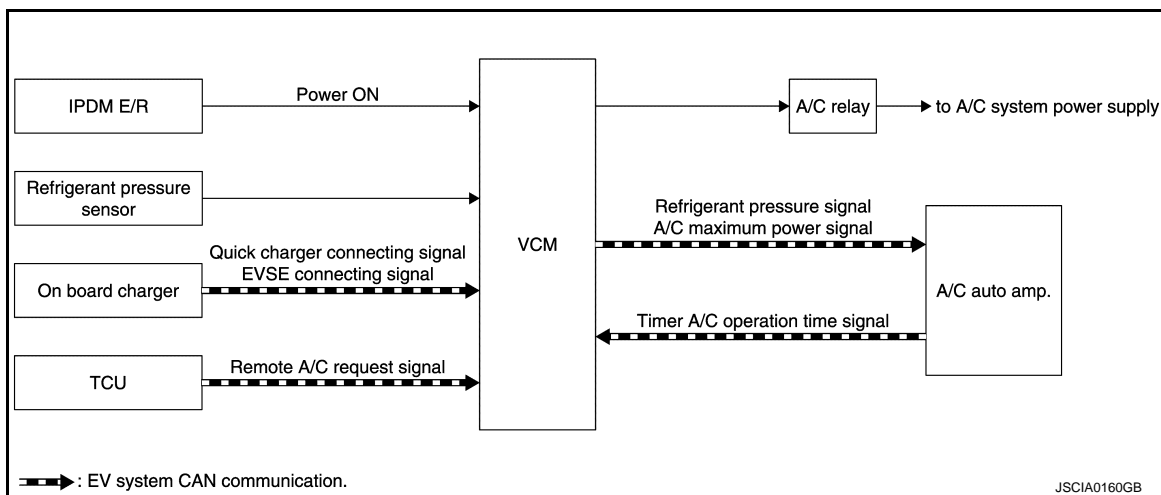


AIR CONDITIONER CONTROL

AIR CONDITIONER CONTROL : System Description

INFOID:000000006977119

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 recognizes a need of air conditioner activation due to the driver operation, timer air conditioner function, or remote air 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 amplifier to control the air conditioner at a lower rate than normally.

For an overview of air conditioner types, refer to [HAC-14. "AUTOMATIC AIR CONDITIONING SYSTEM : System Description"](#).

CONTROL DESCRIPTION

Air Conditioner Control During Charging

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.

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).

Regarding the timer air conditioner operation time, VCM starts the EV system 2 hours prior to the scheduled departure time, and the A/C auto amp. determines the necessary operating time in the range of 0 to 2 hrs

SYSTEM

< SYSTEM DESCRIPTION >

based on the outside air temperature and the temperature in the cabin and sends this information to VCM. VCM back calculates the operation required time from the scheduled department time to determine the timer air conditioner start time.

Furthermore, when the timer charge function and the timer air conditioner function are in operation at the same time due to an overlap of the timer setting, either function can be set to be preferentially provided with electric power.

NOTE:

- When turning on the power during timer air conditioning, switch to normal air conditioning control.
- 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 navigatin screen.

Remote Air Conditioning Control

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

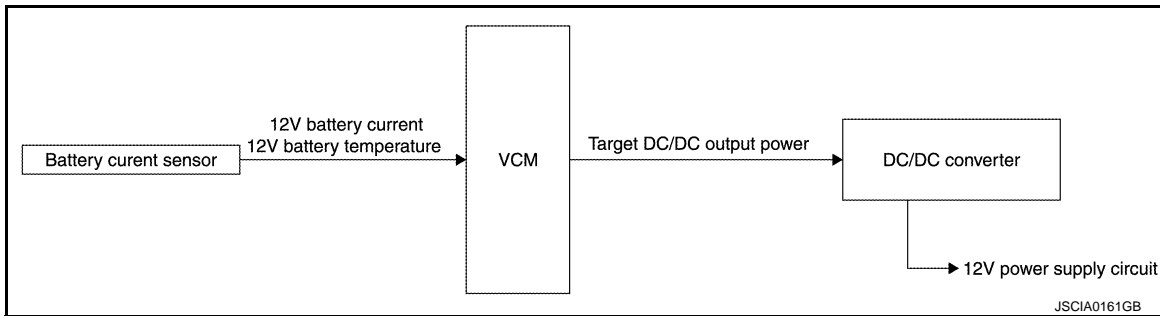
NOTE:

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

POWER VOLTAGE VARIABLE CONTROL SYSTEM

POWER VOLTAGE VARIABLE CONTROL SYSTEM : System Description INFOID:000000006977120

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 occurred with the variable voltage control system, the DC/DC converter outputs 14 V.

AUTOMATIC 12V BATTERY CHARGE CONTROL

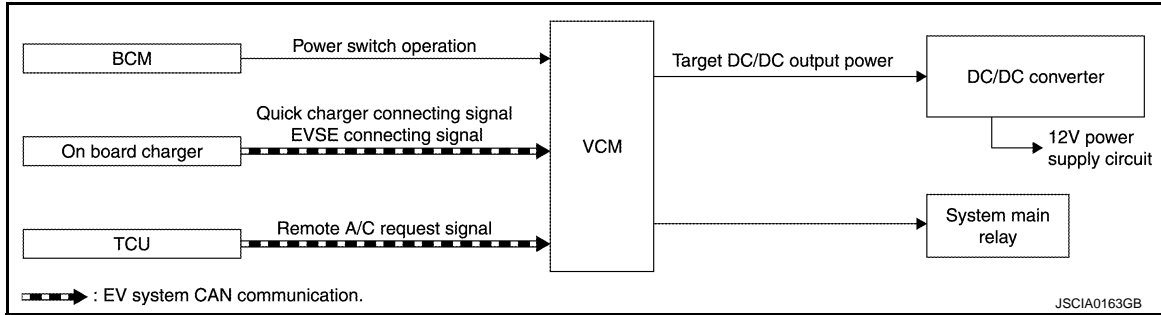
SYSTEM

< SYSTEM DESCRIPTION >

AUTOMATIC 12V BATTERY CHARGE CONTROL : System Description

INFOID:000000006977121

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 has been left unattended for a long time.

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

NOTE:

When setting the system to "READY" or starting Li-ion battery charge during automatic 12V battery charge, the automatic 12V battery charge is cancelled.

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.

When Vehicle is Left for a Long Period of Time

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

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

NOTE:

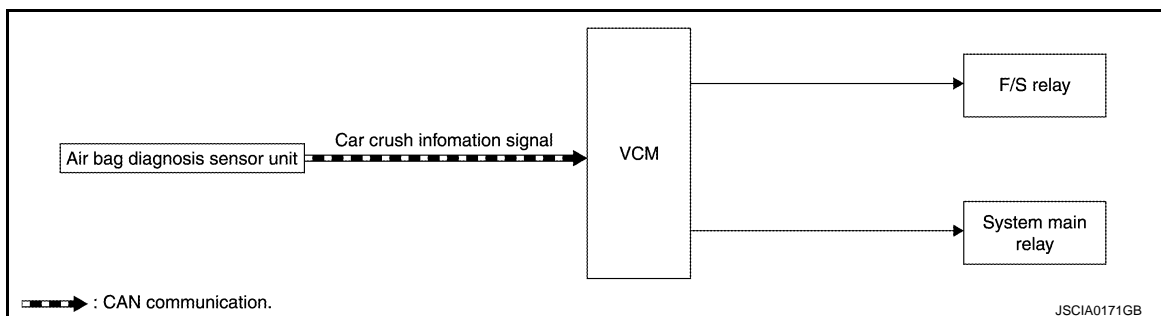
- During automatic 12V battery charging, the charging status indicator blinks.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

POWER CUT OFF CONTROL

POWER CUT OFF CONTROL : System Description

INFOID:000000006977122

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 deac-

SYSTEM

< SYSTEM DESCRIPTION >

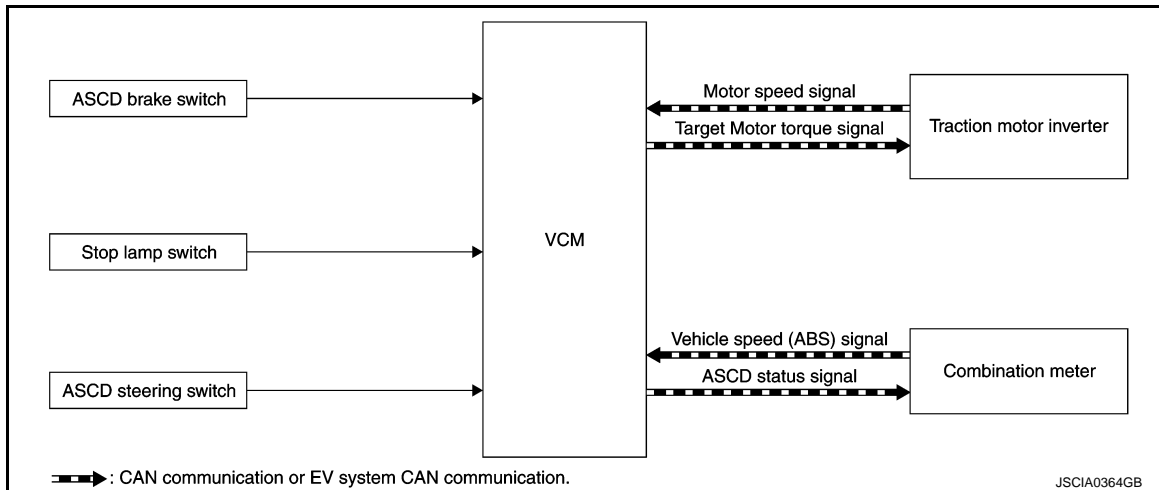
Activates the system main relay to cut off the Li-ion battery from the high voltage circuit so that the risk of electric shock is reduced.

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description

INFOID:000000006977123

SYSTEM DIAGRAM



BASIC ASCD SYSTEM

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 130 km/h (80 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 [EVC-49. "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 will be canceled.

- CANCEL switch is pressed
- More than 2 switches on ASCD steering switch are pressed at the same time (Set speed will be 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 will cancel the cruise operation and inform the driver by blinking SET indicator lamp quickly.

If ASCD MAIN switch is turned to OFF during ASCD is activated, all of ASCD operations will be canceled and vehicle speed memory will be erased.

ECO INDICATOR CONTROL

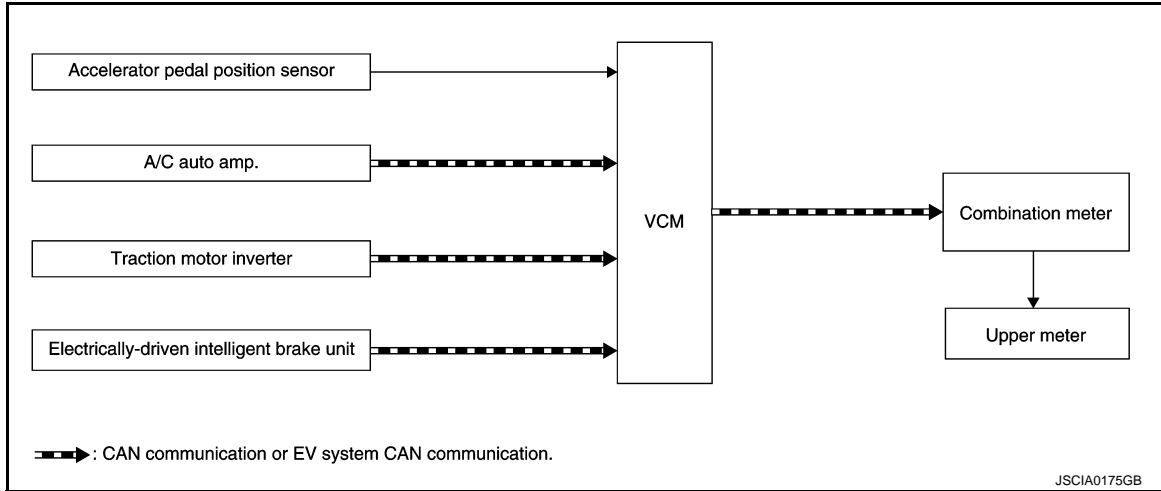
SYSTEM

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ECO INDICATOR CONTROL : System Description

INFOID:000000006977125

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL CHART

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

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 lit up.

NOTE:

Once the ECO tree segment has lit up, it will 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-25. "ECO INDICATOR : System Description"](#).

CAN COMMUNICATION

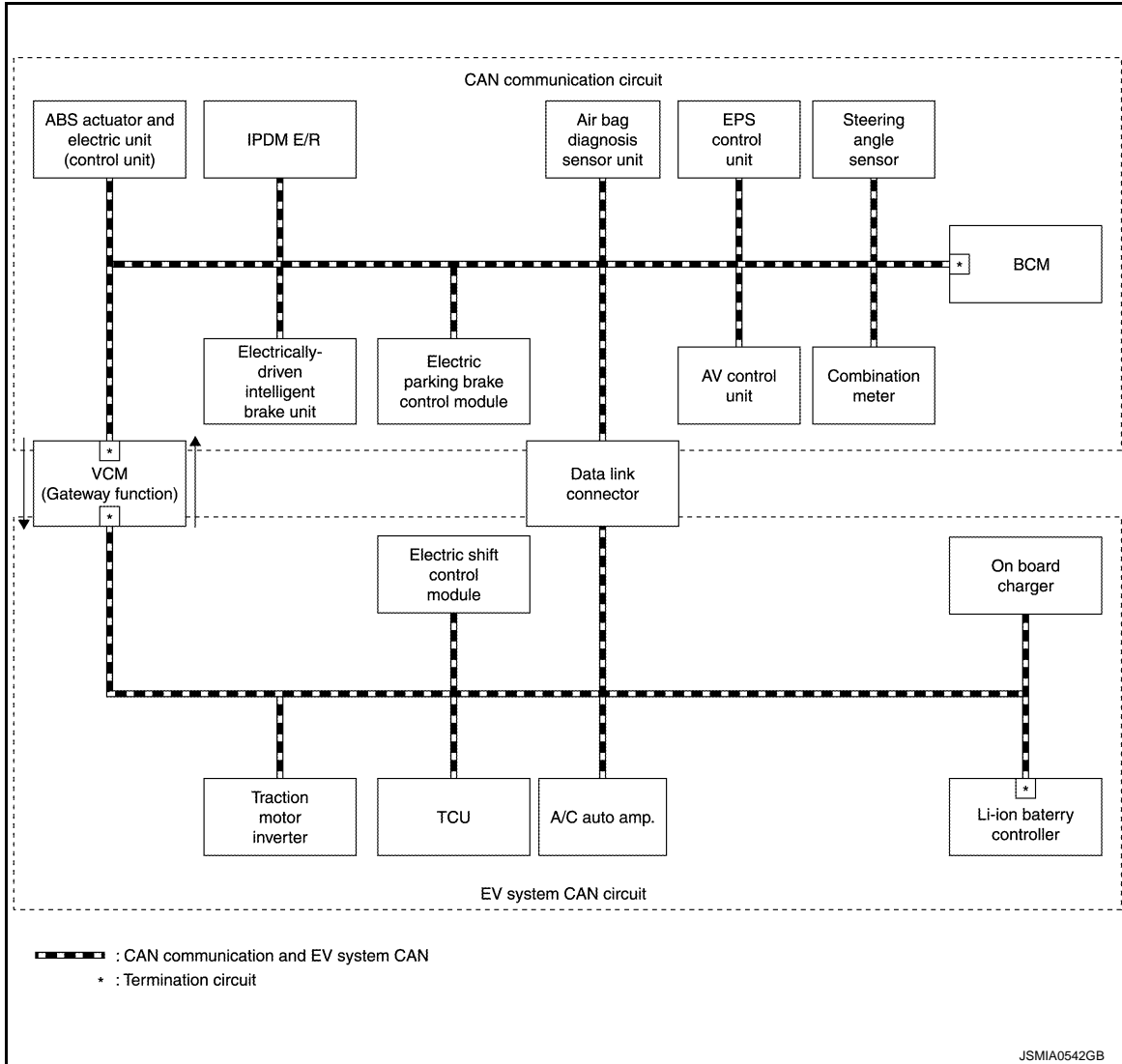
SYSTEM

< SYSTEM DESCRIPTION >

CAN COMMUNICATION : System Description

INFOID:000000006977126

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

< SYSTEM DESCRIPTION >

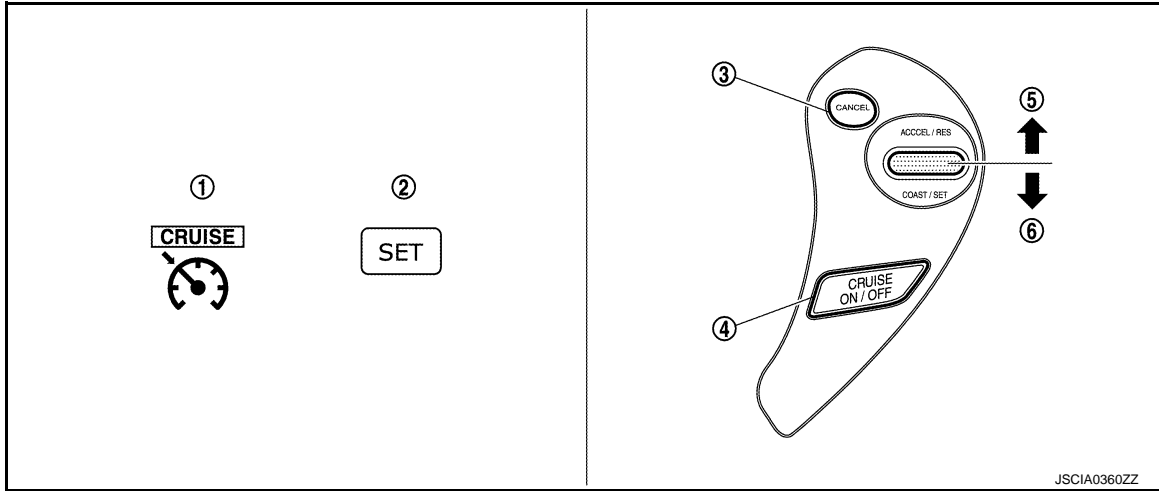
OPERATION

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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

INFOID:000000006977127

SWITCHES AND DISPLAYS



- | | | |
|------------------------|--------------------------|------------------------|
| 1. Cruise indicator | 2. SET indicator | 3. CANCEL switch |
| 4. ASCD MAIN switch | 5. SET/COAST switch | 6. RESUME/ACCEL switch |
| A. Information display | B. On the steering wheel | |

SWITCH OPERATION

Name	Function
ASCD MAIN switch	Turns the ASCD ON/OFF.
RESUME/ACCEL switch	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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.
- Vehicle speed is greater than 40 km/h (25 MPH) and 130 km/h (80 MPH)

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:000000006977129

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

INFOID:000000006977130

In this system, "Power switch is turned OFF⇒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

INFOID:000000006977131

VCM can save multiple DTC but can only save 1 freeze frame data. 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 was saved first can be confirmed. The DTC and freeze frame data are deleted when the self-diagnostic is deleted.

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (VCM)

CONSULT Function

INFOID:000000006977132

FUNCTION

Diagnostic test mode	Function
ECU Identification	VCM part number can be read.
Self-diagnostic result	Self-diagnostic results and freeze frame data can be read and erased quickly.*
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".

*: The following diagnosis information is cleared when the VCM memory is erased.

- Diagnostic trouble codes
- Freeze frame data

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 (MANUAL)	VIN is registered in VCM.	When registering VIN in VCM.

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC, refer to [EVC-78, "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.

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.

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

Freeze Frame Data Item List

Freeze frame data item	Description
DTC	The item is indicated, but not used.
VCM MODE	Displays VCM status. <ul style="list-style-type: none"> • 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
VCM ACTIVAT TRIG	Displays the cause of VCM start-up.
CHG PORT CONNECT	Displays the connection status of the charge connector <ul style="list-style-type: none"> • 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 ANGLE [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

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description
POWER LIMIT CAUSE	<ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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	The vehicle speed computed by the motor speed signal sent from the traction motor inverter is displayed.
12V BATTERY VOLTAGE	V	The 12 V power supply voltage of VCM is displayed.
WATER PUMP 1 TRG DUTY	%	Displays the water pump 1 target rotation command duty.
W/P 1 CRNT SPD DUTY	%	Displays the water pump 1 actual rotation duty.
WATER PUMP 2 TRG DUTY	%	Displays the water pump 2 target rotation command duty.
W/P 2 CRNT SPD DUTY	%	Displays the water pump 2 actual rotation duty.
VCM POWER SUPPLY (ACT)	V	Displays the 12 V power supply voltage of VCM when 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. <ul style="list-style-type: none"> • 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	Displays the voltage on the F/S relay contact side that is being input to VCM.
COOLANT TEMP	degC	The coolant temperature (determined by the signal voltage of the coolant temperature sensor) is displayed.
VCM MODE	—	Displays VCM status. <ul style="list-style-type: none"> • 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
TRG MOTOR TORQ 1	N·m	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. <ul style="list-style-type: none"> • On: Other than READY • READY: READY control in progress
NEXT GEAR POSITION	<ul style="list-style-type: none"> • R • N/P • D 	Displays the position of the selected selector lever. <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • R • N/P • D 	Displays the position of the currently selected selector lever. <ul style="list-style-type: none"> • R: R range • N/P: N or P range • D: D or ECO range

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DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description
READY LAMP SIGNAL	On/BLINK/ Off	Displays the READY indicator lamp operation request status. <ul style="list-style-type: none"> • On: This causes the READY indicator lamp to light up. • BRINK: This causes the READY indicator lamp to flash. • Off: No operation request
CHARGE LAMP SIGNAL	On/BLINK/ Off	Displays the 12V battery charge warning lamp operation request status. <ul style="list-style-type: none"> • On: The causes the 12V battery charge warning lamp to light up. • BRINK: The causes the 12V battery charge warning lamp to flash. • Off: No operation request
EV SYSTEM W/L SIGNAL	On/BLINK/ Off	This displays the EV system warning lamp operation request status. <ul style="list-style-type: none"> • On: This causes the EV system warning lamp to light up • BRINK: 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 output by the traction motor.
MOT REGENERABLE PWR MAX	kW	Displays the maximum value that is currently regenerable 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 STATUS	100V/200V/ QUICK/NG/ Off	Displays the charging mode. <ul style="list-style-type: none"> • 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 instant 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 conditioner system.
POWER CONSUM (AUXS)	kW	Displays the power consumption of the auxiliaries.
GEAR POSITION DISPLAY	P/R/N/D/B	Displays the in-meter gear display request status. <ul style="list-style-type: none"> • 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	Displays the outside air temperature received from the A/C auto amp.
CHARGE MODE	<ul style="list-style-type: none"> • N/CHG • Q/CHG • Off 	Displays the charging mode. <ul style="list-style-type: none"> • N/CHG: Normal charge • Q/CHG: Quick charge • Off: Not charging
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. <ul style="list-style-type: none"> • 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	%	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	The 12V battery temperature (determined by the signal voltage of the battery temperature sensor) is displayed.
12V BATTERY CURRENT AVG	A	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.

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description
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	Accelerator pedal position sensor 1 signal voltage is displayed.
ACCEL SENSOR 2 VOLT	V	Accelerator pedal position sensor 2 signal voltage is displayed.
HI SPEC VEHICLE SPEED	km/h or mph	Displays the high accuracy vehicle speed from "VEHICLE SPEED"
REFRIGERANT PRESS	MPa	The refrigerant pressure (determined by the signal voltage of the refrigerant pressure sensor) is displayed.
SET VHCL SPD	km/h or mph	The preset ASCD vehicle speed is displayed
N/CHG PORT INTERLOCK	On/HALF/ Off	Displays the normal charge connector engagement state. <ul style="list-style-type: none"> • On: The normal charge connector is connected correctly. • HALF: The normal charge connector is semi-engaged. • Off: The normal charge connector is not connected.
ENABLE OBC OUT PWR	kW	Displays the power that can be output by the on-board charger.
OBC OUT PWR	kW	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. <ul style="list-style-type: none"> • 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 (%)	%	The Li-ion battery remained energy rate is displayed.
HV BATT VOLT	V	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	Displays the Li-ion battery temperature received from the Li-ion battery controller.
HV BATT LEVEL	kWh	The Li-ion battery remained energy is displayed.
IR SENSOR SIGNAL P-P	mV	Displays the peak to peak of the signal sent from the 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 inverter.
MOTOR SPEED	rpm	Displays the traction motor revolution received from the traction motor inverter.
SL TRG VHCL SPD	km/h or mph	The preset speed limiter vehicle speed is displayed
ESTMT PWR CNSM (A/C CMP)	kW	Displays the A/C compressor estimated power consumption.
ESTMT PWR CNSM (PTC HTR)	kW	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 <ul style="list-style-type: none"> • 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 • ##	Displays the car crush information received from the air bag diagnosis sensor unit. <ul style="list-style-type: none"> • MID: A non-serious impact was detected. • HEAVY: A serious impact was detected. • ##: When the impact is not detected
POWER SW	On/Off	Displays the POWER switch operation status. <ul style="list-style-type: none"> • On: When the POWER switch is operated • Off: On: When the POWER switch is not operated
START SIGNAL	On/Off	Displays the BCM start signal status. <ul style="list-style-type: none"> • On: Start signal input • Off: Start signal does not input.

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DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description
EV SYS ACT REQ (OBC)	On/Off	Displays the status of the EV system activation request signal received from the on-board charger. <ul style="list-style-type: none"> • On: When a signal is received • Off: When a signal is not received
IMMEDIATE CHG SW	On/Off	Displays the operation status of the immediate charging switch. <ul style="list-style-type: none"> • On: When the switch is operated • Off: When the switch is not operated
EV SYS ACT REQ (TCU)	On/Off	Displays the status of the EV system activation request signal received from the TCU. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • On: The high voltage connector is connected correctly. • Off: Except above.
F/S RELAY	On/Off	Displays the F/S relay operation status. <ul style="list-style-type: none"> • On: F/S relay is ON • Off: F/S relay is OFF
M/C RELAY	On/Off	Displays the M/C relay operation status. <ul style="list-style-type: none"> • On: M/C relay is ON • Off: M/C relay is OFF
F/S CHG RELAY	On/Off	Displays the F/S CHG relay operation status. <ul style="list-style-type: none"> • On: F/S CHG relay is ON • Off: F/S CHG relay is OFF
REVERSE LAMP RELAY	On/Off	Displays the reverse lamp relay operation status. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
A/C RELAY	On/Off	Displays the A/C relay operation status. <ul style="list-style-type: none"> • On: A/C relay is ON • Off: A/C relay is OFF
HV P MAIN RLY ACTIV	On/Off	Displays the system main relay (+) operation status. <ul style="list-style-type: none"> • On: System main relay (+) is ON • Off: System main relay (+) is OFF
HV P MAIN RLY ACTIV MONI	On/Off	Displays the status that VCM is operating the system main relay (+). <ul style="list-style-type: none"> • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
HV N MAIN RLY ACTIV	On/Off	Displays the system main relay (-) operation status. <ul style="list-style-type: none"> • On: System main relay (-) is ON • Off: System main relay (-) is OFF
HV N MAIN RLY ACTIV MONI	On/Off	Displays the status that VCM is operating the system main relay (-). <ul style="list-style-type: none"> • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
HV PRE CHG RLY ACTIV	On/Off	Displays the pre-charge relay operation status. <ul style="list-style-type: none"> • On: pre-charge relay is ON • Off: pre-charge relay is OFF
HV PRE CHG RLY ACTIV MONI	On/Off	Displays the status that VCM is operating the pre-charge relay. <ul style="list-style-type: none"> • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
PLUG IN INDI LAMP	On/Off	Displays the plug in indicator lamp operation request status. <ul style="list-style-type: none"> • On: The plug in indicator lamp is lit. • Off: No operation request
CHARGE STAT INDI 1	On/Off	Displays the charging status indicator 1 operation request status. <ul style="list-style-type: none"> • On: The charging status indicator 1 is lit. • Off: No operation request

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description	
CHARGE STAT INDI 2	On/Off	Displays the charging status indicator 2 operation request status. • On: The charging status indicator 2 is lit. • Off: No operation request	A
CHARGE STAT INDI 3	On/Off	Displays the charging status indicator 3 operation request status. • On: The charging status indicator 3 is lit. • Off: No operation request	B
ASCD MAIN SW	On/Off	Displays the ASCD MAIN switch operation status. • On: When the ASCD MAIN switch is operated • Off: When the ASCD MAIN switch is not operated	EVC
ASCD CANCEL SW	On/Off	Displays the CANCEL switch operation status. • On: When the CANCEL switch is operated • Off: When the CANCEL switch is not operated	D
RESUME/ACC SW	On/Off	Displays the RESUME/ACCELERATE switch operation status. • On: When the RESUME/ACCELERATE switch is operated • Off: When the RESUME/ACCELERATE switch is not operated	E
ASCD SET SW	On/Off	Displays the SET/COAST switch operation status. • On: When the SET/COAST switch is operated • Off: When the SET/COAST switch is not operated	F
ASCD BRAKE SW	On/Off	Displays the ASCD brake switch operation status. • On: The brake pedal is not depressed. • Off: The brake pedal is depressed.	G
STOP LAMP SW	On/Off	Displays the operation status of the stop lamp switch. • On: The brake pedal is depressed. • Off: The brake pedal is not depressed.	H
ASCD SET LAMP	On/Off	Displays the SET indicator operation request status. • On: The SET indicator is lit. • Off: No operation request	I
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	J
VARIABLE V/CONT PERMIT	On/Off	Displays the power voltage variable control authorization status of VCM. • On: Authorized • Off: Prohibited	K
KICK DOWN	On/Off	Displays Kick Down decision state. • On: Accelerator pedal is depressed. • Off: Accelerator pedal is fully released	L
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	M
PWR LIMIT INDICAT LAMP	On/Off	Displays the power limit indicator lamp operation request status. • On: The power limit indicator lamp is lit. • Off: No operation request	N
A/C SW	On/Off	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	O
EVSE COMM	COMM/ NO COM	Displays the communication status between VCM and the EVSE.	
Q/CHG INTERLOCK	On/Off	Displays the quick charger connector engagement status. • On: The quick charger connector is connected correctly. • Off: The quick charger connector is not connected.	P
Q/CHG RELAY	On/Off	Displays the quick charge relay operation status. • On: Quick charge relay is ON • Off: Quick charge relay is OFF	

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

MONITOR ITEM	Unit	Description
HV CNCTR INTRLCK (OBC)	On/Off	Displays the connection status of the high voltage connector connected to the on-board charger. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> • On: When the low beam is operating • Off: When the low beam is not operating
HEAD LAMP HI SIG	On/Off	Displays the operation status of the headlamp received from the IPDM E/R. <ul style="list-style-type: none"> • On: When the high beam is operating • Off: When the high beam is not operating
HV CNCTR INTRLCK (HV BAT)	On/Off	Displays the connection status of the high voltage connector connected to the Li-ion battery pack. <ul style="list-style-type: none"> • On: The high voltage connector is connected correctly. • Off: Except above.
HV BATT EMPTY	OK/EMPTY	Displays that the Li-ion battery remaining energy is low. <ul style="list-style-type: none"> • OK: Normal • EMPTY: When low

ACTIVE TEST MODE

Test Item

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
PLUG IN INDICATOR	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • VCM • Combination meter • CAN communication
CHARGE STAT INDICATOR 1	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • Harness and connectors • Bulb and LED • VCM
CHARGE STAT INDICATOR 2	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • Harness and connectors • Bulb and LED • VCM
CHARGE STAT INDICATOR 3	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • Harness and connectors • Bulb and LED • VCM
REVERSE LAMP RELY	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the reverse lamp relay used by the ACTIVE TEST. 	<ul style="list-style-type: none"> • Check that the reverse lamp relay makes the operating sound. • Check that the reverse lamp is turned ON. 	<ul style="list-style-type: none"> • Harness and connectors • Bulb and LED • F/S relay • VCM
DC/DC CONV DUTY	<ul style="list-style-type: none"> • POWER ON • This changes the duty ratio used by the ACTIVE TEST. 	Check that the 12V battery power supply voltage changes.	<ul style="list-style-type: none"> • Harness and connectors • DC/DC converter • VCM
VOLTAGE CONTROL	<ul style="list-style-type: none"> • POWER ON • This changes the voltage used by the ACTIVE TEST. 	Check that the 12V battery power supply voltage changes.	<ul style="list-style-type: none"> • Harness and connectors • DC/DC converter • VCM
READY INDICATOR	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • VCM • Combination meter • CAN communication
POWER LIMITATION INDICATOR	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • VCM • Combination meter • CAN communication
EV SYSTEM W/L	<ul style="list-style-type: none"> • POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> • VCM • Combination meter • CAN communication

DIAGNOSIS SYSTEM (VCM)

< SYSTEM DESCRIPTION >

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)	
12V BATTERY CHARGE W/L	<ul style="list-style-type: none"> POWER ON This turns ON and OFF the indicator used by the ACTIVE TEST. 	This confirms the indicator is ON/OFF.	<ul style="list-style-type: none"> Harness and connectors VCM Combination meter 	A
HV BATT TEMP DISP	<ul style="list-style-type: none"> POWER ON This changes the display value used by the ACTIVE TEST. 	Confirm that the Li-ion battery temperature gauge display in the combination meter changes.	<ul style="list-style-type: none"> VCM Combination meter CAN communication 	B
ECO INDICATOR	<ul style="list-style-type: none"> POWER ON This changes the display value used by the ACTIVE TEST. 	Confirm that the ECO indicator display in the upper meter changes.	<ul style="list-style-type: none"> VCM Combination meter Upper meter CAN communication 	EVC
ECO TREE	<ul style="list-style-type: none"> POWER ON This changes the display value used by the ACTIVE TEST. 	Confirm that the ECO tree display in the upper meter changes.	<ul style="list-style-type: none"> VCM Combination meter Upper meter CAN communication 	D
WATER PUMP 1	<ul style="list-style-type: none"> POWER ON This turns changes the duty ratio used by the ACTIVE TEST. 	Check that the water pump 1 operation speed changes.	<ul style="list-style-type: none"> Harness and connectors Water pump 1 VCM 	E
WATER PUMP 2	<ul style="list-style-type: none"> POWER ON This turns changes the duty ratio used by the ACTIVE TEST. 	Check that the water pump 2 operation speed changes.	<ul style="list-style-type: none"> Harness and connectors Water pump 2 VCM 	F
COOLING FAN	<ul style="list-style-type: none"> POWER ON This turns changes the duty ratio used by the ACTIVE TEST. 	Check that the cooling fan operation speed changes.	<ul style="list-style-type: none"> Harness and connectors Cooling fan system VCM 	G
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< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

VCM

Reference Value

INFOID:000000006977133

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.

MONITOR ITEM	CONDITION		Values/Status
POWER LIMIT CAUSE	Output being limited	Li-ion battery temperature is too low.	B/T-LOW
		Li-ion battery temperature is too high.	B/T-HI
		When the Li-ion battery remaining energy is low	B LEV
		When the Li-ion battery capacity is low	B CAP
		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.	MOT-T
	No torque limitation		##
VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication.
12V BATTERY VOLTAGE	POWER ON (not READY)		11 – 15 V
	READY		13 – 15 V
WATER PUMP 1 TRG DUTY	Power ON	Pump is stopped	10%
	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
W/P 1 CRNT SPD DUTY	Power ON	Pump is stopped	10%
	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
WATER PUMP 2 TRG DUTY	Power ON	Pump is stopped	10%
	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
W/P 2 CRNT SPD DUTY	Power ON	Pump is stopped	10%
	READY	Pump speed 750 rpm – 4700rpm	20 – 80%
VCM POWER SUPPLY (ACT)	Power ON		11 – 15 V
DC/DC CONV TEMP	Power ON	When output over current is limited	1800 – 2200 μsec
		DC/DC converter temperature: High	2400 – 3000 μsec
		DC/DC converter temperature: Middle	3600 – 4400 μsec
		DC/DC converter temperature: Low	7300 – 8900 μsec
		When the signal circuit is open or shorted	##

VCM

< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
DC/DC TEMP STATUS	Power ON	When output over current is limited	0
		DC/DC converter temperature: High	1
		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
	READY		12 – 15 V
COOLANT TEMP	After 2 minutes have expired since READY		Above the outside temperature and below 80°C (Value in accordance with the cooling water temperature)
VCM MODE	Power ON	Charge connector is not connected	10
		Charge connector is connected	110
	READY		30
	Charging		130
TRG MOTOR TORQ 1	READY		0 – 280 N·m (Depending on accelerator pedal opening angle)
VCM ACTIVATION	READY		READY
	Except READY		On
NEXT GEAR POSITION	Power ON	Selector lever: R	R
		Selector lever: N or P	N/P
		Selector lever: D or ECO	D position
GEAR POSITION	Power ON	Selector lever: R	R
		Selector lever: N or P	N/P
		Selector lever: D or ECO	D position
READY LAMP SIGNAL	READY		On
	When READY is started		Blinks
	Except above		Off
CHARGE LAMP SIGNAL	Power ON		On
	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
MOT REGENERABLE PWR MAX	READY		0 – 51 kW
POWER CONSUM (MOTOR)	READY		0 – 90 kW
NEED CHG/T TO FULL (200V)	Power ON		This displays the same value as in the information display.*1

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< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
NEED CHG/T TO FULL (100V)	Power ON		This displays the same value as in the information display.*1
CHARGE STATUS	Charging using AC 100-120 V		100V
	Charging using AC 200-240 V		200V
	During quick charge		QUICK
	When in a state where charging is not possible		NG
	Except above		Off
ECO INDICATOR	Displays the same value as in the instant ECO indicator.		
ECO TREE	Displays the same value as in the ECO tree.		
POWER CONSUMPTION (A/C)	<ul style="list-style-type: none"> • READY • When the air conditioner is used 		0 – 5 kW
POWER CONSUM (AUXS)	Power ON		0 – 0.6 V
	READY		0.2 – 0.8 V
	Charging		0.1 – 0.7 V
GEAR POSITION	READY	Selector lever: P Range	P
		Selector lever: R range	R
		Selector lever: N Range	N
		Selector lever: D range	D position
		Selector lever: ECO range	B
AMBIENT TEMP	Power: ON		Indicates depending on ambient temperature.
CHARGE MODE	During normal charge		N/CHG
	During quick charge		Q/CHG
	Except above		OFF
DC/DC CONV MONI VOLT	Power ON	When normal operation	4600 mV or more
		When VCM detects a DC/DC converter error	2100 – 4,300 mV
		When VCM prohibits the DC/DC converter operation	0 – 1,000 mV
DC/DC CONV STATUS	Power ON	When normal operation	1
		When VCM detects a DC/DC converter error	2
		When VCM prohibits the DC/DC converter operation	3
DC/DC CONV REQ VOLT	Power ON		14,000 mV
	READY		13000 – 15,000 mV
DC/DC CONV REQ DUTY	Power ON	DC/DC converter output voltage: 13 V	20% (Approx.)
		DC/DC converter output voltage: 14 V	50% (Approx.)
		DC/DC converter output voltage: 15 V	80% (Approx.)
COOLING FAN REQ DUTY	READY		15 – 85%
ACCEL OPEN ANGLE	Power ON	Accelerator pedal: Fully depressed	80 – 90 deg
		Accelerator pedal: Fully released	0 – 5 deg

VCM

< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
12V BATTERY TEMP	Power ON		Indicates depending on motor room air temperature.
12V BATTERY CURRENT AVG	<ul style="list-style-type: none"> READY (at idle^{*2}) Li-ion battery remained energy: Full Selector lever: P or N A/C switch: OFF Electrical load: No load 		0 – 50 A
READY COUNT	Power ON		This shows the READY cumulative count
INTEG READY TIME	Power ON		This shows the READY cumulative operation time
QUICK CHG COUNT	Power ON		This shows the quick charge cumulative count
INTEG Q/CHG TIME	Power ON		This shows the quick charge cumulative operation time
NORMAL CHG COUNT	Power ON		This shows the normal charge cumulative count
INTEG N/CHG TIME	Power ON		This shows the normal charge cumulative operation time
ACCEL SENSOR 1 VOLT	Power ON	Accelerator pedal: Fully depressed	4.0 – 4.8 V
		Accelerator pedal: Fully released	0.6 – 0.9 V
ACCEL SENSOR 2 VOLT	Power ON	Accelerator pedal: Fully depressed	3.9 – 4.8 V
		Accelerator pedal: Fully released	0.6 – 0.9 V
HI SPEC VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication.
REFRIGERANT PRESS	<ul style="list-style-type: none"> READY Both the A/C switch and blower fan switch are ON (A/C compressor is operating) 		0.6 – 2.6 MPa
N/CHG PORT INTERLOCK	Normal charge connector is connected.		On
	Normal charge connector is half-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
	In Quick Charging		0 – 50 kW
AC POWER TYPE	When an AC power supply is not connected		OFF
	When an AC 100-120 V power supply is connected		100V
	When an AC 200-240 V power supply is connected		200V
HV BATT LEVEL	Depending on Li-ion battery remained energy.		0 – 100%
HV BATT VOLT	Power ON		200 – 403 V
HV BATT CURRENT	<ul style="list-style-type: none"> READY (at idle^{*2}) Electrical load: No load 		0 – 10 A
HV BATTERY TEMP	Power ON		Between the outside air temperature and 60°C (140°F)
HV BATT LEVEL	Power ON		0 – 24 kWh
IR SENSOR SIGNAL P-P	Power ON		3150 mV or more
INVERTER DC INPUT VOLT	Power ON		200 – 403 V

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< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
MOTOR PWR LIMIT REQ (INV)	Normal		100%
	When output is limited		0 – 99%
CURRENT MOTOR TORQ	READY		0 – 280 N·m (Depending on accelerator pedal opening angle)
MOTOR SPEED	When vehicle speed is 0 km/h		0 rpm
	When vehicle speed is 60 km/h		4200 rpm (Approx.)
ESTMT PWR CNSM (A/C CMP)	<ul style="list-style-type: none"> READY A/C switch: ON 		0 – 5 kW
ESTMT PWR CNSM (PTC HTR)	<ul style="list-style-type: none"> When the air conditioner is operating Set temperature: HOT side maximum 		0 – 10 kW
FRONT WIPER	Power ON	Front wiper operation status Low	LOW
		Front wiper operation status High	HIGH
		Front wiper operation status Not operation	OFF
CLASH DETECT INFO	When a non-serious collision is detected		MID
	When a serious collision is detected		HEAVY
	No collision is detected		##
POWER SW	Power switch operation: ON⇒OFF⇒ON		On⇒Off⇒On
START SIGNAL	Power switch operation: ON⇒START⇒ON		Off⇒On⇒On
EV SYS ACT REQ (OBC)	When the charge gun is inserted/power supply plug is inserted		On⇒Off
	Except above.		Off
IMMEDIATE CHG SW	Power ON	Immediate charging switch: Pressed	On
		Immediate charging switch: Released	Off
EV SYS ACT REQ (TCU)	Power switch operation: OFF⇒ON		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
F/S CHG RELAY	During quick charge		On
	Except above		Off
REVERSE LAMP RELAY	Power ON	Selector lever: R range	On
		Selector lever: Except R range	Off
REVERSE LAMP RELAY MONI	Power ON	Selector lever: R range	On
		Selector lever: Except R range	Off
A/C RELAY	Power ON		On
	Power OFF		Off
HV P MAIN RLY ACTIV	READY		On
	Power ON		Off
HV P MAIN RLY ACTIV MONI	READY		On
	Power ON		Off
HV N MAIN RLY ACTIV	READY		On
	Power ON		Off

VCM

< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
HV N MAIN RLY ACTIV MONI	READY		On
	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
	Plug in indicator lamp: OFF		Off
CHARGE STAT INDI 1	Charging status lamp 1: ON		On
	Charging status lamp 1: OFF		Off
CHARGE STAT INDI 2	Charging status lamp 2: ON		On
	Charging status lamp 2: OFF		Off
CHARGE STAT INDI 3	Charging status lamp 3: ON		On
	Charging status lamp 3: OFF		Off
ASCD MAIN SW	Power ON	ASCD MAIN switch: Pressed	On
		ASCD MAIN switch: Released	Off
ASCD CANCEL SW	Power ON	CANCEL switch: Pressed	On
		CANCEL switch: Released	Off
RESUME/ACC SW	Power ON	RESUME/ACCELERATE switch: Pressed	On
		RESUME/ACCELERATE switch: Released	Off
ASCD SET SW	Power ON	SET/COAST switch: Pressed	On
		SET/COAST switch: Released	Off
ASCD BRAKE SW	Power ON	Brake pedal: Fully released	On
		Brake pedal: Depressed	Off
STOP LAMP SW	Power ON	Brake pedal: Fully released	Off
		Brake pedal: Depressed	On
ASCD SET LAMP	After the ASCD MAIN switch has been pressed once, press it again.		On⇒Off
DC/DC CONV STAT	READY		On
	Power ON		STOP
VARIABLE V/CONT PERMIT	<ul style="list-style-type: none"> READY The 12V battery is sufficiently charged Wiper not operating 		On
	Except above.		Off
KICK DOWN	Power ON	Accelerator pedal: Depressed	On
		Accelerator pedal: Released	Off
CLUTCH PEDAL SW	This item is displayed but is not applicable to this model.		
TRG HV BATT CHG LEVEL	Selected 100% charge		100%
	Selected 80% charge		80%
REAR DEFOGGER	Rear defogger: Operates		On
	Rear defogger: Not operate		Off
PWR LIMIT INDICAT LAMP	Power limitation indicator lamp: ON		On
	Power limitation indicator lamp: OFF		Off
A/C SW	Power ON	A/C switch: ON	On
		A/C switch: OFF	Off
EVSE COMM	When PWM communication is established between VCM and EVSE		COMM
	Except above		NO COM

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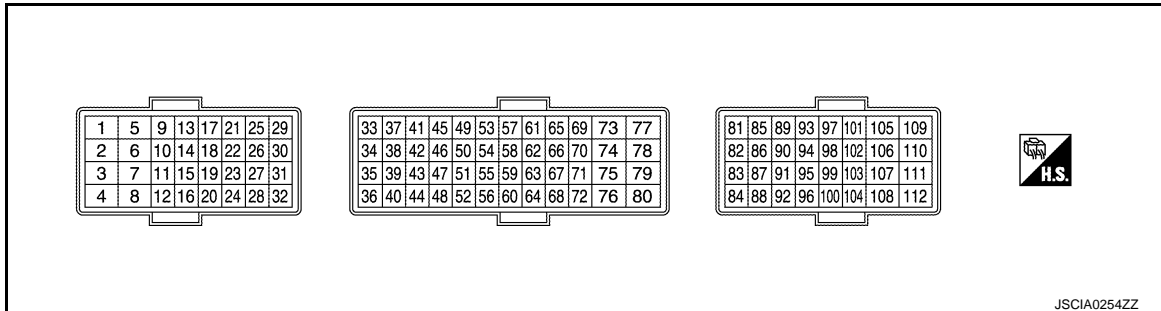
< ECU DIAGNOSIS INFORMATION >

MONITOR ITEM	CONDITION		Values/Status
Q/CHG INTERLOCK	Quick charger connector is connected.		On
	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
BLOWER FAN ACTIV	Blower fan: Operates		On
	Blower fan: Not operate		Off
HEAD LAMP LOW SIG	When the combination switch's low beam was selected		On
	Except above		Off
HEAD LAMP HI SIG	When the combination switch 's high beam was selected		On
	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	Off
HV BATT EMPTY	Power ON	The Li-ion battery remaining energy is sufficient.	OK
		The Li-ion battery remaining energy is low.	EMPTY

*1: When the information display indicates “---”, this item indicates “2047”.

*2: Idle is the state when not driving in the READY state.

TERMINAL LAYOUT



PHYSICAL VALUES

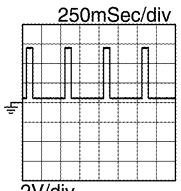
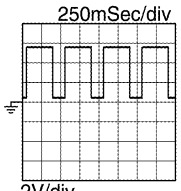
NOTE:

Specification data are reference values.

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
1	Ground	Ignition relay power supply	Input	Power switch: ON	12V BATTERY VOLTAGE (12 - 15 V)
4	—	VCM ground	—	—	—
5	Ground	A/C relay	Output	Power switch: ON	0 V (Approx.)
				A few seconds after turning power switch OFF	11 - 14 V

VCM

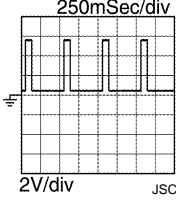
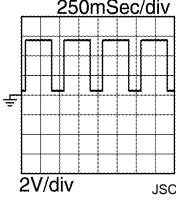
< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)	
+	-	Signal name	Input/ Output			
6	Ground	Battery power supply	Input	Always	12V BATTERY VOLTAGE (11 – 14 V)	A
7	Ground	SSOFF relay	Output	Power switch: ON	0 V	B
				More than 20 seconds after turning power OFF.	12V BATTERY VOLTAGE (11 – 14 V)	EVC
8	—	VCM ground	—	—	—	D
9	—	EV system CAN-H	Input/ Output	—	—	E
13	—	EV system CAN-L	Input/ Output	—	—	F
15	Ground	ASCD brake switch	Input	• Power switch: ON • Brake pedal: depress	0 V	F
				• Power switch: ON • Brake pedal: Fully released	12V BATTERY VOLTAGE (11 – 14 V)	G
18	Ground	Stop lamp switch	Input	• Power switch: ON • Brake pedal: depress	12V BATTERY VOLTAGE (11 – 14 V)	H
				• Power switch: ON • Brake pedal: Fully released	0 V	H
21	Ground	Power ON power supply	Input	Power switch: ON	12V BATTERY VOLTAGE (11 – 14 V)	I
23	Ground	High voltage connector interlock	Input	When all the high voltage connectors are connected	12V BATTERY VOLTAGE (11 – 14 V)	I
				When one of the high voltage connectors is disconnected	0 V	J
25	—	CAN-H	Input/ Output	—	—	K
26	4	Water pump 2 signal	Input	• Power switch ON • Pump operation duty: 0%	 250mSec/div 2V/div JSCIA0323ZZ	L
				• Power switch ON • Pump operation duty: Approx. 70%	 250mSec/div 2V/div JSCIA0324ZZ	M

P

VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
28	4	Water pump 1 signal	Input	<ul style="list-style-type: none"> Power switch ON Pump operation duty: 0% 	 250mSec/div 2V/div JSCIA0325ZZ
				<ul style="list-style-type: none"> Power switch ON Pump operation duty: Approx. 70% 	 250mSec/div 2V/div JSCIA0326ZZ
29	—	CAN-L	Input/ Output	—	—
33	4	Sensor power supply (Refrigerant pressure sensor)	Output	Power switch: ON	5 V
34	35	Refrigerant pressure sensor	Input	A/C compressor operating.	1.0 – 4.0 V
35	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
37	39	Sensor power supply (Accelerator pedal position sensor 1)	Output	Power switch: ON	5 V (Approx.)
38	39	Accelerator pedal position sensor 1	Input	<ul style="list-style-type: none"> Power switch: ON Accelerator pedal: Fully released 	0.45 – 1.0 V
				<ul style="list-style-type: none"> Power switch: ON Accelerator pedal: Fully depressed 	4.4 – 4.8 V
39	—	Sensor ground (Accelerator pedal position sensor 1)	—	—	—
40	—	Shield	—	—	—
41	43	Sensor power supply (Battery current sensor)	Output	Power switch: ON	5 V (Approx.)
42	43	Battery current sensor	Input	<ul style="list-style-type: none"> READY 12V battery is fully charged 	2.6 – 3.5 V
43	—	Sensor ground (Battery current sensor)	—	—	—
45	47	Sensor power supply (Accelerator pedal position sensor 2)	Output	Power switch: ON	5 V (Approx.)
46	47	Accelerator pedal position sensor 2	Input	<ul style="list-style-type: none"> Power switch: ON Accelerator pedal: Fully released 	0.22 – 0.5 V
				<ul style="list-style-type: none"> Power switch: ON Accelerator pedal: Fully depressed 	2.1 – 2.5 V

VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
47	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—
48	—	Shield	—	—	—
50	43	Battery temperature sensor	Input	READY	0 – 4.8 V Output voltage varies with motor room air temperature.
51	52	Coolant temperature sensor	Input	READY	0 – 4.8 V Output voltage varies with coolant temperature.
52	—	Sensor ground (Coolant temperature sensor)	—	—	—
57	4	Power voltage variable control signal	Output	DC/DC converter output power: 13 V	
				DC/DC converter output power: 15 V	
59	4	Cooling fan control signal	Output	Fan duty: 40%	
				Fan duty: 100%	

A
B
EVC
D
E
F
G
H
I
J
K
L
M
N
O
P

VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
62	4	Water pump 1 signal	Input	Pump operation duty: 0%	
				Pump operation duty: Approx. 70%	
64	4	Water pump 2 signal	Input	Pump operation duty: 0%	
				Pump operation duty: Approx. 70%	
67	4	DC/DC converter temperature signal	Input	DC/DC converter temperature: High	
				DC/DC converter temperature: Low	

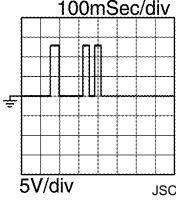
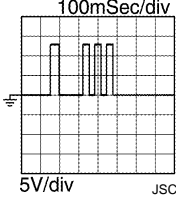
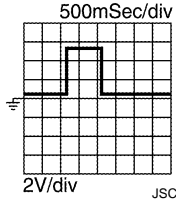
VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)	
+	-	Signal name	Input/ Output			
70	4	DC/DC converter activation signal	Output	<ul style="list-style-type: none"> • READY • DC/DC converter is operating normally 	5 V (Approx.)	A
				<ul style="list-style-type: none"> • READY • When VCM has detected an error in the DC/DC converter 	3 V (Approx.)	B
				Power switch: ON	Less than 1 V	EVC
73	Ground	F/S relay	Output	Power switch: OFF	12V BATTERY VOLTAGE (11 – 14 V)	D
				READY	0 V (Approx.)	E
75	Ground	F/S CHG relay	Output	During quick charge	0 V (Approx.)	F
				Except above	12V BATTERY VOLTAGE (11 – 14 V)	
77	Ground	F/S relay power supply	Input	Power switch: OFF	0 V	G
				READY	12V BATTERY VOLTAGE (11 – 14 V)	
78	Ground	M/C relay	Output	Power switch: OFF	12V BATTERY VOLTAGE (11 – 14 V)	H
				Power switch: ON	0 V (Approx.)	I
80	Ground	Reverse lamp relay	Output	<ul style="list-style-type: none"> • Power ON • Selector lever: R range 	0 V (Approx.)	J
				<ul style="list-style-type: none"> • Power ON • Selector lever: Except R range 	12V BATTERY VOLTAGE (11 – 14 V)	
81	—	K-Line	—	—	—	K
84	4	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.		L
85	Ground	Charging status indicator 2	Output	Charging status indicator 2: ON	0 V (Approx.)	N
				Charging status indicator 2: OFF	12V BATTERY VOLTAGE (11 – 14 V)	
86	Ground	Charging status indicator 1	Output	Charging status indicator 1: ON	0 V (Approx.)	O
				Charging status indicator 1: OFF	12V BATTERY VOLTAGE (11 – 14 V)	
87	Ground	Plug in indicator lamp	Output	Plug in indicator lamp: ON	0 V (Approx.)	P
				Plug in indicator lamp: OFF	12V BATTERY VOLTAGE (11 – 14 V)	

VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
88	4	VSP control signal	Output	EVSE is connected.	 100mSec/div 5V/div JSCIA0336ZZ
				Charge start	 100mSec/div 5V/div JSCIA0337ZZ
89	Ground	Immediate charging switch	Input	Immediate charging switch: Pressed	12V BATTERY VOLTAGE (11 – 14 V)
				Immediate charging switch: Released	0 V
90	Ground	READY signal	Input	<ul style="list-style-type: none"> Power switch: ON Selector lever: P or N Brake pedal: Depressed 	12V BATTERY VOLTAGE (11 – 14 V)
				<ul style="list-style-type: none"> Power switch: ON Selector lever: P or N Brake pedal: Fully released 	0 V (Approx.)
91	Ground	Electric shift warning lamp	Output	Immediately after the power OFF⇒READY operation	0 V (Approx.)
				Except above (Power ON or READY)	12 V
92	Ground	Charging status indicator 3	Output	Charging status indicator 3: ON	0 V (Approx.)
				Charging status indicator 3: OFF	12V BATTERY VOLTAGE (11 – 14 V)
96	4	EV system activation request signal	Input	Power switch: OFF⇒ON NOTE: When turn power switch OFF to ON, the on-board charger sends the voltage signal to check the system for approximately 1 second.	 500mSec/div 2V/div JSCIA0343ZZ
104	4	ASCD steering switch	Input	<ul style="list-style-type: none"> Power ON ASCD steering switch: All OFF 	4 V (Approx.)
				<ul style="list-style-type: none"> Power ON RESUME/ACCELERATE switch: Pressed 	3 V (Approx.)
				<ul style="list-style-type: none"> Power ON SET/COAST switch: Pressed 	2 V (Approx.)
				<ul style="list-style-type: none"> Power ON CANCEL switch: Pressed 	1 V (Approx.)
				<ul style="list-style-type: none"> Power ON ASCD main switch: Pressed 	0 V (Approx.)

VCM

< ECU DIAGNOSIS INFORMATION >

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
105	4	Pre-charge relay	Output	Immediately after the power OFF⇒READY operation	12V BATTERY VOLTAGE* (11 – 14 V)
				Except above	0 V
107	4	System main relay 1	Output	During READY or during charging	12V BATTERY VOLTAGE (11 – 14 V)
				Except above	0 V
108	—	ASCD steering switch ground	—	—	—
110	4	System main relay 2	Output	During READY or during charging	12V BATTERY VOLTAGE (11 – 14 V)
				Except above	0 V
111	—	VCM ground	—	—	—
112	—	VCM ground	—	—	—

*: This signal can be confirmed with oscilloscope.

Fail-Safe

INFOID:000000006977134

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

x:Applicable

DTC		Pattern				Others
		A	B	C	D	
U1010	TYPE 1			x		
	TYPE 2	x	x	x	x	
P0643				x		
P0A8D		x	x	x	x	
P0A8E		x	x	x	x	
P0AA0		x	x	x	x	
P0AA1		x	x	x	x	
P0AA2		x	x	x	x	
P0AA4		x	x	x	x	
P0AA5		x	x	x	x	
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
P1614						Start not possible

VCM

< ECU DIAGNOSIS INFORMATION >

DTC	Pattern				Others	
	A	B	C	D		
P1615					Start not possible	
P2122 P2123 P2127 P2128					<ul style="list-style-type: none"> • Traction motor output is limited. • Reduced responsiveness during accelerator operation 	
P2138	TYPE 1			×		
	TYPE 2				<ul style="list-style-type: none"> • Traction motor output is limited. • Reduced responsiveness during accelerator operation 	
P3100	×	×	×	×		
P3101	TYPE 1			×		
	TYPE 2	×	×	×	×	
	TYPE 3					No fail-safe.
P3102					Traction motor output is limited.	
P312A	×	×	×	×		
P312B	×	×	×	×		
P312C	×	×	×	×		
P312D	×	×	×	×		
P312E	×	×	×	×		
P312F	×	×	×	×		
P3130	×	×	×	×		
P3131	×	×	×	×		
P3137	×	×	×	×		
P315C	TYPE 1		×			
	TYPE 2	×	×			
	TYPE 3	×	×	×	×	
	TYPE 4					No fail-safe.
P316A			×			
P316F	TYPE 1	×	×	×	×	
	TYPE 2	×	×			
P3170	×	×				
P3173	TYPE 1	×	×			Traction motor output is limited.
	TYPE 2	×	×			
	TYPE 3	×				
	TYPE 4		×			
	TYPE 5	×	×	×		
	TYPE 6					No fail-safe.
P3175			×			
P3176	×	×	×	×		
P3177	×	×	×	×		
P3178	×	×	×	×		
P3179						
P317A			×			
P317B	×	×	×	×		
P317D			×			
P317E	×	×				

VCM

< ECU DIAGNOSIS INFORMATION >

DTC	Pattern				Others	
	A	B	C	D		
P3182	×	×	×	×		A
P3183	×	×				B
P3188			×			
P318B	TYPE 1		×			EVC
	TYPE 2				Put the gear position in neutral.	
P3191	TYPE 1		×			D
	TYPE 2				No fail-safe.	
P3193	TYPE 1	×	×		Only driving in creep is possible.	E
	TYPE 2				No fail-safe.	
P3196	TYPE 1	×				F
	TYPE 2	×	×		Traction motor output is limited.	
P3197			×			
P319C			×			
P319E	×	×			Only driving in creep is possible.	
P31A1	TYPE 1	×				G
	TYPE 2	×	×		Traction motor output is limited.	
P31A2			×			
P31A7			×			H
P31A9	×	×			Only driving in creep is possible.	
P31AD			×			I
P31AE	TYPE 1	×				J
	TYPE 2	×	×		Traction motor output is limited.	
P31B0	TYPE 1				VCM inhibits the timer charge.	K
	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.	L
	TYPE 2				No fail-safe.	
P31B4	TYPE 1				VCM inhibits the timer charge.	M
	TYPE 2				VCM inhibits the pre-air conditioner.	
	TYPE 3				No fail-safe.	
P31B5	TYPE 1				<ul style="list-style-type: none"> ASCD operation prohibited NOTE: The ECO meter display value also becomes extremely poor.	N
	TYPE 2				No fail-safe.	
P31B6					VCM sets the DC/DC converter output power to a constant 14 V.	O
P31C5					<ul style="list-style-type: none"> VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control. 	
P31C6					<ul style="list-style-type: none"> VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control. 	P
P31C7					<ul style="list-style-type: none"> VCM inhibits the timer charge and the pre-air conditioner. VCM inhibits the automatic 12V battery charge control. 	
P31CA		×				
P31CB		×				
P31D4	×	×	×	×		

VCM

< ECU DIAGNOSIS INFORMATION >

DTC	Pattern				Others	
	A	B	C	D		
P31D5					<ul style="list-style-type: none"> • Traction motor output is limited. • Vehicle speed is limited. (Approx. 40 km/h) 	
P31DB	×	×	×	×		
P31DC	×	×	×	×		
P31DE	TYPE 1				Traction motor output is limited.	
	TYPE 2	×	×	×	×	
P31E0	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E1	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E2	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E7					Doing READY again is prohibited.	
P31F2					VCM inhibits the timer charge and the pre-air conditioner.	

DTC Inspection Priority Chart

INFOID:000000006977135

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
1	U1000	CAN COMM CIRCUIT
	U1010	CAN ERROR
	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
	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

VCM

< ECU DIAGNOSIS INFORMATION >

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

VCM

< ECU DIAGNOSIS INFORMATION >

Priority	DTC	Detection items
3	P0A8F	14V POWER SUPPLY
	P0AA6	HYBRID BATT VOLT SYS ISOLATION
	P3100, P312A	COMMUNICATION ERROR
	P311C	HIGH VOLTAGE SYSTEM
	P312B	RESTART ERROR
	P312C	INVERTER DISCHARGE ERROR
	P312D	QUICK CHARGE RELAY
	P312E	READY OFF ERROR
	P312F	CHARGE OFF ERROR
	P3130	INVERTER DISCHARGE ERROR
	P3131	SYSTEM SHUTOFF TIMEOUT
	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

DTC Index

INFOID:000000006977136

×:Applicable —: Not applicable

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
U1000	CAN COMM CIRCUIT	—	1	EVC-109
U1010	CAN ERROR	×	1	EVC-110
P0603	INTERNAL CONTROL MODULE	—	1	EVC-111
P0616	STARTER RELAY	—	1	EVC-112
P0643	SENSOR POWER SUPPLY	×	1	EVC-114
P0A00	COOLANT TEMPERATURE SENSOR	—	1	EVC-116
P0A08	DC/DC CONVERTER	—	1	EVC-119
P0A0B	HV SYSTEM INTERLOCK ERROR	×	1	EVC-120
P0A8D	14V POWER SUPPLY	×	1	EVC-123
P0A8E	14V POWER SUPPLY	×	1	EVC-123
P0A8F	14V POWER SUPPLY	×	1	EVC-124
P0A94	DC/DC CONVERTER	—	1	EVC-125
P0AA0	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-126
P0AA1	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-128
P0AA2	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-130
P0AA4	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-132
P0AA5	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-134
P0AA6	HYBRID BATT VOLT SYS ISOLATION	×	1	EVC-136
P1550	BATTERY CURRENT SENSOR	—	1	EVC-141
P1551	BATTERY CURRENT SENSOR	—	1	EVC-141
P1552	BATTERY CURRENT SENSOR	—	1	EVC-141
P1554	BATTERY CURRENT SENSOR	—	1	EVC-145
P1556	BATTERY TEMPERATURE SENSOR	—	1	EVC-149

VCM

< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P1557	BATTERY TEMPERATURE SENSOR	—	1	EVC-149
P155A	BATTERY TEMPERATURE SENSOR	—	1	EVC-151
P1564	ASCD SWITCH	—	1	EVC-153
P1572	ASCD BRAKE SWITCH	—	1	EVC-156
P1574	ASCD VEHICLE SPEED SENSOR	—	1	EVC-161
P1610	LOCK MODE	—	1	SEC-51
P1611	ID DISCORD, IMMU-VCM	—	1	SEC-52
P1612	CHAIN OF VCM-IMMU	—	1	SEC-53
P1805	BRAKE SWITCH	×	1	EVC-162
P2122	APP SENSOR D	×	1	EVC-165
P2123	APP SENSOR D	×	1	EVC-165
P2127	APP SENSOR E	×	1	EVC-168
P2128	APP SENSOR E	×	1	EVC-168
P2138	APP SENSOR	×	1	EVC-171
P3100	COMMUNICATION ERROR	×	1	EVC-173
P3101	VCM	× or —	1	EVC-175
P3102	INVALID BATTERY	×	1	EVC-176
P311C	HIGH VOLTAGE SYSTEM	—	1	EVC-177
P312A	COMMUNICATION ERROR	×	1	EVC-180
P312B	RESTART ERROR	×	1	EVC-182
P312C	INVERTER DISCHARGE ERROR	×	1	EVC-184
P312D	QUICK CHARGE RELAY	×	1	EVC-186
P312E	READY OFF ERROR	×	1	EVC-187
P312F	CHARGE OFF ERROR	×	1	EVC-189
P3130	INVERTER DISCHARGE ERROR	×	1	EVC-184
P3131	SYSTEM SHUTOFF TIMEOUT	×	1	EVC-191
P3137	CAR CRASH	×	1	EVC-193
P315C	CHARGE RELAY	×	1	EVC-194
P315E	VDC SYSTEM	—	1	EVC-195
P316A	MOTOR SPEED	×	1	EVC-196
P316F	ON BOARD CHARGER SYSTEM	×	1	EVC-197
P3172	ON BOARD CHARGER SYSTEM	×	1	EVC-198
P3173	ON BOARD CHARGER SYSTEM	× or —	1	EVC-198
P3175	VCM	×	1	EVC-199
P3176	INVERTER CONDENSER	×	1	EVC-200
P3177	ECU ACTIVATION ERROR	×	1	EVC-202
P3178	ECU ACTIVATION ERROR	×	1	EVC-205
P3179	MOTOR SYSTEM	×	1	EVC-207
P317A	MOTOR SYSTEM	×	1	EVC-207
P317B	MOTOR SYSTEM	×	1	EVC-207
P317D	MOTOR SYSTEM	×	1	EVC-208
P317E	HV BATTERY SYSTEM	—	1	EVC-209
P3180	HV BATTERY SYSTEM	×	1	EVC-209
P3182	HV BATTERY SYSTEM	—	1	EVC-209

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< ECU DIAGNOSIS INFORMATION >

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P3183	HV BATTERY SYSTEM	×	1	EVC-210
P3188	ELECTRIC SHIFT SYSTEM	×	1	EVC-211
P318A	ELECTRIC SHIFT SYSTEM	×	1	EVC-212
P318B	ELECTRIC SHIFT SYSTEM	×	1	EVC-213
P318D	COMMUNICATION ERROR	×	1	EVC-214
P3191	COMMUNICATION ERROR	× or —	1	EVC-215
P3193	COMMUNICATION ERROR	× or —	1	EVC-216
P3194	COMMUNICATION ERROR	—	1	EVC-217
P3195	COMMUNICATION ERROR	—	1	EVC-218
P3196	COMMUNICATION ERROR	×	1	EVC-219
P3197	COMMUNICATION ERROR	×	1	EVC-220
P319C	COMMUNICATION ERROR	×	1	EVC-215
P319E	COMMUNICATION ERROR	×	1	EVC-216
P319F	COMMUNICATION ERROR	—	1	EVC-217
P31A0	COMMUNICATION ERROR	—	1	EVC-218
P31A1	COMMUNICATION ERROR	×	1	EVC-219
P31A2	COMMUNICATION ERROR	×	1	EVC-220
P31A7	COMMUNICATION ERROR	×	1	EVC-215
P31A9	COMMUNICATION ERROR	×	1	EVC-216
P31AA	COMMUNICATION ERROR	—	1	EVC-217
P31AB	COMMUNICATION ERROR	—	1	EVC-218
P31AD	COMMUNICATION ERROR	×	1	EVC-220
P31AE	COMMUNICATION ERROR	×	1	EVC-219
P31AF	COMMUNICATION ERROR	×	1	EVC-221
P31B0	COMMUNICATION ERROR	—	1	EVC-222
P31B3	COMMUNICATION ERROR	× or —	1	EVC-221
P31B4	COMMUNICATION ERROR	—	1	EVC-222
P31B5	COMMUNICATION ERROR	—	1	EVC-223
P31B6	COMMUNICATION ERROR	—	1	EVC-224
P31B7	COMMUNICATION ERROR	×	1	EVC-225
P31B8	COMMUNICATION ERROR	—	1	EVC-226
P31B9	COMMUNICATION ERROR	—	1	EVC-227
P31C0	ON BOARD CHARGER SYSTEM	×	1	EVC-228
P31C1	TCU	×	1	EVC-230
P31C2	TCU	—	1	EVC-230
P31C4	VCM TIMER	×	1	EVC-231
P31C5	VCM	—	1	EVC-232
P31C6	VCM	—	1	EVC-232
P31C7	VCM	×	1	EVC-232
P31C8	ON BOARD CHARGER SYSTEM	×	1	EVC-233
P31C9	ON BOARD CHARGER SYSTEM	×	1	EVC-233
P31CA	ON BOARD CHARGER SYSTEM	×	1	EVC-236
P31CB	ON BOARD CHARGER SYSTEM	×	1	EVC-236
P31D4	PRE CHARGE RELAY	×	1	EVC-238

VCM

< ECU DIAGNOSIS INFORMATION >

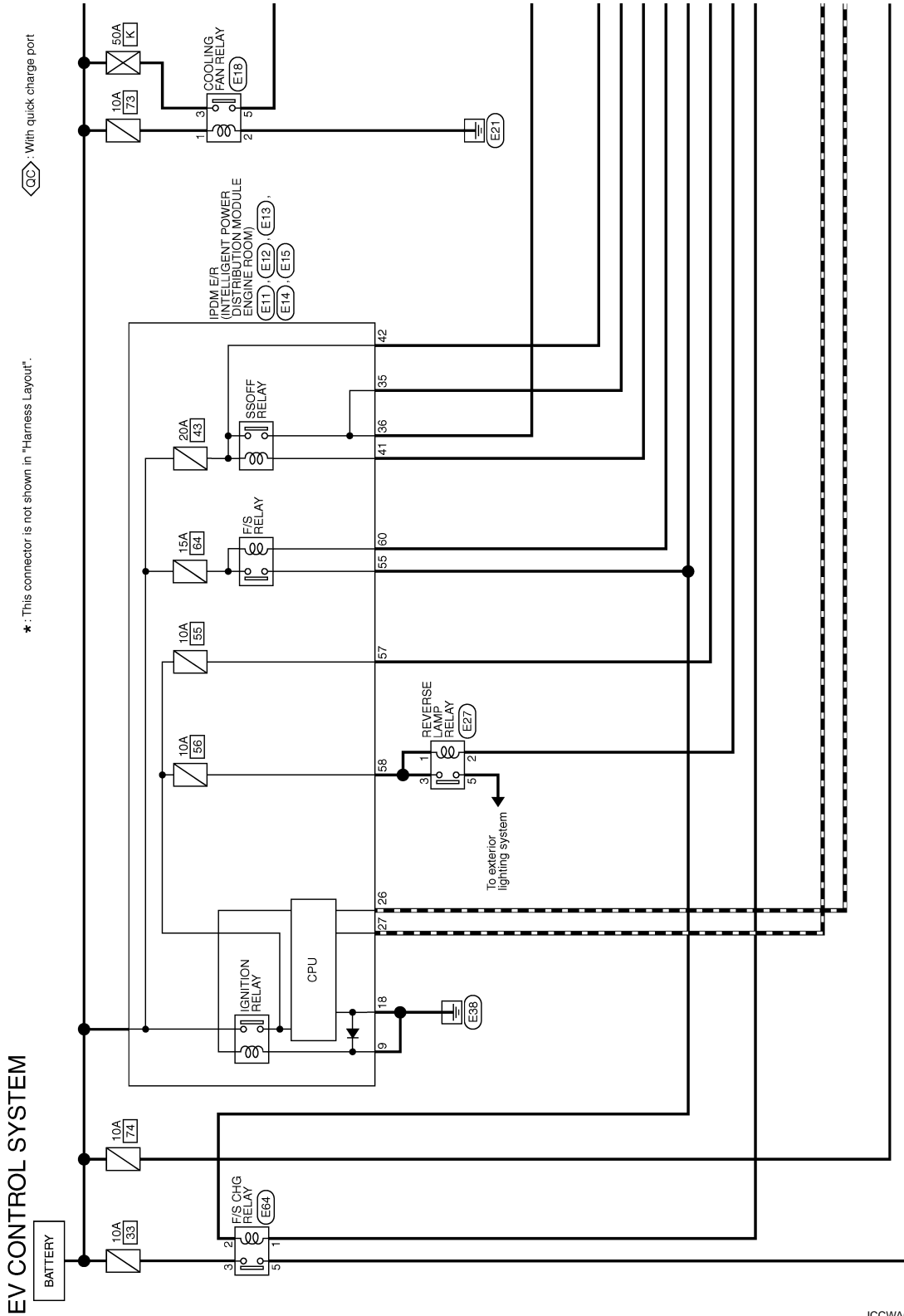
DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page	
P31D5	PRE CHARGE RELAY	×	1	EVC-239	A
P31D6	F/S RELAY	×	1	EVC-241	B
P31D7	F/S RELAY	×	1	EVC-242	B
P31DB	HV BATT MAIN RELAY +	×	1	EVC-244	EVC
P31DC	HV BATT MAIN RELAY -	×	1	EVC-246	
P31DD	PRE CHARGE RELAY	×	1	EVC-248	
P31DE	HV BATT MAIN RELAY	×	1	EVC-249	D
P31E0	HV SYSTEM INTERLOCK ERROR	×	1	EVC-251	
P31E1	HV SYSTEM INTERLOCK ERROR	×	1	EVC-256	
P31E2	HV SYSTEM INTERLOCK ERROR	×	1	EVC-259	E
P31E7	RESTART INHIBITION	×	1	EVC-261	
P31E8	WATER PUMP 1	×	1	EVC-262	
P31E9	WATER PUMP 1	×	1	EVC-264	F
P31EA	WATER PUMP 2	×	1	EVC-265	
P31EB	WATER PUMP 2	×	1	EVC-267	G
P31EC	WATER PUMP 1	—	1	EVC-268	
P31ED	WATER PUMP 2	—	1	EVC-269	
P31EE	REFRIGERANT PRESSURE SENSOR	—	1	EVC-270	H
P31F0	DC/DC CONVERTER COMM LINE	—	1	EVC-273	
P31F2	AV SET INFORMATION	—	1	EVC-275	I

WIRING DIAGRAM

VCM

Wiring Diagram

INFOID:000000006977137



*: This connector is not shown in "Harness Layout".

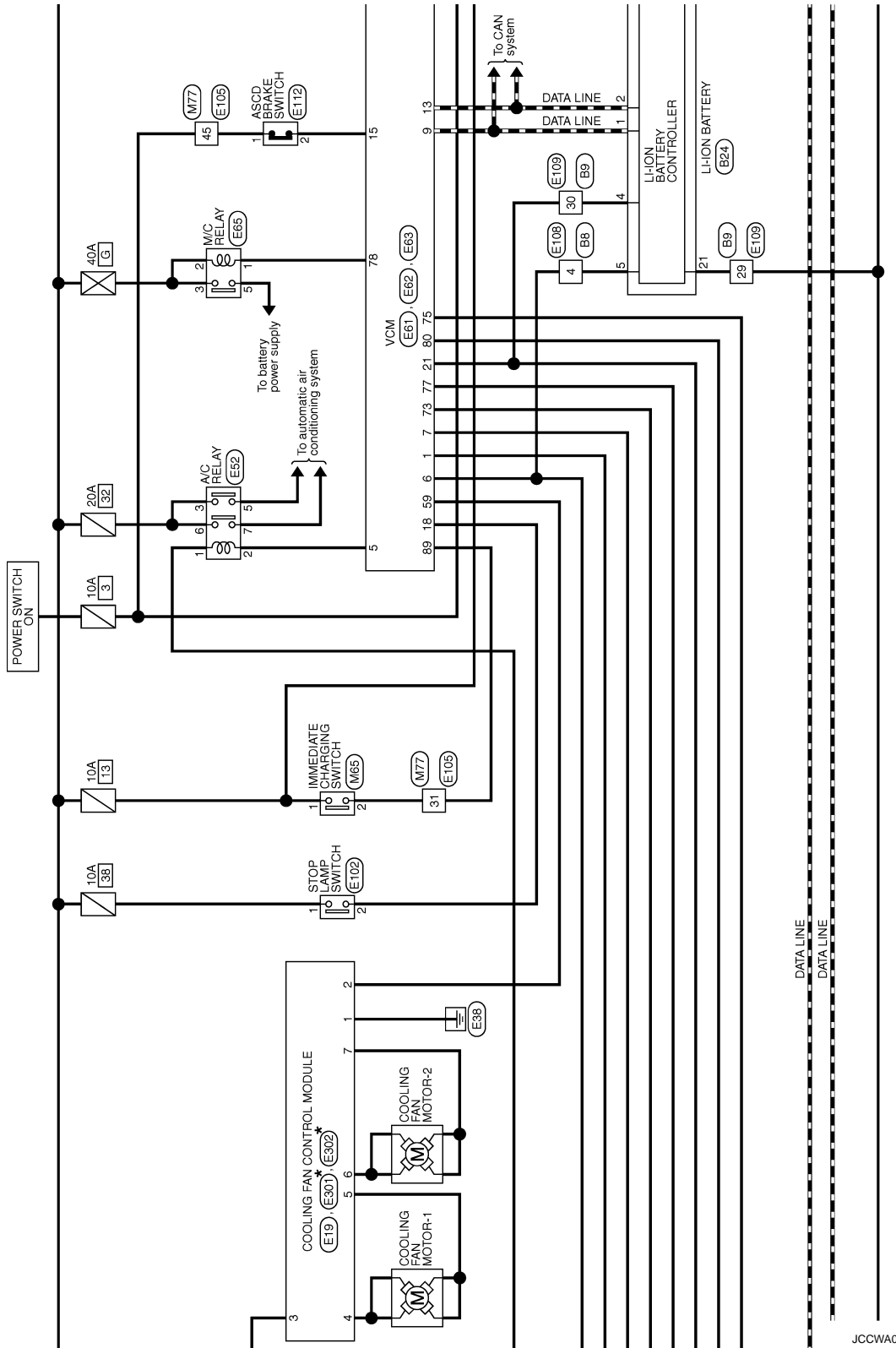
QC: With quick charge port

2010/10/29

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VCM

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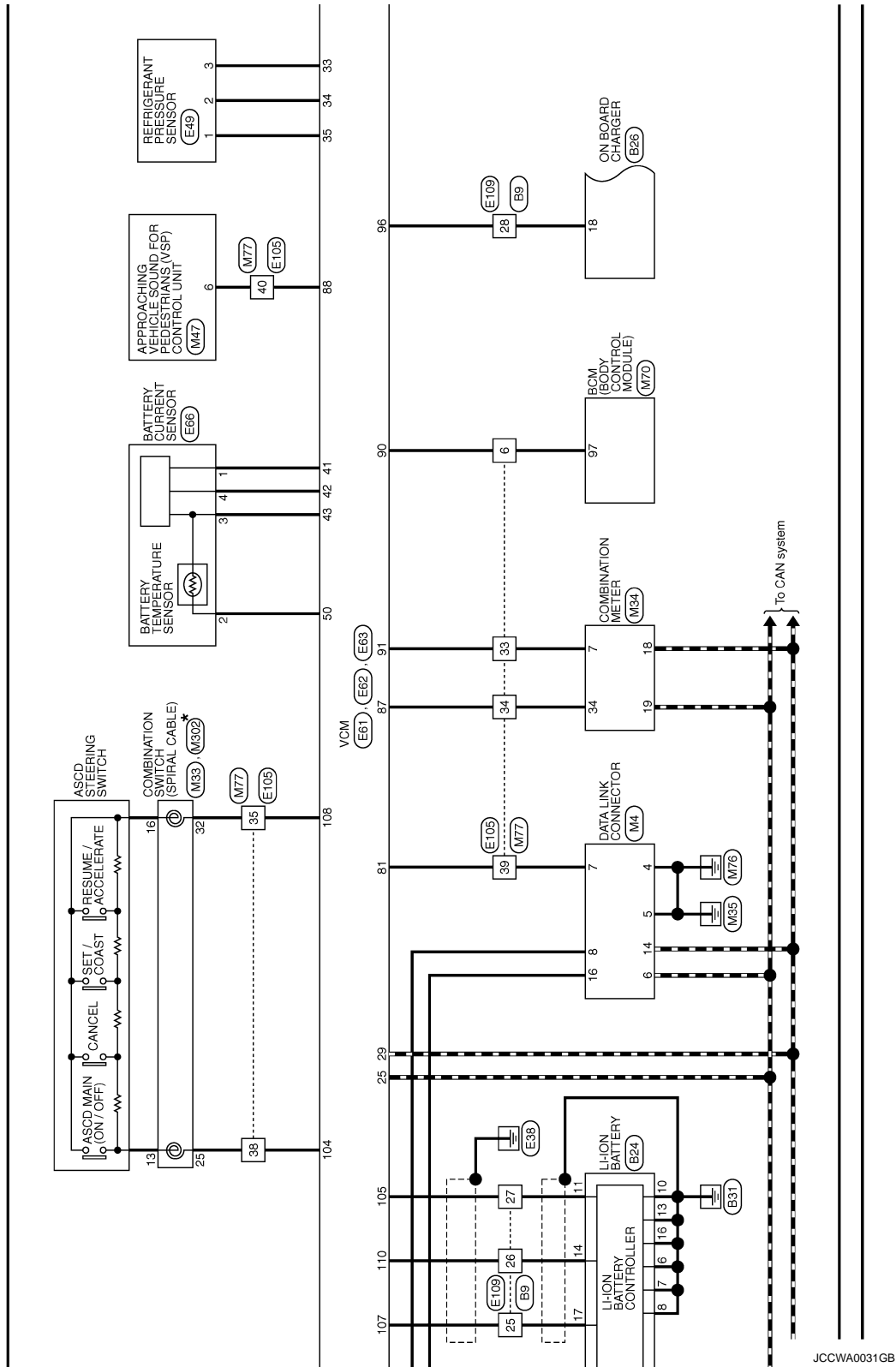


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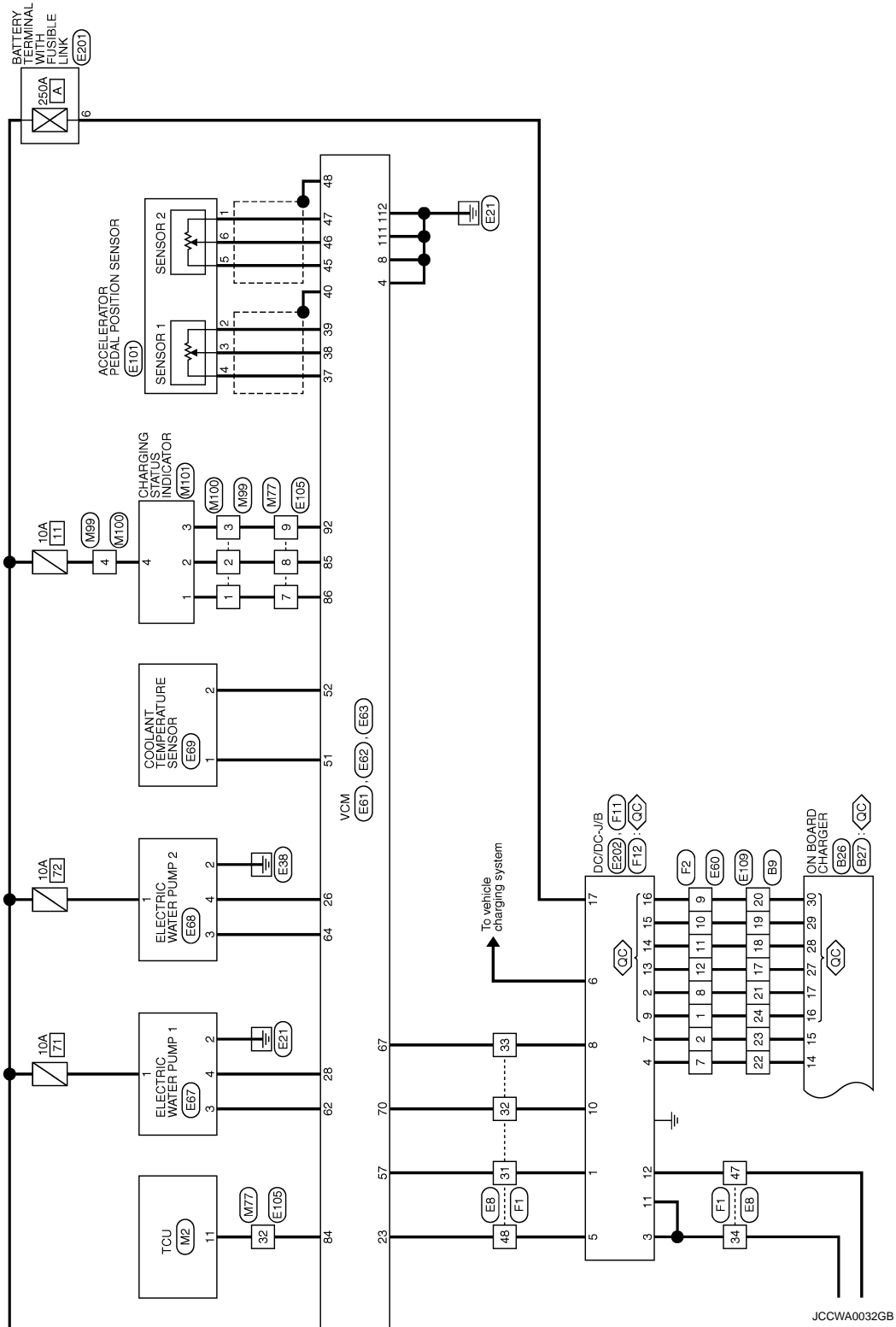
< WIRING DIAGRAM >



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VCM

< WIRING DIAGRAM >



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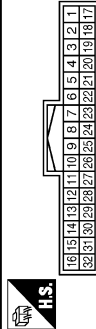
EV CONTROL SYSTEM

Connector No.	B8
Connector Name	WIRE TO WIRE
Connector Type	MS04FH-GS



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	
2	L	
3	R	
4	R	

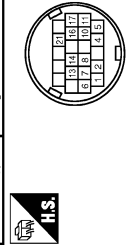
Connector No.	B9
Connector Name	WIRE TO WIRE
Connector Type	TH32FH-BH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	
2	GR	
3	Y	
4	G	
5	BR	
6	L	
7	B	
8	P	
9	SB	
10	LG	
11	W	
17	R	
18	Y	
19	G	
20	V	
21	SB	
22	P	
23	LG	

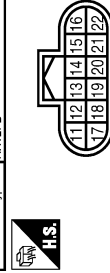
24	L	
25	Y	
26	L	
27	G	
28	GR	
29	R	
30	R	
31	Y	

Connector No.	B24
Connector Name	LI-ION BATTERY
Connector Type	Yazaki: 7283-8750-30



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	EV CAN-H
2	G	EV CAN-L
4	R	IGN
5	R	BAT
6	B	GND3
7	B	GND2
8	B	GND1
10	B	PRE CHG V
11	G	PRE CHG V
13	B	RLY2 GND
14	L	RLY2 V
16	B	RLY1 GND
17	Y	RLY1 V
21	R	CHG IGN

Connector No.	B26
Connector Name	ON BOARD CHARGER
Connector Type	RH12FB



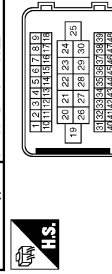
Terminal No.	Color of Wire	Signal Name [Specification]
11	Y	BATTERY POWER SUPPLY
12	W	BATTERY POWER SUPPLY
13	V	POWER ON POWER SUPPLY
14	P	NORMAL CHARGE RELAY +
15	LG	NORMAL CHARGE RELAY -
16	L	QUICK CHARGE RELAY +
17	SB	QUICK CHARGE RELAY -
18	GR	EV ACTIVATION REQUEST SIGNAL
19	L	EV SYSTEM CAN-H
20	G	EV SYSTEM CAN-L
21	BR	PLUG IN SIGNAL
22	B	GROUND

Connector No.	B27
Connector Name	ON BOARD CHARGER
Connector Type	RR08FB



Terminal No.	Color of Wire	Signal Name [Specification]
25	W	QUICK CHARGE PORT TEMPERATURE SENSOR SIGNAL 1
26	GR	QUICK CHARGE PORT TEMPERATURE SENSOR SIGNAL 2
27	R	QUICK CHARGE VOLTAGE SENSOR SIGNAL-L
28	Y	SENSOR POWER SUPPLY QUICK CHARGE VOLTAGE SENSOR
29	G	SENSOR GROUND QUICK CHARGE VOLTAGE SENSOR
30	V	QUICK CHARGE VOLTAGE SENSOR SIGNAL-H

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAASMB-RS10-S22



Terminal No.	Color of Wire	Signal Name [Specification]
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1	Y	
2	L	
3	GR	
4	LG	
5	P	
6	B	
8	BR	
10	B	
11	W	
12	O	
13	G	
14	V	
15	SB	
16	R	
17	L	
18	LG	
20	V	
21	G	
22	Y	
23	B/R	
24	V	
26	V	
27	B	
28	B/R	
29	W	
30	B/R	
31	LG	
32	W	
33	Y	
34	P	
35	P	
36	R	
37	G	
38	B/R	
40	BR	
41	G	
42	SB	
43	L	
44	O	
47	V	
48	P	

EV CONTROL SYSTEM

Connector No.	E11
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	MS08FB-LC



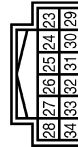
Terminal No.	Color of Wire	Signal Name [Specification]
9	B	
14	R	

Connector No.	E12
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS08FBR-CS



Terminal No.	Color of Wire	Signal Name [Specification]
18	B/W	
19	W	
20	V	

Connector No.	E13
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	TH12FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
25	R	

26	P	
27	L	
34	W	

Connector No.	E14
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS12FBR-CS



Terminal No.	Color of Wire	Signal Name [Specification]
35	G	
36	GR	
38	V	
39	L	
41	W	
42	R	
43	O	
44	LG	
45	Y	

Connector No.	E15
Connector Name	FROM E/R INTELLIGENT POWER DISTRIBUTION MODULE (ENGINE ROOM)
Connector Type	NS16FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
49	Y	
50	G	
51	L	
52	P	
55	LG	
57	R	
58	O	
60	GR	

61	Y	
62	V	

Connector No.	E18
Connector Name	COOLING FAN RELAY
Connector Type	24347_9F-900



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	
2	B/Y	
3	BR	
5	R	

Connector No.	E19
Connector Name	COOLING FAN CONTROL MODULE
Connector Type	SJZ01FGY-SNZ2



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GND
2	V	PWM SIG
3	R	PWM POWER

Connector No.	E27
Connector Name	REVERSE LAMP RELAY
Connector Type	MS02FL-MZ-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	
2	SB	
3	O	
5	G	

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Type	RK03FB



Terminal No.	Color of Wire	Signal Name [Specification]
2	BR	
3	L	

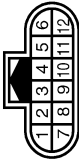
EV CONTROL SYSTEM

Connector No.	E52
Connector Name	A/C RELAY
Connector Type	M08FBR-R-LC



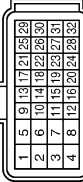
Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	-
2	SB	-
3	R	-
4	R	-
5	V	-
6	R	-
7	W	-

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



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	G	-
3	L	-
4	G	-
5	L	-
6	G	-
7	L	-
8	SB	-
9	V	-
10	O	-
11	BR	-
12	LG	-

Connector No.	E61
Connector Name	VCM
Connector Type	RH24FGV-R28-R-RH



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

Connector No.	E62
Connector Name	VCM
Connector Type	RH40FBR-R28-L-RH



Terminal No.	Color of Wire	Signal Name [Specification]
33	L	SENSOR POWER SUPPLY (REFRIGERANT PRESSURE SENSOR)
34	BR	REFRIGERANT PRESSURE SENSOR SIGNAL
35	BR	SENSOR GROUND (REFRIGERANT PRESSURE SENSOR)
37	W	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR)
38	R	ACCELERATOR PEDAL POSITION SENSOR 1 SIGNAL
39	B	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)

Terminal No.	Color of Wire	Signal Name [Specification]
40	SHIELD	-
41	R	SENSOR POWER SUPPLY (BATTERY CURRENT SENSOR)
42	Y	BATTERY CURRENT SENSOR SIGNAL
43	L	SENSOR GROUND (BATTERY CURRENT SENSOR)
45	W	ACCELERATOR PEDAL POSITION SENSOR 2 SIGNAL
46	R	ACCELERATOR PEDAL POSITION SENSOR 2 SIGNAL
47	B	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
48	SHIELD	-
50	L	BATTERY TEMPERATURE SENSOR SIGNAL
51	O	COOLANT TEMPERATURE SENSOR SIGNAL
52	W	SENSOR GROUND (COOLANT TEMPERATURE SENSOR)
57	LG	POWER VOLTAGE VARIABLE CONTROL SIGNAL
59	V	RADIATOR FAN CONTROL SIGNAL
62	G	WATER PUMP 1 ACTIVATION SIGNAL
64	R	WATER PUMP 2 ACTIVATION SIGNAL
67	Y	DC/DC CONVERTER TEMPERATURE SIGNAL
70	W	DC/DC CONVERTER ACTIVATION SIGNAL
73	GR	F/S RELAY
75	W	F/S CHG RELAY
77	LG	F/S RELAY POWER SUPPLY
78	G	M/C RELAY
80	SB	REVERSE LAMP RELAY

Connector No.	E63
Connector Name	VCM
Connector Type	RH24FBR-R28-L-RH



Terminal No.	Color of Wire	Signal Name [Specification]
81	GR	K-LINE
84	LG	EV SYSTEM ACTIVATION REQUEST SIGNAL
85	P	CHARGING STATUS INDICATOR 2
86	V	CHARGING STATUS INDICATOR 1
87	L	PLUG IN INDICATOR LAMP
88	Y	AVSP CONTROL SIGNAL
89	V	IMMEDIATE CHARGING SWITCH
90	W	STARTER RELAY CONT
91	O	ELECTRIC SHIF WARNING SIGNAL
92	G	CHARGING STATUS INDICATOR 3
96	GR	EV SYSTEM ACTIVATION REQUEST SIGNAL
104	SB	ASCD STEERING SWITCH
105	L/O	PRE-CHARGE RELAY
107	W/L	SYSTEM MAIN RELAY 1

108	BR	ASCD STIRRING SWITCH GROUND
110	L/Y	SYSTEM MAIN RELAY 2
111	B/R	GROUND
112	B/R	GROUND

Connector No.	E64
Connector Name	F/S CHG RELAY
Connector Type	MS02FL-M2-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	LG	-
3	W	-
5	V	-

Connector No.	E65
Connector Name	M/C RELAY
Connector Type	MS02FL-M2-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	R	-
3	R	-
5	W	-

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EV CONTROL SYSTEM

Connector No.	EB6
Connector Name	BATTERY CURRENT SENSOR
Connector Type	SAZ04FGY



Terminal No.	Color of Wire	Signal Name [Specification]
1	R	-
2	L	-
3	L	-
4	Y	-

Connector No.	EB7
Connector Name	ELECTRIC WATER PUMP 1
Connector Type	RSDMFG

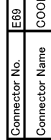


Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	B/Y	-
3	G	-
4	W	-

Connector No.	EB8
Connector Name	ELECTRIC WATER PUMP 2
Connector Type	RSDMFG



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	B/W	-
3	R	-
4	Y	-



Connector No.	EB9
Connector Name	COOLANT TEMPERATURE SENSOR
Connector Type	EDZFGY-RS



Terminal No.	Color of Wire	Signal Name [Specification]
1	O	-
2	W	-



Connector No.	E101
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Type	RHD0FB



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	-
2	B	-
3	R	-
4	W	-
5	W	-
6	R	-

Connector No.	E102
Connector Name	STOP LAMP SWITCH
Connector Type	JM04FW-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	SR	-
3	LG	-
4	P	-

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EV CONTROL SYSTEM

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-GS16-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	BR	-
2	R	-
3	GR	-
4	LG	-
6	W	-
7	V	-
8	P	-
9	G	-
10	R	-
11	O	-
12	W	-
13	B	-
14	Y	-
15	BR	-
16	LG	-
17	L	-
19	G	-
20	V	-
21	P	-
22	LG	-
23	GR	-
24	L	-
25	R	-
26	SB	-
27	B	-
28	BR	-
29	W	-
31	V	-
32	LG	-
33	O	-
34	L	-
35	BR	-
38	SB	-
39	GR	-
40	Y	-
41	R	-
42	W	-
43	SB	-

Connector No.	E108
Connector Name	WIRE TO WIRE
Connector Type	NS5MMH-GS



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	R	-
3	L	-
4	R	-

Connector No.	E109
Connector Name	WIRE TO WIRE
Connector Type	TH82MW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	W	-
2	R	-
3	Y	-
4	G	-
5	BR	-
6	L	-
7	O	-
8	V	-
9	SB	-
10	LG	-
11	L	-
17	LG	-
18	BR	-
19	O	-
20	V	-
21	SB	-
22	L	-
23	G	-

24	Y	-
25	W/L	-
26	L/Y	-
27	L/O	-
28	GR	-
29	P	-
30	R	-
31	W	-

Connector No.	E112
Connector Name	ASC D BRAKE SWITCH
Connector Type	MD2FER-LC



Terminal No.	Color of Wire	Signal Name [Specification]
1	G	-
2	O	-

Connector No.	E201
Connector Name	BATTERY TERMINAL WITH FUSIBLE LINK
Connector Type	-



Terminal No.	Color of Wire	Signal Name [Specification]
8	B/R	-

EV CONTROL SYSTEM

Connector No.	E202
Connector Name	DC/DC-J/B
Connector Type	-



Terminal No.	Color of Wire	Signal Name [Specification]
17	B/R	BATTERY POWER SUPPLY

Connector No.	E301
Connector Name	COOLING FAN CONTROL MODULE (COOLING FAN MOTOR-1)
Connector Type	6188-0239



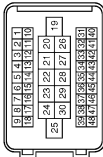
Terminal No.	Color of Wire	Signal Name [Specification]
4	-	-
5	-	-

Connector No.	E302
Connector Name	COOLING FAN CONTROL MODULE (COOLING FAN MOTOR-2)
Connector Type	6188-0239



Terminal No.	Color of Wire	Signal Name [Specification]
6	-	-
7	-	-

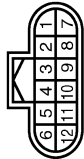
Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SA33PF-RS10-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	L	-
3	GR	-
4	LG	-
5	P	-
6	B	-
8	W	-
10	R	-
11	W	-
12	O	-
13	G	-
14	V	-
15	SB	-
16	LG	-
17	BR	-
18	Y	-
20	V	-
21	G	-
22	LG	-
23	B	-
26	SB	-
27	R	-
28	Y	-
29	W	-
30	P	-
31	L	-
32	W	-
33	Y	-
34	R	-
35	G	-
36	LG	-
37	O	-
37	O	- [With quick charge port]
37	O	- [Without quick charge port]
38	B	-
40	BR	-
41	O	-
42	SB	-
43	L	-

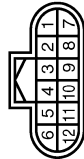
44	LG	-
47	V	-
48	P	-

Connector No.	F2
Connector Name	WIRE TO WIRE
Connector Type	RH1ZFB



Terminal No.	Color of Wire	Signal Name [Specification]
1	L/W	-
2	LG	-
3	L	-
4	G	-
5	L	-
6	G	-
7	V	-
8	Y/V	-
9	V	-
10	O	-
11	R/Y	-
12	W/R	-

Connector No.	F11
Connector Name	DC/DC-J/B
Connector Type	RH1ZFB



Terminal No.	Color of Wire	Signal Name [Specification]
1	L	-
2	Y/V	-
3	R	-
4	V	-
5	P	-

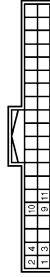
6	O	-
7	LG	-
8	Y	-
9	L/W	-
10	W	-
11	R	BATTERY POWER SUPPLY
12	V	QUICK CHARGE RELAY POWER SUPPLY

Connector No.	F12
Connector Name	DC/DC-J/B
Connector Type	RH04FB



Terminal No.	Color of Wire	Signal Name [Specification]
13	W/R	-
14	R/Y	-
15	O	-
16	V	-

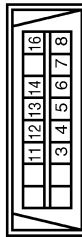
Connector No.	M2
Connector Name	TCU
Connector Type	TH06PW-RH



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

EV CONTROL SYSTEM

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Type	BD18EV



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

Connector No.	M33
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FY-1V



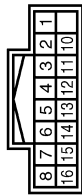
Terminal No.	Color of Wire	Signal Name [Specification]
24	BR	-
25	LG	-
26	B	-
31	Y	-
32	SB	-
33	SHIELD	-
34	G	-

Connector No.	M34
Connector Name	COMBINATION METER
Connector Type	TH40FY-NH



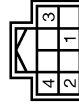
Terminal No.	Color of Wire	Signal Name [Specification]
1	LG	BATTERY POWER SUPPLY
2	R	BATTERY POWER SUPPLY (FOR UPPER METER)
3	GR	POWER SWITCH SUPPLY
4	L	POWER SWITCH SUPPLY (FOR UPPER METER)
5	B	GROUND
6	B	GROUND
7	V	ELECTRIC SHIFT WARNING SIGNAL
9	G	PLUG IN SIGNAL
10	L	COMMUNICATION SIGNAL (METER →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

Connector No.	M47
Connector Name	APPROACHING VEHICLE SOUND FOR PEDESTRIANS (VSP) CONTROL UNIT
Connector Type	TH18EV-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	GROUND
2	L	COMMUNICATION SIGNAL (METER → VSP)
3	SB	POWER SWITCH SIGNAL
4	P	COMMUNICATION SIGNAL (VSP → METER)
5	G	VSP OFF SWITCH SIGNAL
6	Y	CHARGE PULSE SIGNAL
7	L	VSP SPEAKER SIGNAL (-)
8	Y	VSP SPEAKER SIGNAL (+)
10	GR	R-LINE (CONSULT)
11	R	POWER SWITCH SUPPLY
12	SB	STOP LAMP SWITCH SIGNAL
13	L	BATTERY POWER SUPPLY
14	LG	VSP OFF INDICATOR SIGNAL
15	R	STRAT UP SOUND SPEAKER SIGNAL (-)
16	W	STRAT UP SOUND SPEAKER SIGNAL (+)

Connector No.	M65
Connector Name	IMMEDIATE CHARGING SWITCH
Connector Type	TH08FY-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	SB	-
3	W	ILLUMINATION +
4	B	ILLUMINATION -

Connector No.	M70
Connector Name	BGM (BODY CONTROL MODULE)
Connector Type	TH40FY-NH



Terminal No.	Color of Wire	Signal Name [Specification]
75	LG	DR DOOR REQ SW
76	SB	POWER SW (PUSH SW)
78	P	DRIVER DOOR ANT-
79	V	DRIVER DOOR ANT+
80	LG	PASS DOOR ANT-
81	Y	PASS DOOR ANT+
82	W	REAR BEMF ANT-
83	B	REAR BEMF ANT+
84	BR	ROOM ANT 1+
85	Y	ROOM ANT 1-
86	G	ROOM ANT 2+
87	R	ROOM ANT 2-
88	V	LUGGAGE ROOM ANT-
89	LG	LUGGAGE ROOM ANT+
90	W	POWER SW ILL PWR
91	V	ACC 7 ON IND
92	B	POWER SW ILL GND CONT
93	GR	I-KEY WARN BUZZER
97	W	ACC RELAY COAT
98	G	READY
99	R	IGN RELAY (PDM F/R) CONT
100	P	IGN RELAY (F/B) CONT
102	R	PASS DOOR REQ SW
104	LG	WAKE UP
106	P	STOP LAMP SW 2

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EV CONTROL SYSTEM

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Type	TH8DFV-C516-TM4



Terminal No.	Color of Wire	Signal Name [Specification]
1	GR	
2	V	
3	GR	
4	LG	
5	W	
6	W	
7	V	
8	P	
9	SB	
10	L	
11	LG	
12	W	
13	R	
14	Y	
15	R	
16	GR	
17	BR	
19	G	
20	G	
21	P	
22	LG	
23	GR	
24	L	
25	V	
26	W	
27	L	
29	V	
30	W	
31	SB	
32	LG	
33	V	
34	L	
35	SB	
38	LG	
39	GR	
40	Y	
41	R	
42	W	
43	SB	

Connector No.	M89
Connector Name	WIRE TO WIRE
Connector Type	TH04FW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	P	
3	SB	
4	LG	

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	P	
3	SB	
4	L	

Connector No.	M302
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Type	TK08FGY



Connector No.	M100
Connector Name	WIRE TO WIRE
Connector Type	TH04MW-NH



Terminal No.	Color of Wire	Signal Name [Specification]
13	R	
14	W	
15	L	
16	B	
17	BR	
18	G	
19	Y	
20	Y	

Terminal No.	Color of Wire	Signal Name [Specification]
1	V	
2	P	
3	SB	
4	L	

Connector No.	M101
Connector Name	CHARGING STATUS INDICATOR
Connector Type	TH04FW-NH



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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

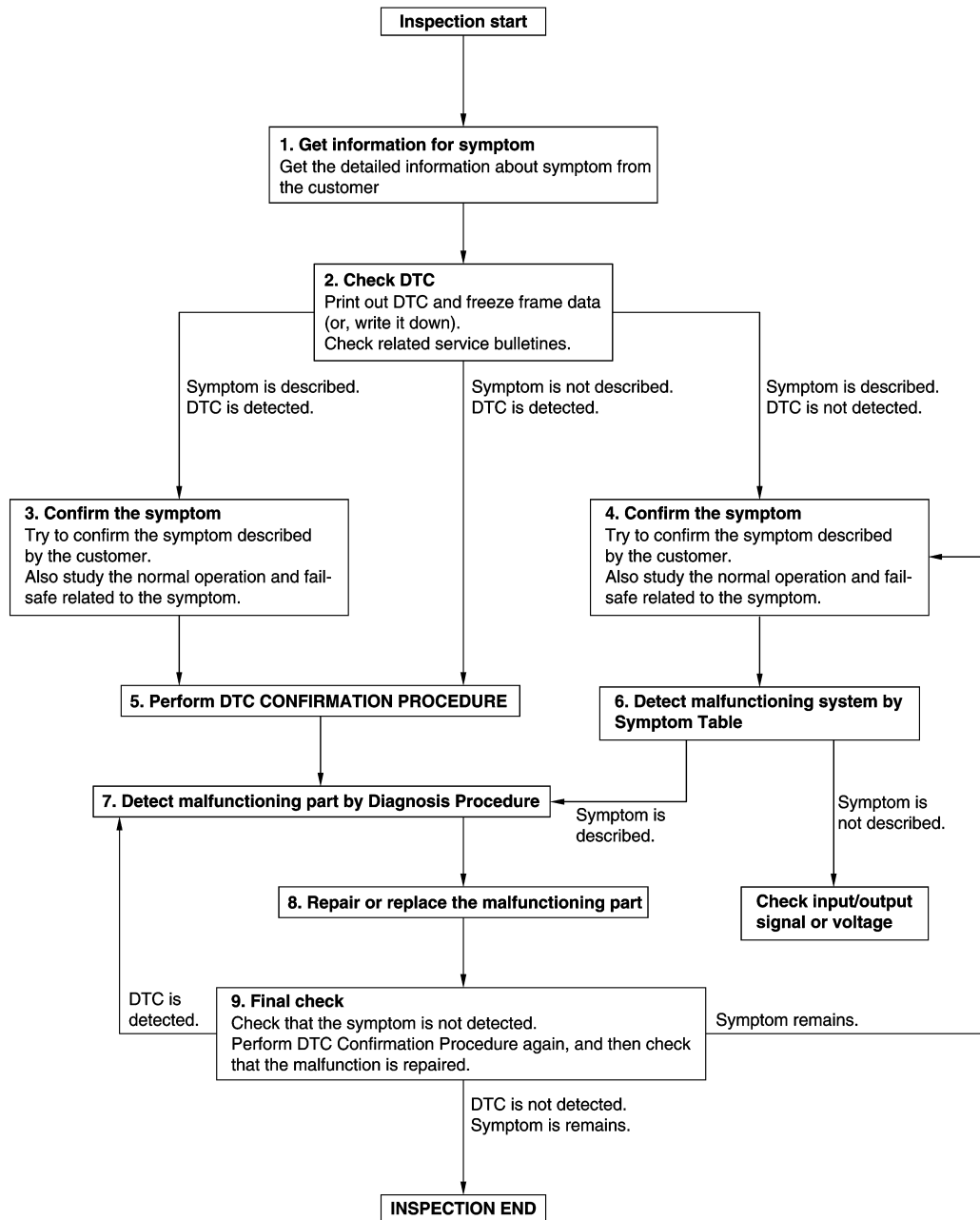
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000006977138

OVERALL SEQUENCE



JSCIA0318GB

DETAILED FLOW

DIAGNOSIS AND REPAIR WORK FLOW

< 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-96, "Diagnostic Work Sheet"](#).)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. Perform the following procedure if DTC is displayed.
 - Record DTC and freeze frame data. (Print them out with CONSULT.)
 - Erase DTC.
 - Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Matrix Chart is useful. Refer to [EVC-303, "Symptom Table"](#).)
3. Check related service bulletins for information.

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-73, "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-303, "Symptom Table"](#) and [EVC-73, "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.

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-76, "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 CONFIRMATION PROCEDURE.

Is DTC detected?

YES >> GO TO 7.

NO >> Check according to [GI-51, "Intermittent Incident"](#).

6.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to [EVC-303, "Symptom Table"](#) based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

Is the symptom described?

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

- YES >> GO TO 7.
 NO >> Monitor input data from related sensors or check voltage of related VCM terminals using CONSULT. Refer to [EVC-60, "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 on-board charger terminals using CONSULT. Refer to [EVC-73, "Fail-Safe"](#).

8. REPAIR OR REPLACE THE MALFUNCTIONING PART

1. Repair or replace the malfunctioning part.
2. 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:000000006977139

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. 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.

KEY POINTS

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

SEF907L

DIAGNOSTIC WORKSHEET

Diagnostic worksheet					
Customer name		License plate No.		Date of first registration	
		Model			
Acceptance Date		VIN		Mileage	km (mile)

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

Question	Group	Information from the customer	
Wall outlet	N	<input type="checkbox"/> Not applicable <input type="checkbox"/> Applicable	
		Location	
		Voltage	V
		Breaker	A
		Other information	
Li-ion battery remaining energy	Q/N/O	<input type="checkbox"/> Not applicable <input type="checkbox"/> Applicable ()	
Shift position/operation	R	<input type="checkbox"/> P <input type="checkbox"/> R <input type="checkbox"/> N <input type="checkbox"/> D <input type="checkbox"/> ECO <input type="checkbox"/> When operating (⇒)	
Weather condition		<input type="checkbox"/> Not applicable <input type="checkbox"/> Applicable	
		Weather	
		Temperature	°C (or °F)
Occurrence frequency	R/Q/N/O	<input type="checkbox"/> All the time <input type="checkbox"/> Once <input type="checkbox"/> Sometimes (times in the past) <input type="checkbox"/> Others ()	
Timing of recovery from malfunction		<input type="checkbox"/> POWER OFF <input type="checkbox"/> Removal of 12V battery terminal <input type="checkbox"/> Shift lever operation <input type="checkbox"/> During driving <input type="checkbox"/> READY <input type="checkbox"/> Others ()	

[MEMO]

ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMINAL

< BASIC INSPECTION >

ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMINAL

Description

INFOID:000000006977140

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

INFOID:000000006977141

1. PERFORM VCM TIMER ADJUSTMENT

Perform VCM timer adjustment. Refer to [AV-82. "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure"](#).

>> END

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ADDITIONAL SERVICE WHEN REPLACING VCM

< BASIC INSPECTION >

ADDITIONAL SERVICE WHEN REPLACING VCM

Description

INFOID:000000006977142

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 [EVC-100, "Work Procedure"](#).

Work Procedure

INFOID:000000006977143

1. SAVE VCM DATA

1. Turn off the power and wait at least 45 seconds.
2. 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 4.

2. REPLACE VCM

1. Turn off the power and wait at least 45 seconds.
2. Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

>> GO TO 3.

3. 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 8.

NO >> GO TO 5.

4. REPLACE VCM

1. Turn off the power and wait at least 45 seconds.
2. Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

>> GO TO 5.

5. LI-ION BATTERY ID REGISTRATION

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

>> GO TO 6.

6. PERFORM VCM KEY ID REGISTRATION

Refer to "CONSULT Operation Manual NATS-IVIS/NVIS".

>> GO TO 7.

7. WRITE VIN DATA

Perform [EVC-105, "Work Procedure"](#).

>> GO TO 8.

ADDITIONAL SERVICE WHEN REPLACING VCM

< BASIC INSPECTION >

8. PERFORM ACCELERATE PEDAL CLOSED POSITION LEARNING

Perform [EVC-102. "Work Procedure"](#).

>> GO TO 9.

9. SET VCM TIMER

Perform [AV-82. "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure"](#).

>> GO TO 10.

10. CHECK DTC

1. Turn off the power and wait at least 20 seconds.
2. Turn power switch ON.
3. Check DTC. If DTC is displayed, erase it.

>> END

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ACCELERATOR PEDAL RELEASED POSITION LEARNING

< BASIC INSPECTION >

ACCELERATOR PEDAL RELEASED POSITION LEARNING

Description

INFOID:000000006977144

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

INFOID:000000006977145

1.START

1. 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:000000006977146

Perform Li-ion Battery Gradual Capacity Loss Data Clear when the Li-ion battery pack assembly 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 pack assembly 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 pack assembly or Li-ion battery controller is not replaced as new one.

Work Procedure

INFOID:000000006977147

1. LI-ION BATTERY GRADUAL CAPACITY LOSS DATA CLEAR

With CONSULT

1. Turn power switch ON.
2. Select "BATTERY GRADUAL CAP LOSS DATA CLEAR" in "WORK SUPPORT" mode with CONSULT.
3. Touch "START" and wait a few seconds.
4. Check 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:000000006977148

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

INFOID:000000006977149

1. LI-ION BATTERY JUNCTION BOX DATA CLEAR

With CONSULT

1. Turn power switch ON.
2. Select "LI-ION BATTERY JUNCTION BOX DATA CLEAR" in "WORK SUPPORT" mode with CONSULT.
3. Touch "START" and wait a few seconds.
4. Check that "COMPLETE" is displayed on CONSULT screen.

>> END

WRITE VEHICLE IDENTIFICATION NUMBER DATA

< BASIC INSPECTION >

WRITE VEHICLE IDENTIFICATION NUMBER DATA

Description

INFOID:000000006977150

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

INFOID:000000006977151

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

 **With CONSULT**

1. Turn power switch ON (not READY).
2. Select "VIN REGISTRATION (MANUAL)" in "WORK SUPPORT" mode.
3. Follow the instructions on the CONSULT display.

>> END

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LOAD BATTERY IDENTIFICATION DATA

< BASIC INSPECTION >

LOAD BATTERY IDENTIFICATION DATA

Description

INFOID:000000006977152

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

- Li-ion battery assembly 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

INFOID:000000006977153

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:000000006977154

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?

YES >> Replace the fuse after repairing the applicable circuit.

NO >> GO TO 2.

2. CHECK VCM GROUND CIRCUIT

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

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace error-detected parts.

3. CHECK BATTERY POWER SUPPLY

Check the voltage between VCM harness connector and ground.

+		-	Voltage
VCM			
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.

POWER SUPPLY AND GROUND CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
VCM			
Connector	Terminal		
E61	6	#43 fuse terminal	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 IGNITION POWER SUPPLY

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

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

Is the inspection result normal?

YES >> INSPECTION END

NO >> GO TO 6.

6.CHECK IGNITION 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.

+		-		Continuity
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 >> Check power supply circuit for battery power supply.

NO >> Repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

INFOID:000000006977155

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:000000006977156

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">Harness or connectors (CAN communication line is open or shorted)

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-109, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977157

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

U1010 CONTROL MODULE (CAN)

< DTC/CIRCUIT DIAGNOSIS >

U1010 CONTROL MODULE (CAN)

DTC Logic

INFOID:000000006977158

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
U1010	CAN COMM CIRCUIT (CAN communication line)	Detecting error during the initial diagnosis of CAN controller of VCM.	Harness or connectors <ul style="list-style-type: none">CAN communication line is open or shorted.EV system CAN communication line is open or shorted.

DTC CONFIRMATION PROCEDURE

1. DTC REPRODUCTION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-110, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977159

1. PERFORM CONFIRMATION PROCEDURE AGAIN

1. Turn power switch ON.
2. Erase self-diagnostic result.
3. Perform DTC confirmation procedure. Refer to [EVC-110, "DTC Logic"](#).
4. Check self-diagnostic result.

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Exploded View"](#).
NO >> INSPECTION END

P0603 VCM

< DTC/CIRCUIT DIAGNOSIS >

P0603 VCM

DTC Logic

INFOID:000000006977160

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

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DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. 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-111, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977161

1. PERFORM CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Turn power switch ON.
3. Perform DTC confirmation procedure again. Refer to [EVC-111, "DTC Logic"](#).
4. Check self-diagnostic result.

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

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P0616 READY SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

P0616 READY SIGNAL

DTC Logic

INFOID:000000006977162

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.	<ul style="list-style-type: none">• Harness or connectors (READY signal circuit is shorted)• BCM• Power switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON.
2. Turn power switch OFF and wait at least 45 seconds.
3. Turn power switch ON.
4. Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-112, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977163

1.CHECK READY SIGNAL VOLTAGE

1. Turn power switch OFF.
2. Disconnect BCM harness connector.
3. Check the voltage between BCM harness connector and ground.

+		-	Voltage
BCM			
Connector	Terminal		
M70	97	Ground	12V battery power supply

Is the inspection result normal?

- YES >> Replace BCM. Refer to [BCS-76, "Removal and Installation"](#).
NO >> GO TO 2.

2.CHECK READY SIGNAL CIRCUIT

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

+		-		Continuity
VCM		BCM		
Connector	Terminal	Connector	Terminal	
E63	90	M70	97	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK VCM POWER SUPPLY

P0616 READY SIGNAL

< DTC/CIRCUIT DIAGNOSIS >

Perform trouble diagnosis for VCM power supply and ground. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> GO TO 4.

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-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

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P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0643 SENSOR POWER SUPPLY

DTC Logic

INFOID:000000006977164

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0643	SENSOR POWER SUPPLY (Sensor reference voltage A circuit high)	<ul style="list-style-type: none">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.	<ul style="list-style-type: none">Harness or connectors (Sensor power supply circuit is shorted.)Accelerator pedal position sensorBattery current sensorRefrigerant pressure sensor

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-114. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977165

1. CHECK SENSOR POWER SUPPLY VOLTAGE

- 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.

+		-	Voltage (Approx.)
Battery current sensor			
Connector	Terminal		
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-107. "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 FOR SHORT

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

P0643 SENSOR POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

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

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EVC

Is the inspection result normal?

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

NO >> Repair or replace error-detected parts.

D

4.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

E

Is the inspection result normal?

YES >> Replace VCM. Refer to [EVC-315, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

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P0A00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0A00 COOLANT TEMPERATURE SENSOR

DTC Logic

INFOID:000000006977166

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A00	COOLANT TEMPERATURE SENSOR (Coolant temperature sensor circuit)	<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> Harness or connectors (The sensor circuit is open or shorted.) Coolant temperature sensor

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-116, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977167

1. CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-I

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

Coolant temperature sensor			Voltage (Approx.)
Connector	+	-	
		Terminal	
E69	1	2	5 V

Is the inspection result normal?

- YES >> GO TO 6.
 NO >> GO TO 2.

2. CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-II

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

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

Is the inspection result normal?

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

3. CHECK COOLANT TEMPERATURE SENSOR GROUND CIRCUIT

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

POA00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

+		-		Continuity
VCM		Coolant temperature sensor		
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.

+		-	Continuity
Coolant temperature sensor			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace error-detected parts.

5.CHECK SENSOR POWER SUPPLY CIRCUIT

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

+		-		Continuity
VCM		Coolant temperature sensor		
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 7.

NO >> Repair or replace error-detected parts.

6.CHECK ENGINE COOLANT TEMPERATURE SENSOR

Refer to [EVC-118, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Replace coolant temperature sensor.

7.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

Is the inspection result normal?

YES >> Replace VCM. Refer to [EVC-315, "Exploded View"](#).

NO >> Repair or replace error-detected parts.

P0A00 COOLANT TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

INFOID:000000006977168

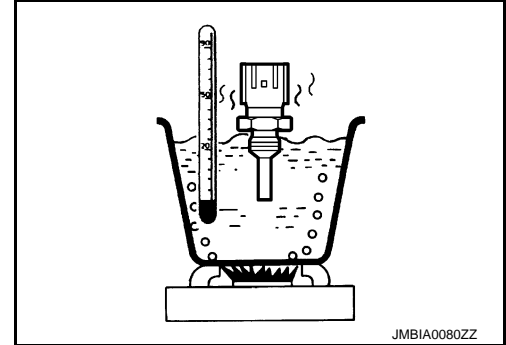
1. CHECK COOLANT TEMPERATURE SENSOR

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
		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.



P0A08 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A08 DC/DC CONVERTER

DTC Logic

INFOID:000000006977169

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.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • DC/DC converter • VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-119, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977170

1.CHECK DC/DC CONVERTER ACTIVATION SIGNAL CIRCUIT

1. 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.

+		-		Continuity
VCM		DC/DC J/B		
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 2.
 NO >> Repair or replace error-detected parts.

2.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace error-detected parts.

3.REPLACE DC/DC JUNCTION BOX

1. Replace DC/DC junction box. Refer to [EVC-307, "Exploded View"](#).
2. Perform DTC confirmation procedure. Refer to [EVC-119, "DTC Logic"](#).

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Exploded View"](#).
 NO >> INSPECTION END

P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

Description

INFOID:000000006977171

The high voltage 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 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 connection detecting circuit becomes broken. VCM detects the connection status of the high voltage harness connectors, according to a voltage applied from this circuit.

DTC Logic

INFOID:000000006977172

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A0B	HV SYSTEM INTERLOCK ERROR (High voltage system interlock circuit performance)	When M/C relay is OFF, VCM detects that high voltage harness connector interlock circuit voltage remains excessively high voltage for 0.5 seconds or more.	<ul style="list-style-type: none">• Harness or connectors• VCM• Quick charge port• DC/DC-J/B

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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-120. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977173

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32. "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.

CAUTION:

Erase DTC after the work is completed.

1. PRECONDITIONING

P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:



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



2. Measure voltage between high voltage harness terminals.

DANGER:



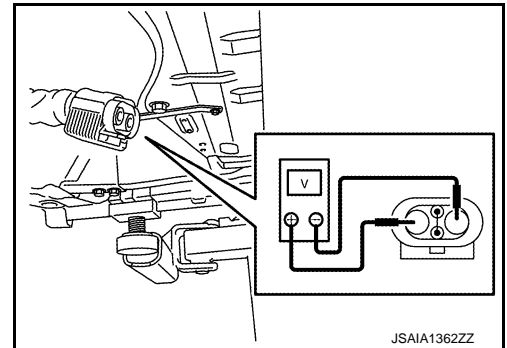
Touching high voltage components without using the appropriate protective equipment will cause electrocution.



Standard : 5 V or less

CAUTION:

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



>> GO TO 2.

2.CHECK HIGH VOLTAGE HARNESS CONNECTOR INTERLOCK DETECTING CIRCUIT POWER SUPPLY-I

1. Connect 12V battery negative terminal.
2. Remove M/C relay.
3. Check the voltage between VCM harness connector and ground.

+		-	Voltage
VCM			
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

YES >> Check M/C relay. Refer to [EVC-281, "Diagnosis Procedure"](#).

NO >> GO TO 3.

3.CHECK HIGH VOLTAGE HARNESS CONNECTOR INTERLOCK DETECTING CIRCUIT POWER SUPPLY-II

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

+		-	Voltage
VCM			
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

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

NO >> GO TO 4.

P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

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

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

+		-	Voltage
VCM			
Connector	Terminal		
E61	23	Ground	0 V

Is the inspection result normal?

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

P0A8D, P0A8E 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0A8D, P0A8E 12V BATTERY POWER SUPPLY

DTC Logic

INFOID:000000006977174

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.	<ul style="list-style-type: none"> • Harness or connectors (The sensor circuit is open or shorted.) • DC/DC J/B
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.	

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> [EVC-123. "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977175

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

1. Turn power switch OFF.
2. Disconnect DC/DC-J/B terminal.
3. Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

+		-	Continuity
DC/DC-J/B			
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 2.
 NO >> Repair or replace error-detected parts.

2.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-307. "Exploded View"](#).
 NO >> Repair or replace error-detected parts.

P0A8F 12V BATTERY POWER SUPPLY

< DTC/CIRCUIT DIAGNOSIS >

P0A8F 12V BATTERY POWER SUPPLY

DTC Logic

INFOID:000000006977176

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 OFF, VCM detects that a voltage of 12V battery power supply remains less than 12 V for 10 seconds.	<ul style="list-style-type: none">• Harness or connectors (The sensor circuit is open or shorted.)• DC/DC-J/B

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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 >> [EVC-124, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977177

NOTE:

DTC may be detected when the following condition lasts for a long time: A range other than P range is selected and the parking brake is OFF with the system main relay in OFF state, resulted from the power switch ON state or fail-safe state.

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

1. Turn power switch OFF.
2. Disconnect DC/DC-J/B terminal.
3. Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

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

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO2.
NO >> Repair or replace error-detected parts.

2. 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-307, "Exploded View"](#).
NO >> Repair or replace error-detected parts.

P0A94 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A94 DC/DC CONVERTER

DTC Logic

INFOID:000000006977178

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
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

NOTE:

DTC "P0A08" is detected along with DTC "P0A94", first diagnose the DTC "P0A08".

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF at least 20 seconds.
2. Set the vehicle to READY and wait at least 10 seconds.
3. Check self-diagnostic result.

Is DTC detected?

- YES >> [EVC-125, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977179

1.DC/DC-J/B OUTPUT POWER CIIRCUIT

1. Turn power switch OFF.
2. Disconnect DC/DC-J/B terminal.
3. Check the continuity between DC/DC-J/B harness terminal and F/L-A terminal.

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

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO2.
NO >> Repair or replace error-detected parts.

2.CHECK VCM POWER SUPPLY AND GROUND CIRCUIT

Check VCM power supply and ground circuit. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

Is the inspection result normal?

- YES >> Replace DC/DC-J/B. Refer to [EVC-307, "Removal and Installation"](#)
NO >> Repair or replace error-detected parts.

P0AA0 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

P0AA0 SYSTEM MAIN RELAY +

DTC Logic

INFOID:000000006977180

DTC DETECTION LOGIC

NOTE:

- Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- If P0AA0 and any of P0AA5, P31D4, P31DB, or P31DD are detected simultaneously, perform diagnosis of P0AA0 and applicable DTC (P0AA5, P31D4, P31DB, or P31DD).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA0	HYBRID BATT POSITIVE CONTACTOR	<ul style="list-style-type: none">• The voltage of an input high voltage signal received from the traction motor inverter remains 240 V or more for 9 seconds or more while starting the EV system.• The voltage of an input high voltage signal received from the traction motor inverter is 190 V or more and the voltage does not decrease to 50 V or less even after waiting for 1 minute or more.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Clear DTC to maintain power switch OFF state for 30 seconds.
2. Turn power switch ON again and wait for 90 seconds.
3. Check self-diagnostic result.

Is "P0AA0" detected?

- YES >> [EVC-126, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977181

1.DTC CHECK

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than "P0AA0"?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [EVB-22, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 3.

3.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 4.

4.PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 5.

5.PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

P0AA0 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform detected DTC diagnosis procedure.

NO >> Check whether "SYSTEM MAIN RLY 1", "SYSTEM MAIN RLY 2" and "PRE CHARGE RLY" become the ON state always.

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P0AA1 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

P0AA1 SYSTEM MAIN RELAY +

DTC Logic

INFOID:000000006977182

DTC DETECTION LOGIC

NOTE:

- Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- If P0AA0 and any of P0AA5, P31D4, P31DB, or P31DD are detected simultaneously, perform diagnosis of P0AA0 and applicable DTC (P0AA5, P31D4, P31DB, or P31DD).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA1	HYBRID BATT POSITIVE CONTACTOR	The voltage of the traction motor inverter is 160 V or more and the voltage does not decrease 100 V or more even after a lapse of the specified time after starting diagnosis.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Check that "SYSTEM MAIN RLY 1" and "PRE CHARGE RLY" in "BATTERY PACK" are in a shutoff state.
2. Clear DTC to maintain power switch OFF state for 60 seconds.
3. Set the vehicle to READY and perform test drive.
4. Turn power switch OFF and wait at least 60 seconds.
5. Check self-diagnostic result.

Is DTC detected?

- YES >> [EVC-128, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977183

1. DTC CHECK

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than "P0AA1"?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [EVB-22, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 5.

5. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

P0AA1 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform detected DTC diagnosis procedure.

NO >> Check that "SYSTEM MAIN RLY 1" in "BATTERY PACK" and "PRE CHARGE RLY" are in a shut-off state.

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P0AA2 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

P0AA2 SYSTEM MAIN RELAY +

DTC Logic

INFOID:000000006977184

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Malfunction type)	DTC detecting condition	Possible cause
P0AA2	HYBRID BATT POSITIVE CONTACTOR	The monitor signal voltage of the system main relay 1 remains HIGH for 2.5 seconds or more.	<ul style="list-style-type: none"> • Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Turn power switch ON and wait a least 10 seconds.
3. Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-130, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977185

1. CHECK HARNESS

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

+		-		Continuity
VCM		Li-ion battery		
Connector	terminal	Connector	terminal	
E63	107	B24	17	Existed

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair harness or connector.

2. CHECK SYSTEM MAIN RLY CIRCUIT

Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		
16	17	Existed

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace error-detected parts.

3. CHECK SYSTEM MAIN RLY GROUND CIRCUIT

Check continuity between Li-ion battery harness connector and ground.

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

P0AA2 SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

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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P0AA4 SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

P0AA4 SYSTEM MAIN RELAY -

DTC Logic

INFOID:000000006977186

DTC DETECTION LOGIC

NOTE:

- Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- If P0AA0 and any of P0AA5, P31D4, P31DB, or P31DD are detected simultaneously, perform diagnosis of P0AA0 and applicable DTC (P0AA5, P31D4, P31DB, or P31DD).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA4	HYBRID BATT POSITIVE CONTACTOR	<ul style="list-style-type: none">• During the stop state from READY or charging state, the voltage of the traction motor inverter is 100 V or more.• The voltage of the traction motor inverter is 100 V or more when only the pre-charge relay is ON.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Clear DTC to maintain power switch OFF state for 60 seconds.
2. Set the vehicle to READY.
3. Turn power switch OFF and wait at least 60 seconds.
4. Check self-diagnostic result.

Is DTC detected?

- YES >> [EVC-132. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977187

1. DTC CHECK

Perform self-diagnosis of VCM. Refer to [EVC-51. "CONSULT Function"](#).

Is DTC detected other than "P0AA4"?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [EVB-22. "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26. "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17. "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 5.

5. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30. "CONSULT Function"](#).

P0AA4 SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

Is DTC detected?

YES >> Perform detected DTC diagnosis procedure.

NO >> Check whether "SYSTEM MAIN RLY 2" become the ON state always.

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P0AA5 SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

P0AA5 SYSTEM MAIN RELAY -

DTC Logic

INFOID:000000006977188

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Malfunction type)	DTC detecting condition	Possible cause
P0AA5	HYBRID BATT NEGATIVE CONTACTOR	<ul style="list-style-type: none"> The monitor signal voltage remains HIGH for 2.5 seconds or more with the system main relay 2 in OFF state. The voltage of a monitor signal remains HIGH for 2.5 seconds or more when the F/S relay is ON. 	<ul style="list-style-type: none"> Harness or connectors Li-ion battery J/B VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch OFF wait at least 60 seconds.
- Turn power switch ON wait at least 10 seconds.
- Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-134, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977189

1. CHECK HARNESS

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

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

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair harness or connector.

2. CHECK SYSTEM MAIN RLY CIRCUIT

Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		
13	14	Existed

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace error-detected parts.

3. CHECK SYSTEM MAIN RLY GROUND CIRCUIT

Check continuity between Li-ion battery harness connector and ground.

P0AA5 SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

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

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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P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

< DTC/CIRCUIT DIAGNOSIS >

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

Description

INFOID:000000006977190

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

INFOID:000000006977191

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA6	HYBRID BATT VOLT SYS ISOLATION (High voltage circuit insulation is low)	VCM detects a insulation resistance calculated based on IR sensor signal sent from Li-ion battery is 380 kW or less.	<ul style="list-style-type: none">• 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. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Set the vehicle to READY and wait at least 80 seconds.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-136, "Diagnosis Procedure"](#).
NO >> INSPECTION END.

Diagnosis Procedure

INFOID:000000006977192

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

1. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-136, "Removal and Installation"](#).

DANGER:

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

< DTC/CIRCUIT DIAGNOSIS >

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



2. Measure voltage between high voltage harness terminals.

DANGER:

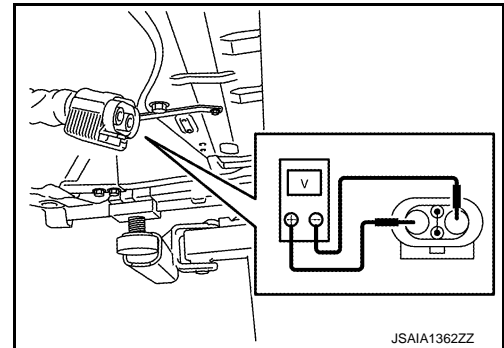
 Touching high voltage components without using the appropriate protective equipment will cause electrocution.



Standard : 5 V or less

CAUTION:

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



>> GO TO 2

2. CHECK HIGH VOLTAGE PART

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

Is the inspection result normal?

YES >> GO TO 3

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

3. IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION

 With CONSULT

Identify the mode used when "P0AA6" is detected.

At which mode is "P0AA6" detected?

Normal charge mode >> GO TO 4

Other than normal charge mode >> GO TO 7

4. CHECK SELF-DIAGNOSIS RESULT-I

 With CONSULT


Check if "P0AA6" is detected only during normal charge.

Is "P0AA6" detected only during normal charge?

YES >> GO TO 5

NO >> GO TO 7

5. CHECK SELF-DIAGNOSIS RESULT-II

 With CONSULT

1. Erase DTC.
2. Wait for 50 seconds after starting normal charge (charge indicator lamp ON).
3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

YES >> GO TO 6

NO >> GO TO 7

6. CHECK INSULATION RESISTANCE OF ON BOARD CHARGER

Check insulation resistance of on board charger. Refer to [VC-88, "Component Insulation Check"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Replace on board charger. Refer to [VC-98, "Removal and Installation"](#).

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

< DTC/CIRCUIT DIAGNOSIS >

7. CHECK SELF-DIAGNOSIS RESULT-III

Ⓟ With CONSULT

1. Erase DTC.
2. Wait for 75 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C switch	OFF

3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> GO TO 8
NO >> GO TO 13

8. CHECK SELF-DIAGNOSIS RESULT-IV

1. Turn power switch OFF.
2. Turn power switch ON and wait at least 35 seconds.
3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> Replace Li-ion battery. Refer to [EVB-136, "Removal and Installation"](#).
NO >> GO TO 9

9. CHECK INSULATION RESISTANCE OF LI-ION BATTERY HIGH VOLTAGE HARNESS (DC/DC J/B SIDE)

Check insulation resistance of Li-ion battery high voltage harness (DC/DC J/B side).

Li-ion battery high voltage harness (DC/DC J/B side)		Ground	Resistance
H3	23		1.8MΩ or more
	24		

Is the inspection result normal?

- YES >> Replace Li-ion battery. Refer to [EVB-136, "Removal and Installation"](#).
NO >> GO TO 10.

10. CHECK INSULATION RESISTANCE OF ELECTRIC COMPRESSOR

Check insulation resistance of electric compressor. Refer to [HAC-125, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 11.
NO >> Replace electric compressor. Refer to [HA-44, "Removal and Installation"](#).

11. CHECK INSULATION RESISTANCE OF PTC ELEMENTS HEATER

Check insulation resistance of PTC elements heater. Refer to [HAC-127, "Component Inspection"](#).

Is the inspection result normal?

- YES >> GO TO 12.
NO >> Replace PTC elements heater. Refer to [HA-66, "Removal and Installation"](#).

12. CHECK INSULATION RESISTANCE OF TRACTION MOTOR INVERTER

Check insulation resistance of traction motor inverter. Refer to [TMS-112, "Component Inspection"](#).

Is the inspection result normal?

- YES >> Replace DC/DC-J/B. Refer to [EVC-307, "Removal and Installation"](#).
NO >> Replace traction motor inverter. Refer to [TMS-115, "Removal and Installation"](#).

13. CHECK SELF-DIAGNOSIS RESULT-V

Ⓟ With CONSULT

1. Erase DTC.
2. Wait for 75 seconds with the following conditions satisfied:

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

< DTC/CIRCUIT DIAGNOSIS >

Power switch	ON
Selector lever	P range
A/C temperature setting	Full cold

3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> GO TO 14.
- NO >> GO TO 18.

14.CHECK SELF-DIAGNOSIS RESULT-VI

Ⓜ With CONSULT

1. Erase DTC.
2. Wait for 70 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C switch	OFF

3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).
- NO >> GO TO 15.

15.CHECK SELF-DIAGNOSIS RESULT-VII

Ⓜ With CONSULT

1. Erase DTC.
2. Wait for 75 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C temperature setting	Full cold

3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> GO TO 16.
- NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

16.CHANGE REFRIGERENT

Change refrigerant gas and compressor oil.

>> GO TO 17.

17.CHECK SELF-DIAGNOSIS RESULT-VIII

Ⓜ With CONSULT

1. Wait for 70 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C temperature setting	Full cold

2. Check if "P0AA6" is detected.

Is "P0AA6" detected?

- YES >> Replace electric compressor. Refer to [HA-44, "Removal and Installation"](#).
- NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

< DTC/CIRCUIT DIAGNOSIS >

18. CHECK SELF-DIAGNOSIS RESULT-IX

Ⓟ With CONSULT

1. Wait for 75 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C temperature setting	Full hot

2. Check if "P0AA6" is detected.

Is "P0AA6" detected?

YES >> GO TO 19.

NO >> GO TO 20.

19. CHECK SELF-DIAGNOSIS RESULT-X

Ⓟ With CONSULT

1. Erase DTC.
2. Wait for 75 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C switch	OFF

3. Check if "P0AA6" is detected.

Is "P0AA6" detected?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> GO TO 22/

20. PERFORM DRIVING TEST

1. Continue driving for 35 seconds or more at 11 km/h (7 MPH).
2. Check if "P0AA6" is detected.

Is "P0AA6" detected?

YES >> GO TO 21.

NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

21. CHECK INSULATION RESISTANCE OF TRACTION MOTOR

Check insulation resistance of traction motor. Refer to [TMS-110, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Replace the traction motor. Refer to [TMS-123, "Removal and Installation"](#).

22. CHECK SELF-DIAGNOSIS RESULT-13

Ⓟ With CONSULT

1. Wait for 70 seconds with the following conditions satisfied:

Power switch	ON
Selector lever	P range
A/C temperature setting	Full hot

2. Check if "P0AA6" is detected.

Is "P0AA6" detected?

YES >> Replace PTC elements heater. Refer to [HA-66, "Removal and Installation"](#).

NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

P1550, P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1550, P1551, P1552 BATTERY CURRENT SENSOR

DTC Logic

INFOID:000000006977193

DTC DETECTION LOGIC

NOTE:

If DTC P1550 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EVC-114, "DTC Logic"](#).

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1550	BATTERY CURRENT SENSOR (Battery current sensor circuit range/performance)	The output voltage of the battery current sensor remains within the specified range during READY or charging.	<ul style="list-style-type: none">• Harness or connectors (Battery current sensor circuit is open or shorted.)• Battery current sensor
P1551	BATTERY CURRENT SENSOR (Battery current sensor circuit low input)	An excessively low voltage from the sensor is sent to VCM.	
P1552	BATTERY CURRENT SENSOR (Battery current sensor circuit high input)	An excessively high voltage from the sensor is sent to VCM.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE-I

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

Is DTC detected?

- YES >> GO TO 2.
NO >> INSPECTION END

2. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Turn power switch OFF and wait at least 20 seconds.
2. Set the vehicle to READY and wait under following condition at least 60 seconds.

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?

- YES >> Proceed to [EVC-141, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977194

1. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-I

1. Turn power switch OFF.
2. Disconnect battery current sensor harness connector.
3. Turn power switch ON.
4. Check the voltage between battery current sensor harness connector terminals.

P1550, P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E66	1	3	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.

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

Is the inspection result normal?

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

3.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
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 VCM GROUND CIRCUIT

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

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

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

P1550, P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between VCM harness connector and battery current sensor harness connector.

-		+		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	1	E62	41	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 SENSOR POWER SUPPLY CIRCUIT

Check harness connector 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.
 NO >> Repair or replace error-detected parts.

7.CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	4	E62	42	Existed

4. 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-143, "Component Inspection"](#).

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).
 NO >> Replace battery battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

Component Inspection

INFOID:000000006977195

1.CHECK BATTERY CURRENT SENSOR

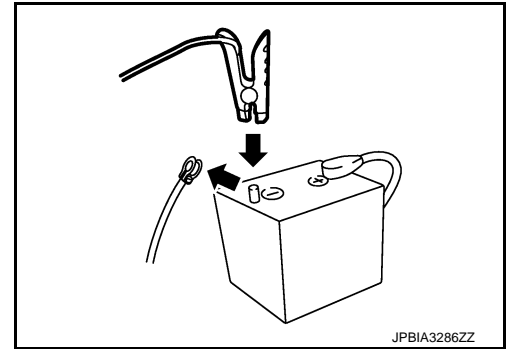
1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.

P1550, P1551, P1552 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

4. Install jumper cable between battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between VCM harness connector terminals.

VCM			Voltage (Approx.)
Connector	+	-	
	Terminal		
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-99, "How to Handle 12V Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1554 BATTERY CURRENT SENSOR

DTC Logic

INFOID:000000006977196

DTC DETECTION LOGIC

NOTE:

If DTC P1554 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EVC-114, "DTC Logic"](#).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1554	BATTERY CURRENT SENSOR (Battery current sensor performance)	The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough.	<ul style="list-style-type: none">• Harness or connectors (Battery current sensor circuit is open or shorted.)• Battery current sensor

DTC CONFIRMATION PROCEDURE

1. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to [EVC-145, "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-145, "Diagnosis Procedure"](#).

Component Function Check

INFOID:000000006977197

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

1. Turn power switch ON.
2. Check the voltage between VCM harness connector terminals.

Connector	VCM		Voltage
	+	-	
	Terminal	Terminal	
E62	42 (Battery current sensor signal)	43	Above 2.3 V at least once

Is the inspection result normal?

YES >> INSPECTION END

NO >> Proceed to [EVC-145, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006977198

1. CHECK BATTERY CURRENT SENSOR POWER SUPPLY-I

1. Turn power switch OFF.
2. Disconnect battery current sensor harness connector.
3. Turn power switch ON.

P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

4. Check the voltage between battery current sensor harness connector terminals.

Battery current sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
E66	1	3	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.

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

Is the inspection result normal?

YES >> GO TO 3.

NO >> GO TO 5.

3. CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
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 VCM GROUND CIRCUIT

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

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51. "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

5. CHECK BATTERY CURRENT SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between VCM harness connector and battery current sensor harness connector.

-		+		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	1	E62	41	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 SENSOR POWER SUPPLY CIRCUIT

Check harness connector 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.

NO >> Repair or replace error-detected parts.

7. CHECK BATTERY CURRENT SENSOR INPUT SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	4	E62	42	Existed

4. 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-147. "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51. "Intermittent Incident"](#).

NO >> Replace battery battery current sensor. Refer to [PG-106. "Removal and Installation"](#).

Component Inspection

INFOID:000000006977199

1. CHECK BATTERY CURRENT SENSOR

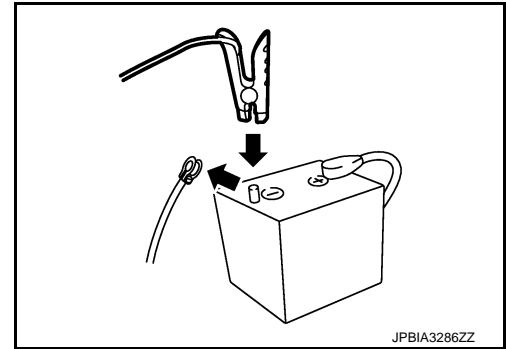
1. Turn ignition switch OFF.
2. Reconnect harness connectors disconnected.
3. Disconnect battery negative cable.

P1554 BATTERY CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

4. Install jumper cable between battery negative terminal and body ground.
5. Turn ignition switch ON.
6. Check the voltage between VCM harness connector terminals.

VCM			Voltage (Approx.)
Connector	+	-	
Terminal			
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-99, "How to Handle 12V Battery"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

P1556, P1557 BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1556, P1557 BATTERY TEMPERATURE SENSOR

DTC Logic

INFOID:000000006977200

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-114, "DTC Logic"](#).

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1556	BATTERY TEMPERATURE SENSOR (Battery temperature sensor circuit low input)	Signal voltage from Battery temperature sensor remains 0.16V or less for 5 seconds or more.	<ul style="list-style-type: none"> Harness or connectors [Battery current sensor (Battery temperature sensor) circuit is shorted.] Battery current sensor (Battery temperature sensor)
P1557	BATTERY TEMPERATURE SENSOR (Battery temperature sensor circuit high input)	Signal voltage from Battery temperature sensor remains 4.84V or more for 5 seconds or more.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-149, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977201

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.

+		-	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

- Turn ignition switch OFF.
- Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
E66	2	E62	50	Existed

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

P1556, P1557 BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
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-150, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Replace battery battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

Component Inspection

INFOID:000000006977202

1. CHECK BATTERY TEMPERATURE SENSOR

1. Turn power switch OFF.
2. Disconnect battery current sensor.
3. 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 battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

P155A BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P155A BATTERY TEMPERATURE SENSOR

DTC Logic

INFOID:000000006977203

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-114, "DTC Logic"](#).

DTC No.	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1556	BATTERY TEMPERATURE SENSOR (Battery temperature sensor circuit low input)	Signal voltage from Battery temperature sensor remains 0.16V or less for 5 seconds or more.	<ul style="list-style-type: none"> Harness or connectors [Battery current sensor (Battery temperature sensor) circuit is shorted.] Battery current sensor (Battery temperature sensor)
P1557	BATTERY TEMPERATURE SENSOR (Battery temperature sensor circuit high input)	Signal voltage from Battery temperature sensor remains 4.84V or more for 5 seconds or more.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-151, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977204

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.

+		-	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

- Turn ignition switch OFF.
- Disconnect VCM harness connector.
- Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Connector	Terminal	Connector	Terminal	
E66	2	E62	50	Existed

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

P155A BATTERY TEMPERATURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit.

NO >> Repair or replace error-detected parts.

3. CHECK BATTERY TEMPERATURE SENSOR GROUND CIRCUIT

1. Turn ignition switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		-		Continuity
Battery current sensor		VCM		
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-152, "Component Inspection"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Replace battery battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

Component Inspection

INFOID:000000006977205

1. CHECK BATTERY TEMPERATURE SENSOR

1. Turn power switch OFF.
2. Disconnect battery current sensor.
3. 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 battery current sensor. Refer to [PG-106, "Removal and Installation"](#).

P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1564 ASCD STEERING SWITCH

DTC Logic

INFOID:000000006977206

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1564	ASCD SWITCH (ASCD steering switch)	<ul style="list-style-type: none">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.	<ul style="list-style-type: none">Harness or connectors (The switch circuit is open or shorted.)ASCD steering switchVCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power ON and wait at least 10 seconds.
- Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
- Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
- 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-153. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977207

1. CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT

- Turn power switch ON.
- Select "ASCD CANCEL SW", "RESUME/ACC SW" and "ASCD SET SW" in "DATA MONITOR" mode with consult.
- Check each item indication under the following conditions.

Monitor item	Condition	Indication	
CANCEL SW	CANCEL switch	Pressed	ON
		Released	OFF
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	ON
		Released	OFF
SET SW	SET/COAST switch	Pressed	ON
		Released	OFF

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 2.

2. CHECK ASCD STEERING SWITCH GROUND CIRCUIT FOR OPEN AND SHORT

- Turn ignition switch OFF.
- Disconnect VCM harness connector.
- Disconnect combination switch harness connector.
- Check the continuity between combination switch and VCM harness connector.

P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

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 4.

NO >> GO TO 3.

3. DETECT MALFUNCTIONING PART

Check the following.

- Combination switch (spiral cable)
- Harness for open and short between VCM and combination switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

4. CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

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 6.

NO >> GO TO 5.

5. DETECT MALFUNCTIONING PART

Check the following.

- Combination switch (spiral cable)
- Harness for open and short between VCM and combination switch

>> Repair open circuit, short to ground or short to power in harness or connectors.

6. CHECK ASCD STEERING SWITCH

Refer to [EVC-154, "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-11, "Exploded View"](#).

Component Inspection (ASCD STEERING SWITCH)

INFOID:000000006977208

1. CHECK ASCD STEERING SWITCH-I

1. Turn ignition switch OFF.
2. Disconnect combination switch (spiral cable) harness connector.
3. Check the continuity between combination switch harness connector terminals under the following condition.

P1564 ASCD STEERING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Combination switch		Condition	Continuity
Connector	Terminals		
M303	35 and 36	Speed limiter MAIN switch	Pressed Existed
			Released Not existed
	35 and 37	ASCD MAIN switch	Pressed Existed
			Released Not existed

Is the inspection result normal?

YES >> GO TO 2.

NO >> Replace ASCD steering switch. Refer to [SR-11, "Exploded View"](#).

2.CHECK ASCD STEERING SWITCH-II

Check resistance between combination switch (spiral cable) harness connector terminals under the following conditions.

Combination switch		Condition	Resistance (Ω)
Connector	Terminals		
M302	13 and 16	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-11, "Exploded View"](#).

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1572 ASCD BRAKE SWITCH

DTC Logic

INFOID:000000006977209

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition		Possible cause
P1572	ASCD BRAKE SWITCH (ASCD brake switch)	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.	<ul style="list-style-type: none"> • 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 • Incorrect ASCD brake switch installation • VCM
		B)	ASCD brake switch signal is not sent to VCM for extremely long time while the vehicle is being driven.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE-I

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. Turn power switch ON (ESP switch OFF).
2. Select "VEHICLE SPEED" and "GEAR POSITION" in "DATA MONITOR" mode.
3. Press MAIN switch and check that CRUISE lamp illuminates.
4. 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-157, "Diagnosis Procedure"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-II

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.

VHCL SPEED SE	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?

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Proceed to [EVC-157, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977210

1. CHECK OVERALL FUNCTION-I

With CONSULT

1. Turn power switch ON.
2. Select "ASCDC BRAKE SW" in "DATA MONITOR" mode with CONSULT.
3. Check "ASCDC BRAKE SW" indication under the following conditions.

Monitor item	Condition		Indication
ASCDC BRAKE SW	Brake pedal	Slightly depressed	OFF
		Fully released	ON

Is the inspection result normal?

- YES >> GO TO 7.
NO >> GO TO 2.

2. CHECK ASCDC BRAKE SWITCH POWER SUPPLY

1. Turn power switch OFF.
2. Disconnect ASCDC brake switch harness connector.
3. Turn power switch ON.
4. Check the voltage between ASCDC brake switch harness connector and ground.

+		-	Voltage
ASCDC brake switch			
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

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

3. CHECK ASCDC BRAKE SWITCH POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Pull out #3 fuse.
3. Check the continuity between ASCDC brake switch harness connector and fuse terminal.

+		-	Continuity
ASCDC brake switch			
Connector	Terminal		
E112	1	#3 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> Check power supply circuit for ignition power supply.
NO >> Repair or replace error-detected parts.

4. CHECK ASCDC BRAKE SWITCH SIGNAL

1. Turn power switch OFF.
2. Reconnect ASCDC brake switch harness connector.
3. Disconnect VCM harness connector.
4. Turn power switch ON.

NOTE:

Brake pedal is fully released.

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

5. Check the voltage between VCM harness connector and ground.

+		-	Voltage
VCM			
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.

5.CHECK ASCD BRAKE SWITCH INPUT SIGNAL CIRCUIT FOR OPEN AND SHORT

1. Turn ignition switch OFF.
2. Disconnect ASCD brake switch harness connector.
3. Check the continuity between ASCD brake switch harness connector and VCM harness connector.

+		-		Continuity
ASCD brake switch		VCM		
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-160, "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-211, "Exploded View"](#).

7.CHECK OVERALL FUNCTION-II

With CONSULT-III

Select "STOP LAMP SW 1" and check indication under the following conditions.

Monitor item	Condition		Indication
STOP LAMP SW 1	Brake pedal	Slightly depressed	ON
		Fully released	OFF

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> GO TO 8.

8.CHECK STOP LAMP SWITCH POWER SUPPLY

1. Turn power switch OFF.
2. Disconnect stop lamp switch harness connector.
3. Check the voltage between stop lamp switch harness connector and ground.

+		-	Voltage
Stop lamp switch			
Connector	Terminal		
E102	1	Ground	Battery voltage

Is the inspection result normal?

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 10.
NO >> GO TO 9.

9.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Pull out #38 fuse.
2. Check the continuity between stop lamp switch harness connector and fuse terminal.

+		-	Continuity
Stop lamp switch			
Connector	Terminal		
E102	1	#38 fuse terminal	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.

+		-	Voltage
VCM			
Connector	Terminal		
E61	8	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 FOR OPEN AND SHORT

1. Disconnect stop lamp switch harness connector.
2. Check the continuity between stop lamp switch harness connector and VCM harness connector.

+		-		Continuity
Stop lamp switch		VCM		
Connector	Terminal	Connector	Terminal	
E112	2	E61	8	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.

12.CHECK STOP LAMP SWITCH

Refer to [EVC-160, "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 [BR-211, "Exploded View"](#).

P1572 ASCD BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection (ASCD Brake Switch)

INFOID:00000000697211

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
1 and 2	Brake pedal	Fully released	Existed
		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-212, "Inspection and Adjustment"](#).
2. Check the continuity between ASCD brake switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Existed
		Slightly de-pressed	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace ASCD brake switch. Refer to [BR-211, "Exploded View"](#).

Component Inspection (Stop Lamp Switch)

INFOID:00000000697212

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
		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-212, "Inspection and Adjustment"](#).
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace stop lamp switch. Refer to [BR-211, "Exploded View"](#).

P1574 ASCD VEHICLE SPEED SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:000000006977213

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-46, "AUTOMATIC SPEED CONTROL DEVICE \(ASCD\) : System Description"](#) for ASCD functions.

DTC Logic

INFOID:000000006977214

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1574	ASCD VEHICLE SPEED SENSOR (ASCD vehicle speed sensor)	The difference between the two vehicle speed signals is out of the specified range.	<ul style="list-style-type: none">Electrically-driven intelligent brake unitTraction motorVCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Set the vehicle to READY.
- Push the ESP OFF switch to stop the ESP control.
- Drive the vehicle at more than 40 km/h (25 MPH).

CAUTION:

Always drive vehicle at a safe speed.

- Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-161, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977215

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-35, "DTC Index"](#).

2. CHECK DTC IN ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT

Check DTC in electrically-driven intelligent brake unit.

Is the inspection result normal?

- YES >> GO TO 3.
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?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Repair or replace error-detected parts.

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P1805 BRAKE SWITCH

DTC Logic

INFOID:0000000069772.16

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.	<ul style="list-style-type: none">• 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-162. "Component Function Check"](#).

Component Function Check

INFOID:0000000069772.17

1.CHECK BRAKE SWITCH FUNCTION

With CONSULT

1. Turn power switch ON.
2. Select "STOP LAMP SW 1" in "DATA MONITOR" mode with CONSULT.
3. Check "STOP LAMP SW 1" indication under the following conditions.

Monitor item	Condition	Indication	
STOP LAMP SW 1	Brake pedal	Slightly depressed	ON
		Fully released	OFF

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Proceed to [EVC-162. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:0000000069772.18

1.CHECK STOP LAMP SWITCH OPERATION

1. Turn power switch OFF.
2. 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

1. Disconnect stop lamp switch harness connector.
2. Check the voltage between stop lamp switch harness connector and ground.

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Stop lamp switch			
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.

+		-	Continuity
Stop lamp switch			
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 battery power supply.

NO >> Repair or replace error-detected parts.

4.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to [EVC-163. "Component Inspection \(Stop Lamp Switch\)".](#)

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace stop lamp switch. Refer to [BR-211. "Exploded View".](#)

5.CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

1. Disconnect stop lamp switch harness connector.
2. Disconnect VCM harness connector.
3. Check the continuity between stop lamp switch harness connector and VCM harness connector.

+		-		Continuity
Stop lamp switch		VCM		
Connector	Terminal	Connector	Terminal	
E102	2	E61	8	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:000000006977219

1.CHECK STOP LAMP SWITCH

1. Adjust stop lamp switch installation. Refer to [BR-212. "Inspection and Adjustment".](#)
2. Turn power switch OFF.
3. Disconnect stop lamp switch harness connector.
4. Check the continuity between stop lamp switch terminals under the following conditions.

P1805 BRAKE SWITCH

< DTC/CIRCUIT DIAGNOSIS >

Terminals	Condition		Continuity
1 and 2	Brake pedal	Fully released	Not existed
		Slightly depressed	Existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace stop lamp switch. Refer to [BR-211, "Exploded View"](#).

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P2122, P2123 APP SENSOR

DTC Logic

INFOID:000000006977220

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-114, "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.	<ul style="list-style-type: none"> Harness or connectors (APP sensor 1 circuit is open or shorted.) Accelerator pedal position sensor 1
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.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON for 1 second.
- Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-165, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977221

1. CHECK APP SENSOR 1 POWER SUPPLY-I

- Turn power switch OFF.
- Disconnect accelerator pedal position (APP) sensor harness connector.
- Turn power switch ON.
- Check the voltage between APP sensor harness connector terminals.

APP sensor			Voltage (Approx.)
Connector	+	-	
	Terminal		
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.

+		-	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E101	4	Ground	5 V

Is the inspection result normal?

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

3. CHECK APP SENSOR POWER SUPPLY CIRCUIT

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between APP sensor harness connector and VCM harness connector.

+		-		Continuity
APP sensor		VCM		
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?

YES >> Check power supply circuit for SSOFF relay power supply. Refer to [EVC-287, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK APP SENSOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between APP sensor harness connector and VCM harness connector.

+		-		Continuity
APP sensor		VCM		
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.

5.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	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.

+		-		Continuity
APP sensor		VCM		
Connector	Terminal	Connector	Terminal	
E101	3	E62	38	Existed

P2122, P2123 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

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-167, "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)

INFOID:000000006977222

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.

Connector	VCM		Condition	Voltage (V)
	+	-		
	Terminal	Terminal		
E62	38 (APP sensor 1)	141	Fully released	0.45 - 1.0
			Fully depressed	4.4 - 4.8
	46 (APP sensor 2)		Fully released	0.22 - 0.5
			Fully depressed	2.1 - 2.5

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

INFOID:000000006977223

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
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.	<ul style="list-style-type: none"> • Harness or connectors (Accelerator pedal position sensor 2 circuit is shorted.) • Accelerator pedal position sensor 2
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.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON for 1 second.
2. Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-168, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977224

1. CHECK APP SENSOR 2 POWER SUPPLY-I

1. 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.

APP sensor			Voltage (Approx.)
Connector	+	-	
		Terminal	
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.

+		-	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E101	5	Ground	5 V

Is the inspection result normal?

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

3. CHECK APP SENSOR POWER SUPPLY 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 >

+		-		Continuity
APP sensor		VCM		
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 power supply. Refer to [EVC-287. "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4.CHECK APP SENSOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between APP sensor harness connector and VCM harness connector.

+		-		Continuity
APP sensor		VCM		
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.

5.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	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.

+		-		Continuity
APP sensor		VCM		
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.

P2127, P2128 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

7. CHECK APP SENSOR

Refer to [EVC-170, "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)

INFOID:000000006977225

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.

Connector	VCM		Condition	Voltage (V)
	+	-		
	Terminal	Terminal		
E62	38 (APP sensor 1)	141	Fully released	0.45 - 1.0
			Fully depressed	4.4 - 4.8
	46 (APP sensor 2)		Fully released	0.22 - 0.5
			Fully depressed	2.1 - 2.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal. Refer to [ACC-4, "Removal and Installation"](#).

P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P2138 APP SENSOR

DTC Logic

INFOID:00000000697226

DTC DETECTION LOGIC

NOTE:

If DTC P2138 is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EVC-114, "DTC Logic"](#).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2138	APP SENSOR (Accelerator pedal position sensor circuit range/performance)	VCM detects abnormal signal of APP sensor 1 and APP sensor 2 at a time.	<ul style="list-style-type: none"> Harness or connectors (APP sensor 1 or 2 circuit is open or shorted.) APP sensor

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON for 1 second.
- Check self-diagnostic result.

Is DTC detected?

- YES >> Proceed to [EVC-171, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:00000000697227

1. CHECK VCM GROUND CIRCUIT

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

+		-	Continuity
VCM			
Connector	Terminal	Ground	Existed
E61	4		
	8		
E63	111		
	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

- Disconnect APP sensor harness connector.
- Check the continuity between APP sensor harness connector terminals

Connector	APP sensor		Continuity
	+	-	
	Terminal		
E101	3	6	Existed

- Also check harness for short to ground and snort to power.

Is the inspection result normal?

- YES >> GO TO 3.

P2138 APP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

3.CHECK APP SENSOR

Refer to [EVC-172. "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)

INFOID:000000006977228

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.

Connector	VCM		Condition	Voltage (V)
	+	-		
	Terminal	Terminal		
E62	38 (APP sensor 1)	141	Fully released	0.45 - 1.0
			Fully depressed	4.4 - 4.8
	46 (APP sensor 2)		Fully released	0.22 - 0.5
			Fully depressed	2.1 - 2.5

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace accelerator pedal. Refer to [ACC-4. "Removal and Installation".](#)

P3100 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3100 EV SYSTEM CAN COMMUNICATION

Description

INFOID:000000006977229

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:000000006977230

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3100	COMMUNICATION ERROR	VCM cannot receive CAN communication signal from LBC and traction motor inverter for 5 seconds or more when VCM starts-up.	<ul style="list-style-type: none">• Harness or connectors• LBC• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 1 minutes.
2. Turn power switch ON and wait at least 20 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-173. "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect EVSE and wait at least 20 seconds.
4. Check DTC.

Is DTC detected?

- YES >> [EVC-173. "Diagnosis Procedure"](#).
NO (without quick charge)>>INSPECTION END
NO (with quick charge) >>GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 20 seconds.
5. Check DTC.

Is DTC detected?

- YES >> [EVC-173. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977231

1. DTC CHECK

Perform self-diagnosis of VCM. Refer to [EVC-51. "CONSULT Function"](#).

Is "P3191" or "P3193" detected?

- YES >>
 - Perform P3191 diagnosis procedure. Refer to [EVC-215. "Diagnosis Procedure"](#).
 - Perform P3193 diagnosis procedure. Refer to [EVC-216. "Diagnosis Procedure"](#).

P3100 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK POWER SUPPLY OF VCM

Check power supply of VCM. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

P3101 VCM

< DTC/CIRCUIT DIAGNOSIS >

P3101 VCM

DTC Logic

INFOID:000000006977232

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. PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-175, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977233

1. PERFORM CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Turn power switch ON.
3. Perform DTC confirmation procedure again. Refer to [EVC-175, "DTC Logic"](#).
4. Check self-diagnostic result.

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

P3102 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P3102 LI-ION BATTERY

Description

INFOID:000000006977234

Li-ion Battery ID Registration must be performed if the Li-ion battery controller or VCM is replaced.

DTC Logic

INFOID:000000006977235

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
B3102	INVALID BATTERY	Detects invalid Li-ion battery ID.	<ul style="list-style-type: none">• Improper replacement of Li-ion battery or Li-ion battery controller.• Li-ion battery• Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 5 seconds.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-176, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977236

1. CHECK SELF-DIAGNOSTIC RESULT OF LI-ION BATTERY CONTROLLER

With CONSULT

1. Turn power switch ON.
2. Check self-diagnostic result of the "HV BAT".

Is any DTC detected?

YES >> Check the DTC. Refer to [EVB-34, "DTC Index"](#).

NO >> GO TO 2.

2. LI-ION BATTERY VISUALLY CHECK

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.

Visually check Li-ion battery for malfunction.

Is the inspection result normal?

YES >> Perform Li-ion Battery ID Registration.

NO >> Check Li-ion battery.

P311C HIGH VOLTAGE CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

P311C HIGH VOLTAGE CIRCUIT

DTC Logic

INFOID:000000006977237

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P311C	HIGH VOLTAGE SYSTEM (High voltage system mal- function)	Remains all of following condition for 0.2 seconds. <ul style="list-style-type: none">• Li-ion battery current: 5.5 A or more• Input voltage to traction motor inverter: 24 V or less• Pre-charge impossible	<ul style="list-style-type: none">• High voltage circuit• Li-ion battery J/B
		Remains all of following condition for 0.5 seconds. <ul style="list-style-type: none">• Li-ion battery current: less than 5.5 A• Input voltage to traction motor inverter: 24 V or less• Pre-charge impossible	
		Remains all of following condition for 0.5 seconds. <ul style="list-style-type: none">• Difference between Li-ion battery voltage and input voltage to traction motor inverter 100 V or more.• Pre-charge impossible	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-177, "Diagnosis Procedure"](#).
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977238

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

P311C HIGH VOLTAGE CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

DANGER:



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



2. Measure voltage between high voltage harness terminals.

DANGER:



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

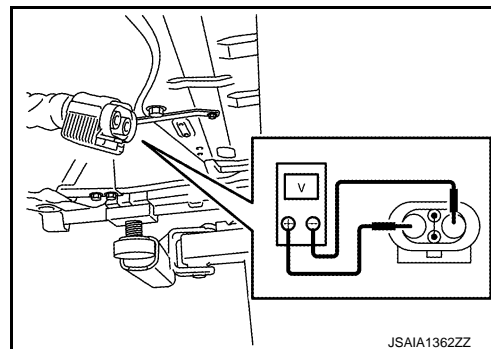


Standard

: 5 V or less

CAUTION:

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



>> GO TO 2.

2.CHECK DTC

Check other DTC detects.

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).

NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN LI-ION BATTERY

Check self-diagnostic result in "HV BAT".

Are any DTC detected?

YES >> Check the DTC. Refer to [EVB-34, "DTC Index"](#).

NO >> GO TO 4.

4.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to [TMS-35, "DTC Index"](#).

NO >> GO TO 5.

5.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to [VC-24, "DTC Index"](#).

NO >> GO TO 6.

6.CHECK SELF-DIAGNOSTIC RESULT IN A/C AUTO AMP.

Check self-diagnostic result in "HVAC".

Are any DTC detected?

YES >> Check the DTC. Refer to [HAC-40, "DTC Index"](#).

NO >> GO TO 7.

7.CHECK SERVICE PLUG FUSE

1. Turn power switch OFF.
2. Disconnect service plug.
3. Check service plug fuse fusing.

P311C HIGH VOLTAGE CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Is the fuse is fusing?

YES >> Replace service plug.

NO >> GO TO 8.

8.REPLACE LI-ION BATTERY JUNCTION BOX

1. Replace Li-ion battery junction box. Refer to [EVB-143, "Exploded view"](#).

2. Perform DTC confirmation procedure again. Refer to [EVC-177, "DTC Logic"](#).

Is the DTC detected again?

YES >> Replace DC/DC J/B. Refer to [EVC-307, "Removal and Installation"](#).

NO >> INSPECTION END

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P312A EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P312A EV SYSTEM CAN COMMUNICATION

Description

INFOID:000000006977239

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:000000006977240

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P312A	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 shut OFF.	<ul style="list-style-type: none">• Harness or connectors• LBC• Traction motor inverter• On board charger• Electric shift control module• A/C auto amp.• TCU• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 1 minutes.
2. Turn power switch ON and wait at least 20 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-181, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect EVSE and wait at least 10 seconds.
4. Disconnect EVSE and wait at least 1 minutes.
5. Check DTC.

Is DTC detected?

- YES >> [EVC-181, "Diagnosis Procedure"](#).
NO (without quick charge)>>INSPECTION END
NO (with quick charge) >>GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 1 minutes.
5. Stop the quick charge and wait at least 1 minutes.
6. Check DTC.

Is DTC detected?

- YES >> [EVC-181, "Diagnosis Procedure"](#).
NO >> INSPECTION END

P312A EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

Diagnosis Procedure

INFOID:000000006977241

1. CHECK VCM POWER SUPPLY CIRCUIT

Select the DATA MONITOR item "POWER SW" of "VCM" with CONSULT. Refer to [EVC-51, "CONSULT Function"](#).

Is indicate "ON"?

YES >> GO TO 2.

NO >> Repair VCM power ON power supply circuit. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

2. CHECK TRACTION MOTOR INVERTER POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect traction motor inverter harness connector F13.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 3.

NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power.

3. CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect LBC harness connector B24.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P312A" detected?

YES >> GO TO 4.

NO >> Check LBC power supply (POWER ON) circuit for short to power.

4. CHECK ON BOARD CHARGER POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect on board charger harness connector B26.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P312A" detected?

YES >> GO TO 5.

NO >> Check on board charger power supply (POWER ON) circuit for short to power.

5. CHECK A/C AUTO AMP. POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect A/C auto amp. harness connector M50.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P312A" detected?

YES >> GO TO 6.

NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power.

6. CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect TCU harness connector M2.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P312A" detected?

YES >> GO TO 7.

NO >> Check TCU power supply (POWER ON) circuit for short to power.

7. CHECK ELECTRIC SHIFT CONTROL MODULE POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect electric shift control module harness connector M59.
2. Perform confirmation procedure. Refer to [EVC-180, "DTC Logic"](#).

Is "P312A" detected?

YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Check electric shift control module power supply (POWER ON) circuit for short to power.

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P312B EV SYSTEM RESTART ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312B EV SYSTEM RESTART ERROR

DTC Logic

INFOID:000000006977242

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P312B	RESTART ERROR	Immediately before restarting VCM, the traction motor inverter and the on board charger cannot be ready for restart for 15 seconds.	<ul style="list-style-type: none">• Harness or connectors• Traction motor inverter• On board charger• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 1 minutes.
2. Turn power switch ON and wait at least 10 seconds.
3. Turn power switch OFF and wait at least 1 minutes.
4. Check DTC.

Is DTC detected?

YES >> [EVC-182, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect EVSE and wait at least 10 seconds.
4. Disconnect EVSE and wait at least 1 minutes.
5. Check DTC.

Is DTC detected?

YES >> [EVC-182, "Diagnosis Procedure"](#).
NO (without quick charge)>>INSPECTION END
NO (with quick charge) >>GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 1 minutes.
5. Stop the quick charge and wait at least 1 minutes.
6. Check DTC.

Is DTC detected?

YES >> [EVC-182, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977243

1.PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P3191, P31A7 and P319C detected?

YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2.CHECK POWER SUPPLY OF VCM

Check power supply of VCM. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

Is inspection result normal?

YES >> GO TO 3.

P312B EV SYSTEM RESTART ERROR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

3.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 4.

4.PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 5.

5.PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P312B?

YES >> Perform diagnosis procedure of detected DTC.

NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

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P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

DTC Logic

INFOID:000000006977244

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P312C	INVERTER DISCHARGE ERROR	Traction motor inverter voltage is 54 V or more for 14 seconds during stop of READY or charge	<ul style="list-style-type: none">• Li-ion battery J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 1 minutes.
2. Set the vehicle to READY and test drive.
3. Turn power switch OFF and wait at least 1 minutes.
4. Turn power switch ON and wait at least 1 minutes.
5. Check DTC.

Is DTC detected?

- YES >> [EVC-184, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect EVSE 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.
6. Check DTC.

Is DTC detected?

- YES >> [EVC-184, "Diagnosis Procedure"](#).
NO (without quick charge) >> INSPECTION END
NO (with quick charge) >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 1 minutes.
5. Stop the quick charge and wait at least 1 minutes.
6. Turn power switch ON and wait at least 1 minutes.
7. Check DTC.

Is DTC detected?

- YES >> [EVC-184, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977245

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P0AA0 or P0AA1 detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

< DTC/CIRCUIT DIAGNOSIS >

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC.
- NO >> GO TO 3.

3.PERFORM CONFIRMATION PROCEDURE

Perform confirmation procedure. Refer to [EVC-184, "DTC Logic"](#)

Is DTC detected other than P312C or P3030?

- YES >> Perform diagnosis procedure of detected DTC.
- NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

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P312D QUICK CHARGE ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312D QUICK CHARGE ERROR

DTC Logic

INFOID:000000006977246

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connector• On board charger• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 2 minutes.
5. Turn power switch ON.
6. Check DTC.

Is DTC detected?

- YES >> [EVC-186, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977247

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P312D?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

P312E READY OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312E READY OFF ERROR

DTC Logic

INFOID:000000006977248

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P312E	READY OFF ERROR	During the shutdown from READY, 10 seconds pass without satisfying the following conditions: <ul style="list-style-type: none">Battery current is 5.5 A or less.Traction motor inverter is ready for discharge.	<ul style="list-style-type: none">Harness or connectorLBCTraction motor inverterA/C auto amp.DC/DC-J/BVCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch OFF and wait at least 60 seconds.
- Set the vehicle to READY.
- Operate the automatic air conditioning system.
- Turn power switch OFF as automatic air conditioning system ON condition
- Wait at least 60 seconds.
- Turn power switch ON.
- Check DTC.

Is DTC detected?

- YES >> [EVC-187, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977249

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P317A detected?

- YES >> Perform diagnosis procedure of P317A. Refer to [EVC-207, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.CHECK DTC

Check DTC of VCM.

Is P3191, P31A7 or P319C detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 3.

3.CHECK DTC

Check DTC of VCM.

Is P0A08 detected?

- YES >> Perform diagnosis procedure of P0A08. Refer to [EVC-119, "Diagnosis Procedure"](#).
NO >> GO TO 4.

4.PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 5.

5.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER.

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

P312E READY OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 6.

6. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [TMS-26. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> Check intermittent incident. Refer to [GI-51. "Intermittent Incident"](#).

P312F CHARGE OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P312F CHARGE OFF ERROR

DTC Logic

INFOID:000000006977250

DTC DETECTION LOGIC

DTC No.	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: <ul style="list-style-type: none">• Battery current is 5.5 A or less• Traction motor inverter is ready for discharge.• Quick charge relay OFF	<ul style="list-style-type: none">• Harness or connector• LBC• Traction motor inverter• A/C auto amp.• DC/DC-J/B• On board charger• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 60 seconds.
3. Connect EVSE and wait at least 60 seconds.
4. Disconnect EVSE and wait at least 60 seconds.
5. Turn power switch ON.
6. Check DTC.

Is DTC detected?

- YES >> [EVC-189, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 60 seconds.
3. Connect quick charge connector.
4. Start quick charge and wait at least 60 seconds.
5. Stop quick charge and wait at least 60 seconds.
6. Turn power switch ON.
7. Check DTC.

Is DTC detected?

- YES >> [EVC-189, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977251

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P317A detected?

- YES >> Perform diagnosis procedure of P317A. Refer to [EVC-207, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.CHECK DTC

Check DTC of VCM.

Is P3191, P31A7 or P319C detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 3.

3.CHECK DTC

Check DTC of VCM.

Is P3196, P31AE or P31A1 detected?

- YES >> Perform diagnosis procedure of detected DTC.

P312F CHARGE OFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 4.

4. CHECK DTC

Check DTC of VCM.

Is P0A08 detected?

YES >> Perform diagnosis procedure of P0A08. Refer to [EVC-119. "Diagnosis Procedure"](#).

NO >> GO TO 5.

5. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 6.

6. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 7.

7. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER.

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 8.

8. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [TMS-26. "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.

NO >> Check intermittent incident. Refer to [GI-51. "Intermittent Incident"](#).

P3131 SYSTEM SHUTOFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3131 SYSTEM SHUTOFF ERROR

DTC Logic

INFOID:000000006977252

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3131	SYSTEM SHUTOFF TIMEOUT	When before shutdown all of the following conditions are fulfilled • READY signal is OFF • Either of EV system CAN connection unit is not shut-down	<ul style="list-style-type: none">• Harness or connectors• LBC• Traction motor inverter• On board charger• Electric shift control module• A/C auto amp.• TCU• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 1 minutes.
2. Turn power switch ON and wait at least 35 minutes.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-191, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect EVSE and wait at least 10 seconds.
4. Disconnect EVSE and wait at least 35 minutes.
5. Check DTC.

Is DTC detected?

- YES >> [EVC-191, "Diagnosis Procedure"](#).
NO (without quick charge)>>INSPECTION END
NO (with quick charge) >>GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF.
2. Charge status indicator OFF condition and wait at least 1 minutes.
3. Connect quick charge connector.
4. Start the quick charge and wait at least 1 minutes.
5. Stop the quick charge and wait at least 35 minutes.
6. Check DTC.

Is DTC detected?

- YES >> [EVC-191, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977253

1. CHECK VCM POWER SUPPLY CIRCUIT

Select the DATA MONITOR item "POWER SW" of "VCM" with CONSULT. Refer to [EVC-51, "CONSULT Function"](#).

Is indicate "ON"?

- YES >> GO TO 2.
NO >> Repair VCM power ON power supply circuit. Refer to [EVC-107, "VCM : Diagnosis Procedure"](#).

P3131 SYSTEM SHUTOFF ERROR

< DTC/CIRCUIT DIAGNOSIS >

2. CHECK TRACTION MOTOR INVERTER POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Disconnect traction motor inverter harness connector F13.
3. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 3.

NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power.

3. CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect LBC harness connector B24.
2. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 4.

NO >> Check LBC power supply (POWER ON) circuit for short to power.

4. CHECK ON BOARD CHARGER POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect on board charger harness connector B26.
2. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 5.

NO >> Check on board charger power supply (POWER ON) circuit for short to power.

5. CHECK A/C AUTO AMP. POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect A/C auto amp. harness connector M50.
2. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 6.

NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power.

6. CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect TCU harness connector M2.
2. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P3131" detected?

YES >> GO TO 7.

NO >> Check TCU power supply (POWER ON) circuit for short to power.

7. CHECK ELECTRIC SHIFT CONTROL MODULE POWER SUPPLY (POWER ON) CIRCUIT

1. Disconnect electric shift control module harness connector M59.
2. Perform confirmation procedure. Refer to [EVC-191, "DTC Logic"](#).

Is "P312A" detected?

YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Check electric shift control module power supply (POWER ON) circuit for short to power.

P3137 AIR BAG INFLATION

< DTC/CIRCUIT DIAGNOSIS >

P3137 AIR BAG INFLATION

DTC Logic

INFOID:000000006977254

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3137	CAR CLASH	VCM received car crash information signal from air bag diagnosis sensor unit	<ul style="list-style-type: none">• Air bag inflated• CAN communication signal• Air bag diagnosis sensor unit• VCM

EVC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

Check air bag inflated?

Is the air bag inflated?

YES >> Refer to [SR-5, "FOR FRONTAL COLLISION : When SRS is activated in a collision"](#).

NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.

2. Turn power switch ON and wait at least 5 seconds.

Check air bag inflated?

Is DTC detected?

YES >> [EVC-193, "Diagnosis Procedure"](#)

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977255

1. CHECK CAR CRASH INFORMATION SIGNAL

Select "CLASH DETECT INFO" in "DATA MONITOR" mode of VCM using CONSULT.

Is indicate ##?

YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Replace air bag diagnosis sensor unit. Refer to [SR-27, "Removal and Installation"](#).

P315C CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P315C CHARGE RELAY

DTC Logic

INFOID:000000006977256

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P315C	CHARGE RELAY	VCM detected P31C8, P31C9, P31CA or P31CB.	<ul style="list-style-type: none">• Harness or connectors• Normal charge relay• Quick charge relay• On-board charger

Diagnosis Procedure

INFOID:000000006977257

Perform diagnosis of P31C8, P31C9, P31CA or P31CB.

- Refer to [EVC-233, "Diagnosis Procedure"](#).
- Refer to [EVC-236, "Diagnosis Procedure"](#).

P315E ABS/VDC

< DTC/CIRCUIT DIAGNOSIS >

P315E ABS/VDC

DTC Logic

INFOID:000000006977258

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P315E	VDC SYSTEM	VCM detected torque request signal error for 2 seconds	<ul style="list-style-type: none">CAN communication signalABS actuator and electric unit (control unit)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch OFF and wait at least 60 seconds.
- Turn power switch OFF and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> [EVC-195, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977259

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P315E?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-152, "Removal and Installation"](#).

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P316A MOTOR SPEED

< DTC/CIRCUIT DIAGNOSIS >

P316A MOTOR SPEED

DTC Logic

INFOID:000000006977260

DTC DETECTION LOGIC

DTC No.	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. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 20 seconds.
2. Set the vehicle to READY and wait at least 60 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-196, "Diagnosis Procedure"](#).
NO >> GO TO2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Perform test drive.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-196, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977261

1. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC (P325B, P325C, P325D, P325E or P325F) detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

P316F ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

P316F ON-BOARD CHARGER

DTC Logic

INFOID:000000006977262

DTC DETECTION LOGIC

DTC No.	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	<ul style="list-style-type: none">• Harness or connector• on board charger• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE 1

1. Perform normal charge and wait at least 10 minutes.
2. Check DTC.

Is DTC detected?

YES >> [EVC-197, "Diagnosis Procedure"](#).
NO (Without quick charger)>>INSPECTION END
NO (With quick charger)>>GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE 2

1. Perform quick charge and wait at least 10 minutes.
2. Check DTC.

Is DTC detected?

YES >> [EVC-197, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977263

1.CHECK ON BOARD CHARGER OUTPUT POWER

1. Perform normal charge.
2. Turn power switch ON.
3. Select "OBC OUT PWR" in "DATA MONITOR" of "EV/HEV" using CONSULT.

Is value 0kW?

YES >> GO TO 2.
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

2.PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charge. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

YES >> Perform diagnosis procedure of detected DTC.
NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

P3172, P3173 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

P3172, P3173 ON-BOARD CHARGER

DTC Logic

INFOID:000000006977264

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3172	ON BOARD CHARGER SYSTEM	VCM detects an error signal that is received from on board charger via CAN communication.	Traction motor inverter
P3173			

Diagnosis Procedure

INFOID:000000006977265

Perform the self-diagnosis of traction motor inverter. Refer to [VC-17, "CONSULT Function"](#).

P3175 VCM

< DTC/CIRCUIT DIAGNOSIS >

P3175 VCM

DTC Logic

INFOID:000000006977266

DTC DETECTION LOGIC

DTC No.	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

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DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 5 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-199, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977267

1.REPLACE VCM

1. Replace the VCM. Refer to [EVC-315, "Removal and Installation"](#).
2. Perform confirmation procedure. Refer to [EVC-199, "DTC Logic"](#).

Is DTC detected?

- YES >> Replace the VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace the electric shift control module. Refer to [TM-130, "Removal and Installation"](#).

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P3176 TRACTION MOTOR INVERTER CONDENSER

< DTC/CIRCUIT DIAGNOSIS >

P3176 TRACTION MOTOR INVERTER CONDENSER

DTC Logic

INFOID:000000006977268

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3176	INVERTER CONDENSER	Immediately before READY or the start of charge, pre-charging cannot be performed for 5 seconds or more.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• LBC• DC/DC-J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY and wait at least 15 seconds.
3. Check DTC.

Is DTC detected?

YES >> [EVC-200, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF and wait at least 60 seconds.
2. Connect EVSE and wait at least 15 seconds.
3. Check DTC.

Is DTC detected?

YES >> [EVC-200, "Diagnosis Procedure"](#).
NO (Without quick charger)>>INSPECTION END
NO (With quick charger)>>GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF and wait at least 60 seconds.
2. Connect quick charge connector and wait at least 15 seconds.
3. Check DTC.

Is DTC detected?

YES >> [EVC-200, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977269

1. CHECK DTC

Check DTC of VCM.

Is P317D detected?

YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2. CHECK DTC

Check DTC of VCM.

Is P31D7 detected?

YES >> Perform diagnosis procedure of P31D7. Refer to [EVC-242, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3. CHECK DTC

Check DTC of VCM.

Is P31D4 or P31DD detected?

P3176 TRACTION MOTOR INVERTER CONDENSER

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Perform diagnosis procedure of P31D7 or P31DD. Refer to [EVC-242. "Diagnosis Procedure"](#) (P31D7) or [EVC-248. "Diagnosis Procedure"](#) (P31DD). A
- NO >> GO TO 4.

4.CHECK DTC

Check DTC of VCM. B

Is P317A detected?

- YES >> Perform diagnosis procedure of P317A. Refer to [EVC-207. "Diagnosis Procedure"](#). EVC
- NO >> GO TO 5.

5.CHECK DTC

Check DTC of VCM. D

Is P3191, P31A7 or P319C detected?

- YES >> Perform diagnosis procedure of DTC. Refer to [EVC-215. "Diagnosis Procedure"](#). E
- NO >> GO TO 6.

6.CHECK DTC

Check DTC of VCM. F

Is P3191, P31A7 or P319C detected?

- YES >> Perform diagnosis procedure of DTC. Refer to [EVC-215. "Diagnosis Procedure"](#). G
- NO >> GO TO 7.

7.CHECK DTC

Check DTC of VCM. H

Is P0A08 or P0A94 detected?

- YES >> Perform diagnosis procedure of P0A94. Refer to [EVC-119. "Diagnosis Procedure"](#) (P0A08) or (P0A94). I
- NO >> GO TO 8.

8.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26. "CONSULT Function"](#). J

Is DTC detected?

- YES >> Perform diagnosis procedure of DTC. K
- NO >> GO TO 9.

9.PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30. "CONSULT Function"](#). L

Is DTC detected?

- YES >> Perform diagnosis procedure of DTC. M
- NO >> GO TO 10.

10.CHECK DTC

Check DTC of VCM. N

Is P311C detected?

- YES >> Perform diagnosis procedure of P311C. Refer to [EVC-177. "Diagnosis Procedure"](#). O
- NO >> GO TO 11.

11.CHECK DTC

Check DTC of VCM. P

Is P3176 detected?

- YES >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).
- NO >> Visually check high voltage harness and connector.

P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3177 ECU ACTIVATION ERROR

DTC Logic

INFOID:000000006977270

DTC DETECTION LOGIC

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.	<ul style="list-style-type: none">• Charging system• Traction motor system• EVSE• Quick charger• External input

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE-TYPE 1

1. Turn power switch OFF and wait at least 20 seconds.
2. Set the vehicle to READY and wait at least 200 seconds.
3. Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-202, "TYPE 1 : Diagnosis Procedure"](#).
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-TYPE 2

1. Turn power switch OFF and wait at least 20 seconds.
2. Make sure that the charging status indicator does not illuminate.
3. Connect normal charge connector (with AC power input) and wait at least 200 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-203, "TYPE 2 : Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-TYPE 3

1. Turn power switch OFF and wait at least 20 seconds.
2. Make sure that the charging status indicator does not illuminate.
3. Connect quick charge connector.
4. Start quick charging and wait at least 200 seconds.
5. Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-203, "TYPE 3 : Diagnosis Procedure"](#).
NO >> INSPECTION END

TYPE 1

TYPE 1 : Diagnosis Procedure

INFOID:000000006977271

1.CHECK DTC

Check other DTC detected.

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 3.

P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

3.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to [VC-24, "DTC Index"](#).

NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

TYPE 2

TYPE 2 : Diagnosis Procedure

INFOID:00000000697722

1.CHECK CONDITION

Check and study the following items:

- No interruption in the indoor power and EVSE.
- EVSE is within the specification.
- The charger remains cold.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace error-detected parts.

2.CHECK DTC

Check other DTC detected.

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).

NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).

NO >> GO TO 4.

4.CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to [VC-24, "DTC Index"](#).

NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

TYPE 3

TYPE 3 : Diagnosis Procedure

INFOID:00000000697723

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

Check other DTC detected.

Are any DTC detected?

YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).

NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

P3177 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Check the DTC. Refer to [EVC-78. "DTC Index"](#).

NO >> GO TO 4.

4. CHECK SELF-DIAGNOSTIC RESULT IN ON-BOARD CHARGER

Check self-diagnostic result in "CHARGER".

Are any DTC detected?

YES >> Check the DTC. Refer to [VC-24. "DTC Index"](#).

NO >> Check intermittent incident. Refer to [GI-51. "Intermittent Incident"](#).

P3178 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3178 ECU ACTIVATION ERROR

DTC Logic

INFOID:00000000697274

DTC DETECTION LOGIC

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.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery system• Traction motor system

DTC CONFIRMATION PROCEDURE

NOTE:

Before performing the following procedure, confirm that 12V battery voltage is more than 11 V.

1. PERFORM DTC CONFIRMATION PROCEDURE-I

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY and wait at least 200 seconds.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-205, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-II

1. Turn power switch OFF and wait at least 60 seconds.
2. Make sure that the charging status indicator does not illuminate.
3. Connect normal charge connector (with AC power input) and wait at least 20 seconds.
4. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-205, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE-III

1. Turn power switch OFF and wait at least 60 seconds.
2. Make sure that the charging status indicator does not illuminate.
3. Connect quick charge connector.
4. Start quick charging and wait at least 20 seconds.
5. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-205, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:00000000697275

1. CHECK DTC

Check other DTC detected.

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

Check self-diagnostic result in "MOTOR".

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 3.

3. CHECK SELF-DIAGNOSTIC RESULT IN LI-ION BATTERY CONTROLLER

P3178 ECU ACTIVATION ERROR

< DTC/CIRCUIT DIAGNOSIS >

Check self-diagnostic result in "HV BAT".

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVB-34, "DTC Index"](#).
- NO >> Check high voltage harness connector installation condition.

P3179, P317A, P317B TRACTION MOTOR INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3179, P317A, P317B TRACTION MOTOR INVERTER

DTC Logic

INFOID:00000000697276

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3179	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
P317A			
P317B			

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EVC

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Diagnosis Procedure

INFOID:00000000697277

Perform the self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

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P317D TRACTION MOTOR INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P317D TRACTION MOTOR INVERTER

DTC Logic

INFOID:000000006977278

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P317D	MOTOR SYSTEM	<ul style="list-style-type: none">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. PERFORM DTC CONFIRMATION PROCEDURE 1

- Turn power switch OFF and wait at least 20 seconds.
- Set the vehicle to READY and then test drive. (High speed as possible).
- Check DTC.

Is DTC detected?

- YES >> [EVC-208, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977279

1. ERASE DTC

- Erase DTC.
- Perform confirmation procedure again. Refer to [EVC-208, "DTC Logic"](#).
- Check DTC again.

IS P317D detected?

- YES >> Replace traction motor inverter. Refer to [TMS-115, "Removal and Installation"](#).
NO >> Check intermittent incident. Refer [GI-51, "Intermittent Incident"](#).

P317E, P3180, P3182 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P317E, P3180, P3182 LI-ION BATTERY

DTC Logic

INFOID:00000000697280

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P317E	HV BATTERY SYSTEM	VCM detects an error signal that is received from LBC via CAN communication for 0.02 seconds or more.	LBC
P3180			
P3182			

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EVC

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Diagnosis Procedure

INFOID:00000000697281

Perform the self-diagnosis of traction motor inverter. Refer to [EVB-22, "CONSULT Function"](#).

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P3183 LI-ION BATTERY

< DTC/CIRCUIT DIAGNOSIS >

P3183 LI-ION BATTERY

DTC Logic

INFOID:000000006977282

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• CAN communication• LBC• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-210, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977283

1.ERASE DTC

Erase DTC and perform confirmation procedure. Refer to [EVC-210, "DTC Logic"](#).

Is "P3183" detected?

- YES >> GO TO 2.
NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

2.REPLACE LBC

Replace LBC. Refer to [EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly"](#).

Is "P3183" detected?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

P3188 ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P3188 ELECTRIC SHIFT

DTC Logic

INFOID:00000000697284

DTC DETECTION LOGIC

DTC No.	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 module

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EVC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 5 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-211, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:00000000697285

Perform self-diagnosis of electric shift. Refer to [TM-35, "CONSULT Function"](#).

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P318A ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P318A ELECTRIC SHIFT

DTC Logic

INFOID:000000006977286

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318A	ELECTRIC SHIFT SYS- TEM (Shift position signal invalid)	Difference between target shift position signal and current shift position signal for 1.2 seconds.	<ul style="list-style-type: none">• Electric shift system• VCM

DTC CONFIRMATION PROCEDURE

NOTE:

Before performing the following procedure, confirm that battery voltage is 10 V or more.

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON.
3. Shift selector lever in N range and wait at least 20 seconds.
4. Check DTC.

Is DTC detected?

- YES >> [EVC-212, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977287

1. CHECK DTC

CHECK other DTC detects.

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

Check self-diagnostic result in "SHIFT".

Are any DTC detected?

- YES >> Check the DTC. Refer to [TM-44, "DTC Index"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Turn power switch OFF and wait at least 20 seconds.
3. Perform DTC confirmation procedure again. Refer to [EVC-212, "DTC Logic"](#).

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

P318B ELECTRIC SHIFT

< DTC/CIRCUIT DIAGNOSIS >

P318B ELECTRIC SHIFT

DTC Logic

INFOID:00000000697288

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318B	ELECTRIC SHIFT SYSTEM (Electric shift malfunction)	<ul style="list-style-type: none">VCM detects invalid signal of shift position signal sent from electric shift control module.VCM receives abnormal shift position signal for 0.2 seconds or more.VCM receives abnormal shift position signal for 10 seconds or more.	<ul style="list-style-type: none">Electric shift systemVCM

DTC CONFIRMATION PROCEDURE

NOTE:

Before performing the following procedure, confirm that 12V battery voltage is 10 V or more.

1. PERFORM DTC CONFIRMATION PROCEDURE-I

- Turn power switch OFF and wait at least 1 minute.
- Turn power switch ON and wait at least 20 seconds.
- Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-213, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE-II

- Shift selector lever in R, N and D range.
- Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-213, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:00000000697289

1. CHECK DTC

CHECK other DTC detects.

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVC-78, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

Check self-diagnostic result in "SHIFT".

Are any DTC detected?

- YES >> Check the DTC. Refer to [TM-44, "DTC Index"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

- Erase DTC.
- Turn power switch OFF and wait at least 20 seconds.
- Perform DTC confirmation procedure again. Refer to [EVC-213, "DTC Logic"](#).

Is the DTC detected again?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

P318D CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P318D CAN COMMUNICATION

DTC Logic

INFOID:000000006977290

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P318D	COMMUNICATION ERROR	When VCM is not transmitting CAN communication signal for 2 seconds or more.	<ul style="list-style-type: none">• Harness connector (CAN communication)• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-214, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977291

1. ERASE DTC

Erase DTC and perform self-diagnosis of VCM. Refer to [EVC-214, "DTC Logic"](#).

Is "P318D" detected?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

P3191, P319C, P31A7 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3191, P319C, P31A7 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977292

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3191	COMMUNICATION ERROR	When VCM detects an error signal that is received from traction motor inverter via CAN communication	<ul style="list-style-type: none">• Traction motor inverter• VCM
P319C			
P31A7			

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn ignition switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-215, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977293

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P3191, P319C and P31A7?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace traction motor inverter. Refer to [TMS-115, "Removal and Installation"](#).

P3193, P319E, P31A9 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3193, P319E, P31A9 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977294

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3193	COMMUNICATION ERROR	When VCM detects an error signal that is received from LBC via CAN communication	<ul style="list-style-type: none">• LBC• VCM
P319E			
P31A9			

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-216, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977295

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P3193, P319E and P31A9?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace LBC. Refer to [EVB-155, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly"](#).

P3194, P319F, P31AA CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3194, P319F, P31AA CAN COMMUNICATION

DTC Logic

INFOID:000000006977296

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3194	COMMUNICATION ERROR	When VCM detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication	<ul style="list-style-type: none">• ABS actuator and electric unit (control unit)• VCM
P319F			
P31AA			

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-217, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977297

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [BRC-38, "CONSULT Function"](#).

Is DTC detected other than P3194, P319F and P31AA?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace ABS actuator and electric unit (control unit). Refer to [BRC-152, "Removal and Installation"](#).

P3195, P31A0, P31AB CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3195, P31A0, P31AB CAN COMMUNICATION

DTC Logic

INFOID:000000006977298

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3195	COMMUNICATION ERROR	When VCM detects an error signal that is received from electrically-driven intelligent brake unit via CAN communication	<ul style="list-style-type: none">Electrically-driven intelligent brake unitVCM
P31A0			
P31AB			

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> [EVC-218, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977299

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P3195, P31A0 and P31AB?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace electrically-driven intelligent brake unit. Refer to [BR-20, "CONSULT Function"](#).

P3196, P31A1, P31AE EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3196, P31A1, P31AE EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977300

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3196	COMMUNICATION ERROR	When VCM detects an error signal that is received from on board charger via CAN communication	<ul style="list-style-type: none">On board chargerVCM
P31A1			
P31AE			

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> [EVC-219, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977301

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P3196, P31A1 and P31AE?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace on board charger. Refer to [VC-17, "CONSULT Function"](#).

P3197, P31A2, P31AD EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P3197, P31A2, P31AD EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977302

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P3197	COMMUNICATION ERROR	When VCM detects an error signal that is received from electric shift control module via CAN communication	<ul style="list-style-type: none">• Electric shift control module• VCM
P31A2			
P31AD			

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-220, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977303

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P3197, P31A2 and P31AD?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace electric shift control module. Refer to [TM-130, "Removal and Installation"](#).

P31AF, P31B3 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31AF, P31B3 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977304

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31AF P31B3	COMMUNICATION ER- ROR	When VCM detects an error signal that is received from A/C auto amp. via CAN communication	<ul style="list-style-type: none">• A/C auto amp.• VCM

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EVC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-221, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977305

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31AF and P31B3?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace A/C auto amp. Refer to [HAC-134, "Removal and Installation"](#).

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P31B0, P31B4 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B0, P31B4 CAN COMMUNICATION

DTC Logic

INFOID:000000006977306

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B0 P31B4	COMMUNICATION ERROR	When VCM detects an error signal that is received from AV control unit via CAN communication	<ul style="list-style-type: none">• AV control unit• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-222, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977307

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B0 and P31B4?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace AV control unit. Refer to [AV-119, "Removal and Installation"](#).

P31B5 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B5 CAN COMMUNICATION

DTC Logic

INFOID:000000006977308

DTC DETECTION LOGIC

DTC No.	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	<ul style="list-style-type: none">• Combination meter• VCM

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EVC

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF.
2. Turn power switch ON and wait at least 10 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-223, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977309

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B5?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace combination meter. Refer to [MWI-89, "Removal and Installation"](#).

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P31B6 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B6 CAN COMMUNICATION

DTC Logic

INFOID:000000006977310

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B6	COMMUNICATION ERROR	When VCM detects an error signal that is received from IPDM E/R via CAN communication	<ul style="list-style-type: none">• IPDM E/R• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-224, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977311

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B6?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace IPDM E/R. Refer to [PCS-28, "Removal and Installation"](#).

P31B7 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B7 CAN COMMUNICATION

DTC Logic

INFOID:000000006977312

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B7	COMMUNICATION ERROR	When VCM detects an error signal that is received from air bag diagnosis sensor unit via CAN communication	<ul style="list-style-type: none">Air bag diagnosis sensor unitVCM

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EVC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> [EVC-225, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977313

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B7?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace air bag diagnosis sensor unit. Refer to [SR-27, "Removal and Installation"](#).

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P31B8 EV SYSTEM CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B8 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:000000006977314

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B8	COMMUNICATION ERROR	When VCM detects an error signal that is received from TCU via CAN communication	<ul style="list-style-type: none">• TCU• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-226, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977315

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B8?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace TCU. Refer to [AV-211, "Removal and Installation"](#).

P31B9 CAN COMMUNICATION

< DTC/CIRCUIT DIAGNOSIS >

P31B9 CAN COMMUNICATION

DTC Logic

INFOID:000000006977316

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31B9	COMMUNICATION ERROR	When VCM detects an error signal that is received from electric parking brake control module via CAN communication	<ul style="list-style-type: none">• Electric parking brake control module• VCM

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EVC

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

- YES >> [EVC-227, "Diagnosis Procedure"](#).
NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977317

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31B9?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> Replace electric parking brake control module. Refer to [PB-83, "Removal and Installation"](#).

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P31C0 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

P31C0 ON-BOARD CHARGER

DTC Logic

INFOID:000000006977318

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• On board charger• VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 10 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-228, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977319

1.CHECK ELECTRIC VEHICLE SYSTEM ACTIVATION REQUEST

1. Select "EV SYS ACT REQ (OBC)" in DATA MONITOR using CONSULT.
2. Turn power switch OFF.
3. Turn power switch ON.
4. Check the state remain "ON" for 5 seconds or more after turning power switch from OFF to ON.

NOTE:

Normal is 2 seconds or less.

Is indicate "ON" 5 seconds or more?

- YES >> GO TO 2.
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

2.CHECK HARNESS

1. Disconnect VCM harness connector and on board charger harness connector.
2. Check continuity VCM harness connector E63 and on board charger harness connector B26.

VCM		On board charger		Continuity
Connector	Terminal	Connector	Terminal	
E63	96	B26	18	Existed

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

Is inspection result normal?

- YES >> GO TO 3.
NO >> Repair or replace error-detected parts.

3.CHECK VOLTAGE OF VCM

1. Turn power switch OFF.
2. Connect on board charger harness connector B26.
3. Check the voltage on board charger harness connector and ground.

P31C0 ON-BOARD CHARGER

< DTC/CIRCUIT DIAGNOSIS >

+		-	Condition	Value
VCM				
Connector	Terminal			
E63	96	Ground	Turn power switch from OFF to ON	<p style="text-align: right;">JSCIA0343ZZ</p>

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Is inspection result normal?

- YES >> Replace on board charger. Refer to [VC-98. "Removal and Installation"](#).
- NO >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).

P31C1, P31C2 TCU

< DTC/CIRCUIT DIAGNOSIS >

P31C1, P31C2 TCU

DTC Logic

INFOID:000000006977320

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none"> • Harness • VCM • TCU
P31C2		VCM detects the EV system activation request signal (from TCU) is 0 V for 3 seconds after power switch OFF → ON.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 10 seconds.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-230, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977321

1. CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect VCM harness connector and TCU harness connector.
3. Check the continuity between VCM harness terminal and TCU harness terminal.

+		-		Continuity
VCM		TCU		
Connector	Terminal	Connector	Terminal	
E63	84	M2	11	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair harness or connector.

2. CHECK VCM INPUT SIGNAL

1. Turn power switch OFF.
2. Disconnect TCU connector.
3. Check the voltage between VCM harness terminal and ground.
4. Turn power switch ON.

+		-	Condition	Voltage
VCM				
Connector	Terminal			
E63	84	Ground	After power switch OFF → ON	0 V → 5 V → 0 V

Is the inspection result normal?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#)
 NO >> Replace TCU. Refer to [AV-211, "Removal and Installation"](#).

P31C4 VCM TIMER

< DTC/CIRCUIT DIAGNOSIS >

P31C4 VCM TIMER

DTC Logic

INFOID:000000006977322

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• VCM power supply circuit• 12V battery

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

Perform 4 times of following procedure and check DTC.

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 10 seconds.

Is DTC detected?

YES >> [EVC-231, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977323

1.CHECK VCM POWER SUPPLY

Check VCM power supply (battery power). Refer to [EVC-107, "VCM : Diagnosis Procedure"](#)

Is inspection result normal?

YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P31C5, P31C6, P31C7 VCM

< DTC/CIRCUIT DIAGNOSIS >

P31C5, P31C6, P31C7 VCM

DTC Logic

INFOID:000000006977324

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31C5	VCM	VCM malfunction is detected	VCM
P31C6	VCM		
P31C7	VCM		

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 5 seconds.

Is DTC detected?

- YES >> [EVC-232, "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 6 seconds.

Is DTC detected?

- YES >> [EVC-232, "Diagnosis Procedure"](#).
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE 3

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 60 seconds.

Is DTC detected?

- YES >> [EVC-232, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977325

1. ERASE DTC AND PERFORM CONFIRMATION PROCEDURE

1. Erase DTC.
2. Perform confirmation procedure. Refer to [EVC-232, "DTC Logic"](#).

Is P31C5, P31C6 or P31C7 detected?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
NO >> INSPECTION END

P31C8. P31C9 NORMAL CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31C8. P31C9 NORMAL CHARGE RELAY

DTC Logic

INFOID:000000006977326

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Malfunction type)	DTC detecting condition	Possible cause
P31C8	ON BOARD CHARGER SYSTEM	VCM received normal charge relay (-) stuck signal from on board charger.	<ul style="list-style-type: none">• Harness or connectors• Normal charge relay• On-board charger
P31C9		VCM received normal charge relay (+) stuck signal from on board charger.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE 1

1. Erase DTC.
2. Turn power switch OFF wait at least 30 seconds.
3. Set the vehicle to READY and wait at least 180 seconds.
4. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-233. "Diagnosis Procedure"](#).
NO >> GO TO 2.

2. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF wait at least 30 seconds.
2. Start normal charge and wait at least 180 seconds.
3. Turn power switch ON.
4. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-233. "Diagnosis Procedure"](#).
NO (with quick charge)>>GO TO 3.
NO (without quick charge)>>INSPECTION END

3. PERFORM DTC CONFIRMATION PROCEDURE 2

1. Turn power switch OFF wait at least 30 seconds.
2. Start quick charge and wait at least 180 seconds.
3. Turn power switch ON.
4. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-233. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977327

WARNING:

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

P31C8. P31C9 NORMAL CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

- Refer to [GI-32, "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.

CAUTION:

Erase DTC after the work is completed.

1. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC.
- NO >> GO TO 2.

2. CHECK DTC OF VCM

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P3101 detected?

- YES >> Perform diagnosis procedure of P3101. Refer to [EVC-175, "Diagnosis Procedure"](#).
- NO >> GO TO 3.

3. PRECONDITIONING OF HIGH VOLTAGE OPERATION

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:



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



2. Measure voltage between high voltage harness terminals.

DANGER:



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

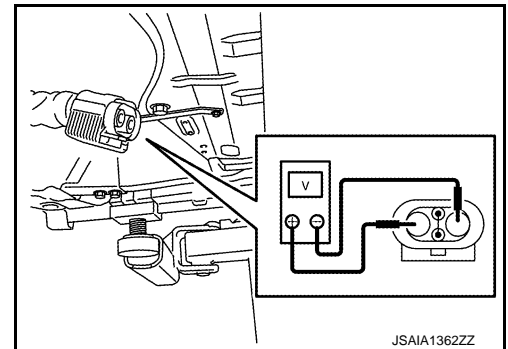


Standard

: 5 V or less

CAUTION:

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



JSAIA1362ZZ

>> GO TO 4.

4. CHECK NORMAL CHARGE RELAY

1. Disconnect DC/DC-J/B harness connectors H4 and H7.
2. Turn power switch ON.
3. Check continuity between DC/DC-J/B terminals 25 and 28.

DC/DC J/B		Continuity
Terminals		
25	28	Not existed

P31C8. P31C9 NORMAL CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

4. Check continuity between DC/DC-J/B terminals 27 and 27.

DC/DC J/B		Continuity
Terminals		
24	27	Not existed

Is the inspection result normal?

- YES >> Replace DC/DC-J/B. Refer to [EVC-307. "Removal and Installation"](#).
NO >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).

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P31CA. P31CB QUICK CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31CA. P31CB QUICK CHARGE RELAY

DTC Logic

INFOID:000000006977328

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31CA	ON BOARD CHARGER SYSTEM	VCM received quick charge relay (-) stuck signal from on board charger.	<ul style="list-style-type: none">• Harness or connectors• Quick charge relay• On-board charger
P31CB		VCM received quick charge relay (+) stuck signal from on board charger.	

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 30 seconds.
2. Start quick charge and wait at least 30 seconds.
3. Stop quick charge.
4. Turn power switch ON.
5. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-236, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977329

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "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.

CAUTION:

Erase DTC after the work is completed.

1. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2. CHECK DTC OF VCM

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is P3101 detected?

- YES >> Perform diagnosis procedure of P3101. Refer to [EVC-175, "Diagnosis Procedure"](#).
NO >> GO TO 3.

P31CA. P31CB QUICK CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

3. PRECONDITIONING OF HIGH VOLTAGE OPERATION

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:



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



2. Measure voltage between high voltage harness terminals.

DANGER:



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

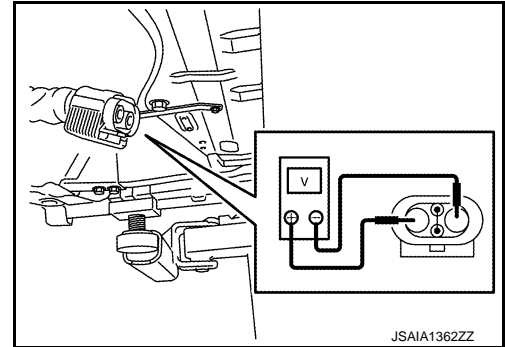


Standard

: 5 V or less

CAUTION:

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



>> GO TO 4.

4. CHECK NORMAL CHARGE RELAY

1. Disconnect DC/DC-J/B harness connectors H7 and H11.
2. Turn power switch ON.
3. Check continuity between DC/DC-J/B terminals 28 and 33.

DC/DC J/B		Continuity
Terminals		
28	33	Not existed

4. Check continuity between DC/DC-J/B terminals 27 and 34.

DC/DC J/B		Continuity
Terminals		
27	34	Not existed

Is the inspection result normal?

- YES >> Replace DC/DC-J/B. Refer to [EVC-307, "Removal and Installation"](#).
 NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

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P31D4 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D4 PRE-CHARGE RELAY

DTC Logic

INFOID:000000006977330

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, the voltage of a pre-charge relay monitor signal remains HIGH for 0.2 seconds or more.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Turn power switch ON and wait at least 10 seconds.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-238, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977331

1. CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect VCM harness connector E63 and Li-ion battery harness connector B24.
3. 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

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

Is inspection result normal?

- YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2. CHECK HARNESS

Check continuity between Li-ion battery harness connector and ground.

Li-ion battery		Ground	Continuity
Connector	Terminal		
B24	10	Ground	Existed

Is inspection result normal?

- YES >> Repair or replace error-detected parts of Li-ion battery inside.
NO >> Repair harness or connector.

P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D5 PRE-CHARGE RELAY

DTC Logic

INFOID:000000006977332

DTC DETECTION LOGIC

NOTE:

- Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- If P0AA0 and any of P0AA5, P31D4, P31DB, or P31DD are detected simultaneously, perform diagnosis of P0AA0 and applicable DTC (P0AA5, P31D4, P31DB, or P31DD) first.

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D5	PRE CHARGE RELAY	<ul style="list-style-type: none">• 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.	<ul style="list-style-type: none">• Harness or connectors• Li-ion battery J/B• Traction motor inverter• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Check that "SYSTEM MAIN RLY 1" and "PRE CHARGE RLY" in "BATTERY PACK" are in a shutoff state.
2. Clear DTC to maintain power switch OFF state for 60 seconds.
3. Set the vehicle to READY.
4. Check self-diagnostic result.

Is DTC detected?

- YES >> [EVC-239, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977333

1. DTC CHECK

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than "P31D5"?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [EVB-22, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
NO >> GO TO 5.

5. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of A/C auto amp. Refer to [HAC-30, "CONSULT Function"](#).

P31D5 PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

Is DTC detected?

- YES >> Perform detected DTC diagnosis procedure.
- NO >> Check that "SYSTEM MAIN RLY 1" and "PRE CHARGE RLY" in "BATTERY PACK" are in a shut-off state when power switch OFF.

P31D6 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D6 F/S RELAY

DTC Logic

INFOID:000000006977334

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D6	F/S RELAY	VCM detected the F/S relay stuck	<ul style="list-style-type: none"> • Harness or connectors • IPDM E/R • VCM

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DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 5 seconds.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-241, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

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Diagnosis Procedure

INFOID:000000006977335

1. CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect VCM harness connector E62 and IPDM E/R harness connector E15.
3. Check continuity between VCM harness connector and IPDM E/R harness connector.

VCM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E62	73	E15	60	Existed
	77		55	

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

Is inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace error-detected parts.

2. CHECK HARNESS

Check the voltage between VCM harness connector and ground.

VCM		Ground	Voltage
Connector	Terminal		
E62	77	Ground	0 V

Is inspection result normal?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
 NO >> Replace IPDM E/R. Refer to [PCS-28, "Removal and Installation"](#).

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P31D7 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31D7 F/S RELAY

DTC Logic

INFOID:000000006977336

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible cause
P31D7	F/S RELAY	VCM detected the F/S relay open	<ul style="list-style-type: none">• Harness or connectors• IPDM E/R• VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 20 seconds.
2. Set the vehicle to READY and wait at least 5 seconds.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-242, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977337

1. CHECK VOLTAGE OF VCM

1. Turn power switch OFF.
2. Check voltage between VCM harness connector and Ground.

+		-	Voltage
VCM			
Connector	Terminal		
E62	73	Ground	12V battery voltage (11 – 14)

Is inspection result normal?

- YES >> GO TO 3.
NO >> GO TO 2.

2. CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect VCM harness connector E62 and IPDM E/R harness connector E15.
3. Check continuity between VCM harness connector and IPDM E/R harness connector.

VCM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E62	73	E15	60	Existed

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

Is inspection result normal?

- YES >> Perform trouble diagnosis for power supply circuit (#64 fuse circuit).
NO >> Repair or replace error-detected parts.

3. CHECK HARNESS

1. Check continuity between VCM harness connector and IPDM E/R harness connector.

P31D7 F/S RELAY

< DTC/CIRCUIT DIAGNOSIS >

VCM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E62	77	E15	55	Existed

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

Is inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-28. "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

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P31DB SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

P31DB SYSTEM MAIN RELAY +

DTC Logic

INFOID:000000006977338

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DB	HV BATT MAIN RELAY +	The monitor signal voltage of the system main relay 1 remains Lo for 2.5 seconds or more.	<ul style="list-style-type: none"> • Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-244, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977339

1. CHECK HARNESS

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

+		-		Continuity
VCM		Li-ion battery		
Connector	terminal	Connector	terminal	
E63	107	B24	17	Existed

4. Check continuity between Li-ion battery harness connector and ground

+		-	Continuity
Li-ion battery			
Connector	terminal		
B24	17	Ground	Not existed

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair harness or connector.

2. CHECK SYSTEM MAIN RLY CIRCUIT

1. Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		
16	17	Existed

2. Check continuity between Li-ion battery connector terminal and ground.

P31DB SYSTEM MAIN RELAY +

< DTC/CIRCUIT DIAGNOSIS >

+	-	Continuity
Li-ion battery		
terminals		
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

INFOID:000000006977340

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DC	HV BATT MAIN RELAY -	The monitor signal voltage of the system main relay 2 remains Lo for 2.5 seconds or more.	<ul style="list-style-type: none"> • Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY.
3. Check DTC.

Is DTC detected?

- YES >> [EVC-246, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977341

1. CHECK HARNESS

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

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

4. Check continuity between Li-ion battery harness connector and ground

+		-	Continuity
Li-ion battery			
Connector	terminal		
B24	14	Ground	Not existed

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair harness or connector.

2. CHECK SYSTEM MAIN RLY CIRCUIT

1. Check continuity between Li-ion battery connector terminals.

Li-ion battery		Continuity
terminals		
13	14	Existed

2. Check continuity between Li-ion battery connector terminal and ground.

P31DC SYSTEM MAIN RELAY -

< DTC/CIRCUIT DIAGNOSIS >

+	-	Continuity
Li-ion battery		
terminals		
13	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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P31DD PRE-CHARGE RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31DD PRE-CHARGE RELAY

DTC Logic

INFOID:000000006977342

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)	The monitor signal voltage of the pre-charge relay remains Lo for 2.5 seconds or more.	<ul style="list-style-type: none">• Harness or connectors (Pre-charge relay drive circuit is shorted)• Pre-charge relay

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch OFF and wait at least 60 seconds.
2. Set the vehicle to READY.
3. Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-248, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977343

1.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-I

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

+		-
VCM		
Connector	Terminal	
E62	105	Ground

Indicates Approx. 0 Ω?

- YES >> GO TO 2.
NO >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

2.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-II

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

+		-	Continuity
VCM			
Connector	Terminal		
E62	105	Ground	Not existed

Is the inspection result normal?

- YES >> Check Li-ion battery internal pre-charge relay drive circuit.
NO >> Repair or replace error-detected parts.

P31DE SYSTEM MAIN RELAY

< DTC/CIRCUIT DIAGNOSIS >

P31DE SYSTEM MAIN RELAY

DTC Logic

INFOID:000000006977344

DTC DETECTION LOGIC

DTC No.	Trouble diagnosis name	DTC detecting condition	Possible cause
P31DE	HV BATT MAIN RELAY	<ul style="list-style-type: none">The number of shutoffs is no less than 3 and no more than 5 when a battery current values at the system main relay shutoff are added up and the integrated value is substituted for the number of shutoffs at battery current 200 A or more.The number of shutoffs is 5 or more when a battery current values at the system main relay shutoff are added up and the integrated value is substituted for the number of shutoffs at battery current 200 A or more.	<ul style="list-style-type: none">Li-ion battery J/BLBCA/C auto amp.DC/DC-J/BTraction motor inverterVCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Erase DTC.
- Turn power switch OFF and wait at least 30 seconds.
- Turn power switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> [EVC-249, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977345

1. PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31DE?

- YES >> Perform diagnosis procedure of detected DTC and then replace Li-ion battery J/B. Refer to [EVB-149, "BATTERY JUNCTION BOX : Disassembly and Assembly"](#).
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF LBC

Perform self-diagnosis of LBC. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC and then GO TO 6.
NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

Perform self-diagnosis of traction motor inverter. Refer to [TMS-26, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC and then GO TO 6.
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF ON BOARD CHARGER

Perform self-diagnosis of on board charger. Refer to [VC-17, "CONSULT Function"](#).

Is DTC detected?

- YES >> Perform diagnosis procedure of detected DTC and then GO TO 6.
NO >> GO TO 5.

5. PERFORM SELF-DIAGNOSIS OF A/C AUTO AMP.

Perform self-diagnosis of on board charger. Refer to [HAC-30, "CONSULT Function"](#).

Is DTC detected?

P31DE SYSTEM MAIN RELAY

< DTC/CIRCUIT DIAGNOSIS >

YES >> Perform diagnosis procedure of detected DTC and then GO TO 6.

NO >> GO TO 6.

6.REPLACE LI-ION BATTERY J/B

Replace Li-ion battery J/B. Refer to [EVB-149. "BATTERY JUNCTION BOX : Disassembly and Assembly"](#).

>> INSPECTION END

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

INFOID:000000006977346

The high voltage connector connection detecting circuit monitors the connection status of the high voltage connector.

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:000000006977347

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E0	HV SYSTEM INTERLOCK ERROR (High voltage harness connection detecting circuit low input)	VCM detects an excessively low voltage of the high voltage harness connection detecting circuit for 2.5 seconds during READY.	<ul style="list-style-type: none">• Harness or connectors (High voltage harness connection detection circuit is open or shorted.)• High voltage harness connectors• Quick charge port
		VCM detects an excessively low voltage of the high voltage harness connection detecting circuit for 0.5 seconds during power switch ON.	

DTC CONFIRMATION PROCEDURE

1. PERFORM CONFIRMATION PROCEDURE-I

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

Is DTC detected?

- YES >> GO TO 2.
NO >> INSPECTION END

2. PERFORM CONFIRMATION PROCEDURE-II

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

Is DTC detected?

- YES >> Proceed to [EVC-251, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977348

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "High Voltage Precautions"](#).

CAUTION:

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

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

1. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:



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



2. Measure voltage between high voltage harness terminals.

DANGER:



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

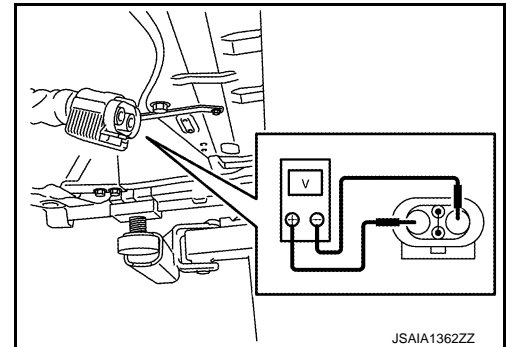


Standard

: 5 V or less

CAUTION:

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



>> GO TO 2.

2. 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.
4. Turn power switch ON.
5. Check the voltage between quick charge port and ground.

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
Quick charge port			
Connector	Terminal		
H13	12	Ground	12V battery power supply

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 5.

5. CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-I

1. Turn power switch OFF.
2. Remove M/C relay.
3. Check the continuity between quick charge port harness connector and M/C relay harness connector terminal.

+		-	Continuity
Quick charge port		M/C relay	
Connector	Terminal	Terminal	
H13	12	5	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-281, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

6. CHECK QUICK CHARGE PORT HARNESS

1. Disconnect quick charge port harness connector (-) side.
2. Check the continuity between quick charge port harness connectors.

+		-		Continuity
Quick charge port				
Connector	Terminal	Connector	Terminal	
H13	13	H14	15	Existed

3. 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 CONNECTION DETECTING CIRCUIT-I

1. Disconnect DC/DC junction box harness connector.
2. Check the continuity between quick charge port harness connector and DC/DC junction box harness connector.

+		-		Continuity
Quick charge port		DC/DC J/B		
Connector	Terminal	Connector	Terminal	
H14	16	F11	6	Existed

3. 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.

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

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.

+		-	Voltage
DC/DC J/B			
Connector	Terminal		
H13	12	Ground	12V battery power supply

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 9.

9. CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT-II

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.

+		-		Continuity
DC/DC J/B		M/C relay		
Connector	Terminal	Terminal		
F11	6	5		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-281, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

10. CHECK CONNECTION DETECTION CIRCUIT-II

1. Disconnect VCM harness connector.
2. Check the continuity between VCM harness connector and DC/DC junction box harness connector.

+		-		Continuity
VCM		DC/DC J/B		
Connector	Terminal	Connector	Terminal	
E61	23	F11	5	Existed

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

Is the inspection result normal?

YES >> GO TO 11.

NO >> Repair or replace error-detected parts.

11. CHECK HIGH VOLTAGE HARNESS CONNECTOR

1. Disconnect high voltage harness connectors from DC/DC junction box.
2. Check the continuity between following connector terminals.

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

High voltage harness				Continuity
Harness	Connector	+	-	
		Terminal		
To A/C compressor	H2	22	23	Existed
To Li-ion battery	H4	38	39	
To on-board charger	H7	40	41	
To PTC elements heater	H9	42	43	
To Quick charge port	H11	44	45	
To traction motor inverter	H15	46	47	

Is the inspection result normal?

- YES >> Replace DC/DC junction box. Refer to [EVC-307, "Removal and Installation"](#).
- NO >> Replace malfunctioning high voltage harness.

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P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

INFOID:000000006977349

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:000000006977350

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E1	HV SYSTEM INTERLOCK ERROR (High voltage harness connection malfunction)	VCM receives the connection malfunction signal via EV system CAN communication sent from Li-ion battery controller.	<ul style="list-style-type: none">• Harness and connector (Connector detecting circuit within Li-ion battery)• High voltage harness• Service plug

DTC CONFIRMATION PROCEDURE

1. PERFORM CONFIRMATION PROCEDURE-I

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

Is DTC detected?

- YES >> GO TO 2.
NO >> INSPECTION END

2. PERFORM CONFIRMATION PROCEDURE-II

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

Is DTC detected?

- YES >> Proceed to [EVC-256, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977351

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

WARNING:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:

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



2. Measure voltage between high voltage harness terminals.

DANGER:

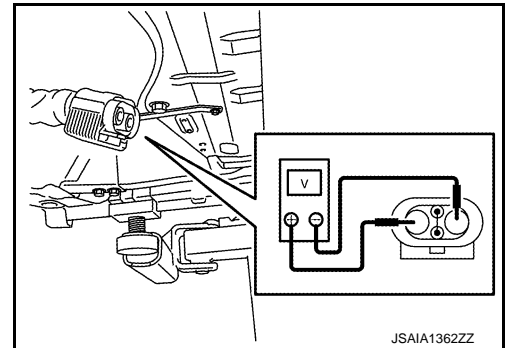
 Touching high voltage components without using the appropriate protective equipment will cause electrocution.



Standard : 5 V or less

CAUTION:

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



>> GO TO 2.

2.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 3.
- NO >> Repair or replace error-detected parts.

3.CHECK SELF-DIAGNOSTIC RESULT IN LI-ION BATTERY CONTROLLER

Check self-diagnostic result in "HV BAT".

Are any DTC detected?

- YES >> Check the DTC. Refer to [EVB-34, "DTC Index"](#).
- NO >> GO TO 4.

4.CHECK SERVICE PLUG

Check service plug connector terminals.

Service plug		Continuity
Terminal		
+	-	Existed
3	4	

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 the continuity between high voltage harness connector terminals.

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P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

High voltage harness			Continuity
Connector	+	-	
	Terminal		
H3	1	2	Existed

Is the inspection result normal?

YES >> Check a circuit within the battery.

NO >> Replace high voltage harness.

P31E2 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31E2 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

INFOID:000000006977352

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

INFOID:000000006977353

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E2	HV SYSTEM INTERLOCK ERROR (High voltage harness connection malfunction)	VCM receives the connection malfunction signal via EV system CAN communication sent from on-board charger.	<ul style="list-style-type: none"> High voltage harness On-board charger VCM

DTC CONFIRMATION PROCEDURE

1.PERFORM CONFIRMATION PROCEDURE-I

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

Is DTC detected?

- YES >> GO TO 2.
NO >> INSPECTION END

2.PERFORM CONFIRMATION PROCEDURE-II

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

Is DTC detected?

- YES >> Proceed to [EVC-259, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977354

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses/face shield 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 [GI-32, "High Voltage Precautions"](#).

CAUTION:

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

1.PRECONDITIONING

WARNING:

P31E2 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

< DTC/CIRCUIT DIAGNOSIS >

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

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

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

DANGER:

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



2. Measure voltage between high voltage harness terminals.

DANGER:

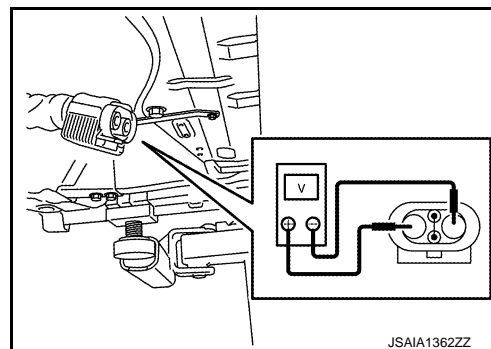
 Touching high voltage components without using the appropriate protective equipment will cause electrocution.



Standard : 5 V or less

CAUTION:

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



>> GO TO 2.

2.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 3.

NO >> Repair or replace error-detected parts.

3.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-24, "DTC Index"](#).

NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Turn power switch OFF and wait at least 20 seconds.
3. Perform DTC confirmation procedure again. Refer to [EVC-259, "DTC Logic"](#).

Is the DTC detected again?

YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> INSPECTION END

P31E7 RESTART INHIBITION

< DTC/CIRCUIT DIAGNOSIS >

P31E7 RESTART INHIBITION

Description

INFOID:000000006977355

DTC "P3127" is detected with DTC "P0AA6". If DTC "P3127" detected, Perform trouble diagnosis for "P0AA6". Refer to [EVC-136. "Description"](#).

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P31E8 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31E8 WATER PUMP 1

DTC Logic

INFOID:000000006977356

DTC DETECTION LOGIC

DTC No.	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. <ul style="list-style-type: none"> • Less than 2% • 98% or more • Between 13% and 17% 	<ul style="list-style-type: none"> • Harness or connectors • Electric water pump 1 • VCM

DTC CONFIRMATION PROCEDURE

1. 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 >> [EVC-262, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977357

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31E8?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2. CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect electric water pump 1 harness connector E67 and VCM harness connectors E61 and E62.
3. Check continuity between electric water pump 1 harness connector and VCM harness connector.

Electric water pump 1		VCM		Continuity
Connector	Terminals	Connector	Terminals	
E67	3	E62	62	Existed
	4	E61	28	

4. Check continuity between VCM harness connector and ground.

VCM		—	Continuity
Connector	Terminals		
E61	28	Ground	Not existed
E62	62		

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Repair harness or connector.

3. CHECK WATER PUMP 1 TARGET DUTY

1. Connect VCM and electric water pump 1 harness connectors.
2. Set the vehicle to READY.
3. Select "WATER PUMP 1 TRG DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 20% and 80%?

P31E8 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
- NO >> Replace VCM.

A

4.CHECK WATER PUMP 1 CURRENT SPEED DUTY

Select "W/P 1 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

B

Is value between 20% and 80%?

- YES >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).
- NO >> Replace electric water pump 1. Refer to [HCO-22, "Removal and Installation"](#).

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P31E9 WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31E9 WATER PUMP 1

DTC Logic

INFOID:000000006977358

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• Electric water pump 1• VCM

DTC CONFIRMATION PROCEDURE

1.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 >> [EVC-264, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977359

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31E9?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2.CHECK WATER PUMP 1 CURRENT SPEED DUTY

Select "W/P 1 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 83% and 91%?

- YES >> Replace electric water pump 1. Refer to [HCO-22, "Removal and Installation"](#).
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

P31EA WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31EA WATER PUMP 2

DTC Logic

INFOID:000000006977360

DTC DETECTION LOGIC

DTC No.	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. <ul style="list-style-type: none"> • Less than 2% • 98% or more • Between 13% and 17% 	<ul style="list-style-type: none"> • Harness or connectors • Electric water pump 2 • VCM

DTC CONFIRMATION PROCEDURE

1.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 >> [EVC-265. "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977361

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51. "CONSULT Function"](#).

Is DTC detected other than P31EA?

YES >> Perform diagnosis procedure of detected DTC.

NO >> GO TO 2.

2.CHECK HARNESS

1. Turn power switch OFF.
2. Disconnect electric water pump 2 harness connector E68 and VCM harness connectors E61 and E62.
3. Check continuity between electric water pump 2 harness connector and VCM harness connector.

Electric water pump 2		VCM		Continuity
Connector	Terminals	Connector	Terminals	
E68	3	E62	64	Existed
	4	E61	26	

4. Check continuity between VCM harness connector and ground.

VCM		—	Continuity
Connector	Terminals		
E61	26	Ground	Not existed
E62	64		

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

3.CHECK WATER PUMP 2 TARGET DUTY

1. Connect VCM and electric water pump 2 harness connectors.
2. Set the vehicle to READY.
3. Select "WATER PUMP 2 TRG DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 20% and 80%?

P31EA WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 4.
- NO >> Replace VCM.

4.CHECK WATER PUMP 2 CURRENT SPEED DUTY

Select "W/P 2 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 20% and 80%?

- YES >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).
- NO >> Replace electric water pump 2. Refer to [HCO-22. "Removal and Installation"](#).

P31EB WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31EB WATER PUMP 2

DTC Logic

INFOID:000000006977362

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• Electric water pump 2• VCM

DTC CONFIRMATION PROCEDURE

1.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 >> [EVC-267, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977363

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31EB?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2.CHECK WATER PUMP 2 CURRENT SPEED DUTY

Select "W/P 2 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 83% and 91%?

- YES >> Replace electric water pump 2. Refer to [HCO-22, "Removal and Installation"](#).
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

P31EC WATER PUMP 1

< DTC/CIRCUIT DIAGNOSIS >

P31EC WATER PUMP 1

DTC Logic

INFOID:000000006977364

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• Electric water pump 1• VCM

DTC CONFIRMATION PROCEDURE

1. 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 >> [EVC-268, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977365

1. CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31EC?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2. CHECK WATER PUMP 1 CURRENT SPEED DUTY

Select "W/P 1 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 3% and 7%?

- YES >> Replace electric water pump 1. Refer to [HCO-22, "Removal and Installation"](#).
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

P31ED WATER PUMP 2

< DTC/CIRCUIT DIAGNOSIS >

P31ED WATER PUMP 2

DTC Logic

INFOID:000000006977366

DTC DETECTION LOGIC

DTC No.	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.	<ul style="list-style-type: none">• Harness or connectors• Electric water pump 2• VCM

DTC CONFIRMATION PROCEDURE

1.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 >> [EVC-269, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977367

1.CHECK DTC

Perform self-diagnosis of VCM. Refer to [EVC-51, "CONSULT Function"](#).

Is DTC detected other than P31ED?

- YES >> Perform diagnosis procedure of detected DTC.
NO >> GO TO 2.

2.CHECK WATER PUMP 2 CURRENT SPEED DUTY

Select "W/P 2 CRNT SPD DUTY" in "DATA MONITOR" mode of "VCM" using CONSULT.

Is value between 3% and 7%?

- YES >> Replace electric water pump 2. Refer to [HCO-22, "Removal and Installation"](#).
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P31EE REFRIGERANT PRESSURE SENSOR

DTC Logic

INFOID:000000006977368

DTC DETECTION LOGIC

NOTE:

If DTC P31EE is displayed with DTC P0643, first perform the trouble diagnosis for DTC P0643. Refer to [EVC-114, "DTC Logic"](#).

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31EE	REFRIGERANT PRES- SURE SENSOR (Refrigerant pressure sen- sor circuit range/perfor- mance)	<ul style="list-style-type: none">Signal voltage from refrigerant pressure sensor remains Approx. 0 V for 2.5 seconds or moreSignal voltage from refrigerant pressure sensor remains Approx. 4.7 V or more for 2.5 seconds or more	<ul style="list-style-type: none">Harness or connectors (Refrigerant pressure sensor circuit is open or shorted.)Refrigerant pressure sensorVCM

DTC CONFIRMATION PROCEDURE

1. PERFORM CONFIRMATION PROCEDURE

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

Is DTC detected?

- YES >> Proceed to [EVC-270, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977369

1. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY-I

1. 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.

Refrigerant pressure sensor			Voltage (Approx.)
Connector	+	-	
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.

+		-	Voltage (Approx.)
Refrigerant pressure sensor Connector	Terminal		
E49	3	Ground	5 V

Is the inspection result normal?

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

P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between refrigerant pressure sensor and VCM harness connector.

+		-		Continuity
Refrigerant pressure sensor		VCM		
Connector	Terminal	Connector	Terminal	
E49	3	E62	33	Existed

4. 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-114, "Diagnosis Procedure"](#).

NO >> Repair or replace error-detected parts.

4. CHECK REFRIGERANT PRESSURE SENSOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between refrigerant pressure sensor and VCM harness connector.

+		-		Continuity
Refrigerant pressure sensor		VCM		
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.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

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 >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

7. REPLACE REFRIGERANT PRESSURE SENSOR

1. Replace refrigerant pressure sensor. Refer to [HAC-139, "Removal and Installation"](#).
2. Reconnect all harness connector disconnected.
3. Perform DTC confirmation procedure again. Refer to [EVC-270, "DTC Logic"](#).

Is the DTC detected again?

P31EE REFRIGERANT PRESSURE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).
NO >> INSPECTION END

P31F0 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P31F0 DC/DC CONVERTER

DTC Logic

INFOID:000000006977370

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.	<ul style="list-style-type: none"> Harness or connectors (DC/DC converter temperature signal circuit) VCM

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

- Turn power switch OFF and wait at least 20 seconds.
- Turn ignition switch ON and wait at least 10 seconds.
- Check DTC.

Is DTC detected?

- YES >> Proceed to [EVC-273, "Diagnosis Procedure"](#).
 NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977371

1. CHECK DC/DC CONVERTER TEMPERATURE SIGNAL CIRCUIT

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

+		-		Continuity
VCM		DC/DC J/B		
Connector	Terminal	Connector	Terminal	
E62	67	F11	8	Existed

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

Is the inspection result normal?

- YES >> GO TO 2.
 NO >> Repair or replace error-detected parts.

2. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

Is the inspection result normal?

- YES >> GO TO 3.
 NO >> Repair or replace error-detected parts.

P31F0 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

3. 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 4.

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-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

P31F2 AV INFORMATION MISMATCH

< DTC/CIRCUIT DIAGNOSIS >

P31F2 AV INFORMATION MISMATCH

DTC Logic

INFOID:000000006977372

DTC DETECTION LOGIC

DTC	Trouble diagnosis name (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31F2	AV SET INFORMATION (Timer malfunction)	<ul style="list-style-type: none">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.	<ul style="list-style-type: none">AV control unitVCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE-I

- Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- Change the timer charge setting 1 on navigation display and wait at least 6 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-275. "Diagnosis Procedure"](#).
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-II

- Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- Change the timer charge setting 2 on navigation display and wait at least 6 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-275. "Diagnosis Procedure"](#).
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-III

- Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- Change the timer air conditioner setting 1 on navigation display and wait at least 6 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-275. "Diagnosis Procedure"](#).
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-IV

- Turn power switch OFF and wait at least 20 seconds.
- Turn power switch ON.
- Change the timer air conditioner setting 2 on navigation display and wait at least 6 minutes.
- Check DTC.

Is DTC detected?

YES >> Proceed to [EVC-275. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006977373

1.REPLACE AV CONTROL UNIT

- Replace AV control unit. Refer to [AV-119. "Removal and Installation"](#).
- Perform DTC confirmation procedure again. Refer to [EVC-275. "DTC Logic"](#).

Is the DTC detected again?

P31F2 AV INFORMATION MISMATCH

< DTC/CIRCUIT DIAGNOSIS >

YES >> Replace VCM. Refer to [EVC-315. "Removal and Installation"](#).
NO >> INSPECTION END

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

COOLING FAN

Component Function Check

INFOID:000000006977374

1.CHECK COOLING FAN FUNCTION

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-277. "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006977375

1.CHECK COOLING FAN CONTROL MODULE POWER SUPPLY

1. Turn ignition switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Turn ignition switch ON.
4. Check the voltage between cooling fan control module harness connector and ground.

+		-	Voltage
Cooling fan control module			
Connector	Terminal		
E19	3	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 10.
NO >> GO TO 2.

2.CHECK 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.

+		-	Voltage
Cooling fan relay			
Connector	Terminal		
E18	3	Ground	12V battery voltage

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.

+		-	Voltage
Cooling fan relay			
Connector	Terminal		
E18	1	Ground	12V battery voltage

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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 voltage

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.

+		-	Continuity
M/C relay			
Connector	Terminal		
E65	5	#73 fuse terminal	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-281, "Diagnosis Procedure"](#).
- NO >> Repair or replace error-detected parts.

7.CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Check the continuity between cooling fan relay harness connector and fuse harness connector.

+		-	Continuity
Cooling fan relay			
Connector	Terminal		
E18	1	#73 fuse terminal	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 >

2. Check the continuity between cooling fan relay harness connector and ground.

+		-	Continuity
Cooling fan relay			
Connector	Terminal	Ground	Existed
E18	2		

Is the inspection result normal?

- YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9.CHECK COOLING FAN RELAY

Refer to [EVC-280, "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.

10.CHECK COOLING FAN MOTOR 1 AND 2

Check cooling fan motor. Refer to [EVC-279, "Component Inspection \(Cooling Fan Motor\)"](#).

Is the inspection result normal?

- YES >> GO TO 11.
NO >> Replace malfunctioning cooling fan motor. Refer to [HCO-18, "Exploded View"](#).

11.CHECK COOLING FAN CONTROL SIGNAL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between cooling fan control module harness connector and VCM harness connector.

+		-		Continuity
Cooling fan control module		VCM		
Connector	Terminal	Connector	Terminal	Existed
E19	2	E62	59	

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.

12.REPLACE COOLING FAN CONTROL MODULE

1. Replace cooling fan control module. Refer to [HCO-18, "Exploded View"](#).
2. Erase the DTC.
3. Perform component function check. Refer to [EVC-277, "Component Function Check"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace VCM. Refer to [EVC-315, "Removal and Installation"](#).

Component Inspection (Cooling Fan Motor)

INFOID:0000000006977376

1.CHECK COOLING FAN MOTOR

1. Turn power switch OFF.
2. Disconnect cooling fan control module harness connectors.
3. Supply cooling fan control module harness connector terminals with battery voltage as per the following, and check operation.

COOLING FAN

< DTC/CIRCUIT DIAGNOSIS >

Cooling fan control module				Operation
Motor	Connector	Terminal		
		+	-	
1	E301	4	5	Cooling fan operates.
2	E302	6	7	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace malfunctioning cooling fan motor. Refer to [HCO-18, "Exploded View"](#).

Component Inspection (Cooling Fan Relay)

INFOID:000000006977377

1. CHECK COOLING FAN RELAY

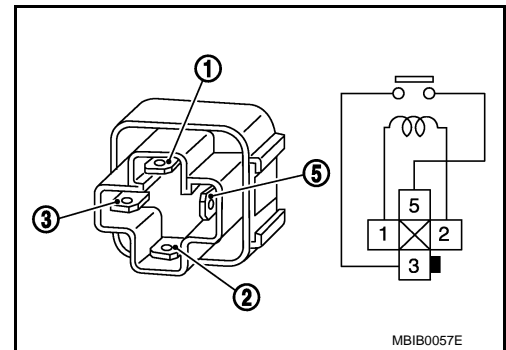
1. Turn power switch OFF.
2. Remove cooling fan relay.
3. Check the continuity between cooling fan relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace cooling fan relay.



MBIB0057E

M/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

M/C RELAY

Diagnosis Procedure

INFOID:000000006977378

1. CHECK M/C RELAY CONTROL CIRCUIT

1. Turn power switch OFF.
2. Remove M/C relay.
3. Check the voltage between M/C relay harness connector terminals.

M/C relay			Voltage
Connector	+	-	
	Terminal		
E65	2	1	0 V

4. Turn power switch ON.
5. Check the voltage between M/C relay harness connector terminals.

M/C relay			Voltage
Connector	+	-	
	Terminal		
E65	2	1	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 2.

2. CHECK BATTERY POWER SUPPLY-I

Check the voltage between M/C relay harness connector and ground.

+		-	Voltage
M/C relay			
Connector	Terminal		
E65	2	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

3. 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 4.
NO >> Replace the fusible link after repairing the applicable circuit.

4. CHECK BATTERY POWER SUPPLY-II

Check the voltage between fusible link harness connector and ground.

+	-	Voltage
#G fusible link terminal	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 5.

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M/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Check power supply circuit for battery power supply.

5.CHECK BATTERY POWER SUPPLY CIRCUIT-I

1. Check the continuity between M/C relay harness connector and fusible link harness connector.

+	-		Continuity
	M/C relay		
	Connector	Terminal	
#G fusible link terminal	E65	2	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.

6.CHECK M/C RELAY CONTROL SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between M/C relay harness connector and VCM harness connector.

+		-		Continuity
M/C relay		VCM		
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.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

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 VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

9.CHECK BATTERY POWER SUPPLY-III

Check the voltage between M/C relay harness connector and ground.

M/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
M/C relay			
Connector	Terminal		
E65	3	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.CHECK BATTERY POWER SUPPLY CIRCUIT-II

1. Check the continuity between M/C relay harness connector and fusible link harness connector.

+	-		Continuity
	M/C relay		
	Connector	Terminal	
#G fusible link terminal	E65	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.

11.CHECK M/C RELAY

Refer to [EVC-283, "Component Inspection \(M/C Relay\)"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace M/C relay.

Component Inspection (M/C Relay)

INFOID:000000006977379

1.CHECK M/C RELAY

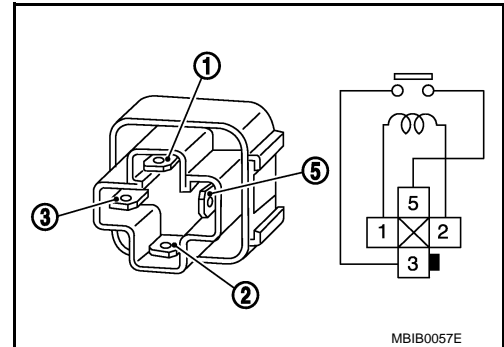
1. Turn power switch OFF.
2. Remove M/C relay.
3. Check the continuity between M/C relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	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:000000006977380

1. CHECK F/S CHG RELAY POWER SUPPLY-I

1. Turn power switch OFF.
2. Remove F/S CHG relay.
3. Turn power switch ON.
4. Check the voltage between F/S CHG relay harness connector and ground.

+		-	Voltage
F/S CHG relay			
Connector	Terminal		
E64	2	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> GO TO 2.

2. CHECK F/S CHG RELAY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

+		-	Voltage
IPDM E/R			
Connector	Terminal		
E15	55	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 3.
NO >> Check F/S relay routing circuit. Refer to [EVC-242, "Diagnosis Procedure"](#).

3. CHECK F/S CHG RELAY POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between F/S CHG relay harness connector and IPDM E/R harness connector.

+		-		Continuity
F/S CHG relay		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E64	2	E15	55	Existed

4. 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.

4. CHECK BATTERY POWER SUPPLY-I

Check the voltage between F/S CHG relay harness connector and ground.

F/S CHG RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
F/S CHG relay			
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.
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 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.

+	-		Continuity
	F/S CHG relay		
	Connector	Terminal	
#33 fuse terminal	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 CONTROL SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between F/S CHG relay harness connector and VCM harness connector.

+		-		Continuity
F/S CHG relay		VCM		
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 9.

F/S CHG 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.

+		-	Continuity
VCM			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

Is the inspection result normal?

YES >> GO TO 10.

NO >> Repair or replace error-detected parts.

10. CHECK F/S RELAY

Refer to [EVC-280. "Component Inspection \(Cooling Fan Relay\)".](#)

Is the inspection result normal?

YES >> GO TO 11.

NO >> Replace F/S CHG relay.

11. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to [GI-51. "Intermittent Incident".](#)

Is the inspection result normal?

YES >> Replace VCM. Refer to [EVC-315. "Removal and Installation".](#)

NO >> Repair or replace error-detected parts.

Component Inspection (F/S CHG Relay)

INFOID:000000006977381

1. CHECK F/S CHG RELAY

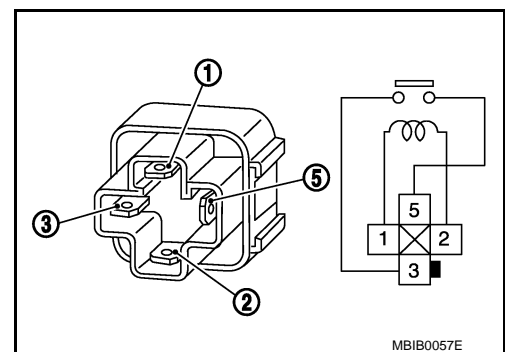
- Turn power switch OFF.
- Remove F/S CHG relay.
- Check the continuity between F/S CHG relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace F/S CHG relay.



SSOFF RELAY

< DTC/CIRCUIT DIAGNOSIS >

SSOFF RELAY

Diagnosis Procedure

INFOID:000000006977382

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

+		-	Voltage
IPDM E/R			
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.

+		-	Voltage
IPDM E/R			
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. Remove #D fusible link.
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.

5.CHECK SSOFF RELAY CONTROL CIRCUIT FOR SHORT TO GROUND

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check harness for short to ground between IPDM E/R harness connector and VCM harness connector.

+		-		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E14	41	E61	7	Existed

Is the inspection result normal?

- YES >> Replace IPDM E/R. Refer to [PCS-28, "Removal and Installation"](#).

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SSOFF RELAY

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair or replace error-detected parts.

6. CHECK SSOFF RELAY CONTROL SIGNAL

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

+		-	Voltage (Approx.)
IPDM E/R			
Connector	Terminal	Ground	0 V
E14	41		

Is the inspection result normal?

YES >> GO TO 10.

NO >> GO TO 7.

7. CHECK SSOFF RELAY CONTROL SIGNAL CIRCUIT

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

+		-		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	Existed
E14	41	E61	7	

4. 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.

+		-	Continuity
IPDM E/R			
Connector	Terminal	Ground	Existed
E61	4		
	8		
E63	111		
	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-315, "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.

SSOFF RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
IPDM E/R			
Connector	Terminal		
E14	36	Ground	12V battery voltage

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace IPDM E/R. Refer to [PCS-28, "Removal and Installation"](#).

Component Inspection (SSOFF Relay)

INFOID:00000006977383

1. CHECK SSOFF RELAY

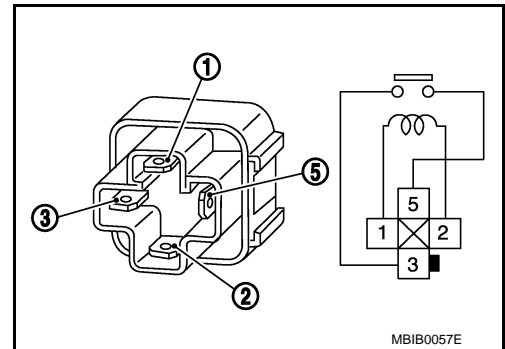
1. Turn power switch OFF.
2. Remove SSOFF relay.
3. Check the continuity between SSOFF relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	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:000000006977384

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-290, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006977385

1.CHECK REVERSE LAMP RELAY CONTROL CIRCUIT

1. Turn power switch OFF.
2. Remove reverse lamp relay.
3. Turn power switch ON.
4. Check the voltage between reverse lamp relay harness connector terminals.

Reverse lamp relay			Voltage
Connector	+	-	
Terminal			
E27	1	2	0 V

5. Shift the selector lever in P position.
6. Check the voltage between reverse lamp relay harness connector terminals.

Reverse lamp relay			Voltage
Connector	+	-	
Terminal			
E27	1	2	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 9.
NO >> GO TO 2.

2.CHECK IGNITION POWER SUPPLY-I

Check the voltage between reverse lamp relay harness connector and ground.

+		-	Voltage
Reverse lamp relay	Terminal		
Connector	Terminal		
E27	1	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 6.
NO >> GO TO 3.

3.CHECK IGNITION POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

REVERSE LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
IPDM E/R			
Connector	Terminal		
E15	58	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5.

NO >> GO TO 4.

4.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #56 fuse.
3. 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.

5.CHECK IGNITION POWER SUPPLY CIRCUIT-I

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.

+		-		Continuity
Reverse lamp relay		IPDM E/R		
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.

6.CHECK REVERSE LAMP RELAY CONTROL SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between reverse lamp relay harness connector and VCM harness connector.

+		-		Continuity
Reverse lamp relay		VCM		
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 7.

NO >> Repair or replace error-detected parts.

7.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

REVERSE LAMP RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Continuity
VCM			
Connector	Terminal	Ground	Existed
E61	4		
	8		
E63	111		
	112		

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 VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

9.CHECK IGNITION POWER SUPPLY-III

Check the voltage between reverse lamp relay harness connector and ground.

+		-	Voltage
Reverse lamp relay			
Connector	Terminal	Ground	12V battery voltage
E27	3		

Is the inspection result normal?

YES >> GO TO 11.

NO >> GO TO 10.

10.CHECK IGNITION POWER SUPPLY CIRCUIT-II

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.

+		-		Continuity
Reverse lamp relay		IPDM E/R		
Connector	Terminal	Connector	Terminal	Existed
E27	3	E15	58	

Is the inspection result normal?

YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).

NO >> Repair or replace error-detected parts.

11.CHECK REVERSE LAMP RELAY

Refer to [EVC-292, "Component Inspection \(Reverse Lamp Relay\)"](#).

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace reverse lamp relay.

Component Inspection (Reverse Lamp Relay)

INFOID:000000006977386

1.CHECK REVERSE LAMP RELAY

REVERSE LAMP RELAY

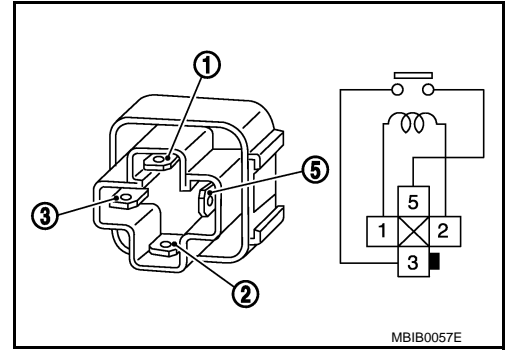
< DTC/CIRCUIT DIAGNOSIS >

1. 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
	No current supply	Not existed

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Replace reverse lamp relay.



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A/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

A/C RELAY

Diagnosis Procedure

INFOID:000000006977387

1. CHECK A/C RELAY CONTROL CIRCUIT

1. Turn power switch OFF.
2. Remove A/C relay.
3. Check the voltage between A/C relay harness connector terminals.

A/C relay			Voltage
Connector	+	-	
	Terminal		
E52	1	2	0 V

4. Turn power switch ON.
5. Check the voltage between A/C relay harness connector terminals.

A/C relay			Voltage
Connector	+	-	
	Terminal		
E52	1	2	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 8.
NO >> GO TO 2.

2. CHECK SSOFF RELAY POWER SUPPLY-I

Check the voltage between A/C relay harness connector and ground.

+		-	Voltage
A/C relay			
Connector	Terminal		
E52	1	Ground	12V battery voltage

Is the inspection result normal?

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

3. CHECK SSOFF RELAY POWER SUPPLY-II

Check the voltage between IPDM E/R harness connector and ground.

+		-	Voltage
IPDM E/R			
Connector	Terminal		
E14	36	Ground	12V battery voltage

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Check SSOFF relay routing circuit. Refer to [EVC-287, "Diagnosis Procedure"](#).

4. CHECK A/C RELAY POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect IPDM E/R harness connector.

A/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

3. Check the continuity between A/C relay harness connector and IPDM E/R harness connector.

+		-		Continuity
A/C relay		IPDM E/R		
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.

5.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.

+		-		Continuity
A/C relay		VCM		
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 6.

NO >> Repair or replace error-detected parts.

6.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		-	Continuity
IPDM E/R			
Connector	Terminal		
E61	4	Ground	Existed
	8		
E63	111		
	112		

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 VCM. Refer to [EVC-315, "Removal and Installation"](#).

NO >> Repair or replace error-detected parts.

8.CHECK BATTERY POWER SUPPLY

1. Turn power switch OFF.
2. Check the voltage between A/C relay harness connector and ground.

A/C RELAY

< DTC/CIRCUIT DIAGNOSIS >

+		-	Voltage
A/C relay			
Connector	Terminal		
E52	3	Ground	12V battery voltage
	6		

Is the inspection result normal?

- YES >> GO TO 11.
NO >> GO TO 9.

9.CHECK FUSE

- Turn power switch OFF.
- Pull out #32 fuse.
- Check that the fuse is not fusing.

Is the inspection result normal?

- YES >> GO TO 10.
NO >> Replace the fuse after repairing the applicable circuit.

10.CHECK BATTERY POWER SUPPLY CIRCUIT

Check the continuity between A/C relay harness connector and fuse harness connector.

+		-	Continuity
A/C relay			
Connector	Terminal		
E52	3	#32 fuse terminal	Existed
	6		

Is the inspection result normal?

- YES >> Check intermittent incident. Refer to [GI-51, "Intermittent Incident"](#).
NO >> Repair or replace error-detected parts.

11.CHECK A/C RELAY

Refer to [EVC-296, "Component Inspection \(A/C Relay\)"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace A/C relay.

Component Inspection (A/C Relay)

INFOID:000000006977388

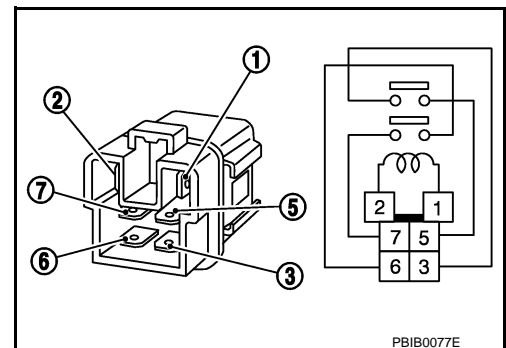
1.CHECK A/C RELAY

- Turn power switch OFF.
- Remove A/C relay.
- 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
	6 - 7	
No current supply	3 - 5	Not existed
	6 - 7	

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:000000006977389

1. CHECK CHARGING STATUS INDICATOR FUNCTION

With CONSULT

1. Turn power switch ON.
2. Perform "CHARGE STAT INDICATOR 1" of "ACTIVE TEST" mode in "VCM" with CONSULT.
3. Activate the charging status indicator 1 and check that the indicator lights up.
4. Check charging status indicator 2 and 3 in the same way.

Is the inspection result normal?

- YES >> INSPECTION END
 NO >> Proceed to [EVC-297, "Diagnosis Procedure"](#).

Diagnosis Procedure

INFOID:000000006977390

1. CHECK CHARGING STATUS INDICATOR CONTROL CIRCUIT

With CONSULT

1. Disconnect charging status indicator.
2. Check the voltage between charging status indicator harness connector terminals.

Items	Charging status indicator			Voltage
	Connector	+	-	
		Terminal		
Charging status indicator 1	M101	4	1	0 V
Charging status indicator 2			2	
Charging status indicator 3			3	

3. Turn power switch ON.
4. Perform "CHARGE STAT INDICATOR 1" of "ACTIVE TEST" mode in "VCM" with CONSULT.
5. Activate the charging status indicator 1.
6. Check the voltage between charging status indicator harness connector terminals.
7. Check charging status indicator 2 and 3 in the same way.

Items	Charging status indicator			Voltage
	Connector	+	-	
		Terminal		
Charging status indicator 1	M101	4	1	Battery voltage
Charging status indicator 2			2	
Charging status indicator 3			3	

Is the inspection result normal?

- YES >> Replace charging status indicator. Refer to [VC-114, "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.

+		-	Voltage
Charging status indicator			
Connector	Terminal		
M101	4	Ground	12V battery voltage

Is the inspection result normal?

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.

+		-	Continuity
Charging status indicator			
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.

5.CHECK CHARGING STATUS INDICATOR GROUND CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the continuity between charging status indicator harness connector and VCM harness connector.

Items	+		-		Continuity
	Charging status indicator		VCM	Terminal	
	Connector	Terminal	Connector		
Charging status indicator 1	M101	1	E63	86	Existed
Charging status indicator 2		2		85	
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.

+		-	Continuity
VCM			
Connector	Terminal		
E63	4	Ground	Existed
	8		
	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-315, "Removal and Installation"](#).
- NO >> Repair or replace error-detected parts.

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EVC

IMMEDIATE CHARGING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

IMMEDIATE CHARGING SWITCH

Diagnosis Procedure

INFOID:000000006977391

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.

+		-	Voltage
Immediate charging switch			
Connector	Terminal		
M65	3	Ground	Battery voltage

Is the inspection result normal?

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

3. CHECK FUSE

1. 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

1. Disconnect immediate charging switch harness connector.
2. Check the continuity between immediate charging switch harness connector and fuse harness connector.

+		-	Continuity
Immediate charging switch			
Connector	Terminal		
M65	3	#47 fuse terminal	Existed

Is the inspection result normal?

- YES >> Check power supply circuit.
NO >> Repair or replace error-detected parts.

5. CHECK IMMEDIATE CHARGING SWITCH GROUND CIRCUIT

1. Turn power switch OFF.
2. 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 >

+		-	Continuity
Immediate charging switch			
Connector	Terminal		
M65	4	Ground	Existed

A
B

Is the inspection result normal?

- YES >> Replace immediate switch. Refer to [VC-113, "Removal and Installation"](#).
 NO >> Repair or replace error-detected parts.

EVC

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 and ground.

D
E

+		-	Voltage
Immediate charging switch			
Connector	Terminal		
M65	1	Ground	Battery voltage

F
G

Is the inspection result normal?

- YES >> GO TO 9.
 NO >> GO TO 7.

H

7.CHECK FUSE

1. Pull out #13 fuse.
2. Check that the fuse is not fusing.

I

Is the inspection result normal?

- YES >> GO TO 8.
 NO >> Replace the fuse after repair the applicable circuit.

J

8.CHECK IMMEDIATE CHARGING SWITCH POWER SUPPLY CIRCUIT

Check the continuity between immediate charging switch harness connector and fuse harness connector.

K

+		-	Continuity
Immediate charging switch			
Connector	Terminal		
M65	1	#13 fuse terminal	Existed

L
M

Is the inspection result normal?

- YES >> Check power supply circuit.
 NO >> Repair or replace error-detected parts.

N

9.CHECK IMMEDIATE CHARGING SWITCH SIGNAL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between immediate charging switch harness connector and VCM harness connector.

O

+		-		Continuity
Immediate charging switch		VCM		
Connector	Terminal	Connector	Terminal	
M65	1	E63	89	Existed

P

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

Is the inspection result normal?

IMMEDIATE CHARGING SWITCH

< DTC/CIRCUIT DIAGNOSIS >

- YES >> GO TO 10.
NO >> Repair or replace error-detected parts.

10.CHECK IMMEDIATE CHARGING SWITCH

Perform component inspection. Refer to [EVC-302, "Component Inspection \(Immediate Charging Switch\)"](#).

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace immediate charging switch. Refer to [VC-113, "Removal and Installation"](#).

Component Inspection (Immediate Charging Switch)

INFOID:000000006977392

1.CHECK IMMEDIATE CHARGING SWITCH

1. Turn ignition 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 charging switch	Released	Not existed
		Pressed	Existed

Is the inspection result normal?

- YES >> INSPECTION END
NO >> Replace immediate charging switch. Refer to [VC-113, "Removal and Installation"](#).

EV CONTROL SYSTEM

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

EV CONTROL SYSTEM

Symptom Table

INFOID:000000006977393

NOTE:

Perform the self-diagnoses with CONSULT before performing the symptom diagnosis. If DTC is detected, perform the corresponding diagnosis.

Symptom	Possible cause	
Does not become READY.	READY signal from BCM is not input to VCM.	
	VCM judges except P or N range.	
	Charging connector is connected.	
	Li-ion battery remaining energy is low.	
	Steering lock is not canceled.	
Cannot driving.	VCM judges P or N range.	
	Accelerator pedal is not depressed.	
	Brake pedal is depressed.	
	VCM receives the torque limit request signal sent from ABS actuator and electric unit (control unit).	
	VCM receives the motor torque limit signal sent from the traction motor inverter or Li-ion battery controller.	
	Motor outputs power.	Parking brake operating
		Brake is on
		Parking gear locking
	Poor electricity consumption	Running resistance too high.
Incorrect tire size		
Brake is on.		
Too much power consumption of A/C.		Set temperature is low
		Set temperature is high
		Manual mode is selected.
Too much power consumption of auxiliary.	Installed some electric equipment	
Cannot power OFF	TCU continues to transmit the EV activation request signal.	
	On-board charger continues to transmit the EV activation request signal.	
	Immediate charging switch stuck ON	
	SSOFF relay stuck ON	

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EV CONTROL SYSTEM

< SYMPTOM DIAGNOSIS >

Symptom	Possible cause	
Regeneration control does not operate.	—	VCM receives power limit request signal sent from the traction motor inverter.
	VCM receives power limit request signal from the Li-ion battery controller.	Li-ion battery temperature is too high or too low.
		Characteristic malfunction of Li-ion battery temperature sensor.
		Bus bar (installed Li-ion battery module) is open.
		Li-ion battery is charged enough.
	—	VCM receives the torque limit request signal sent from ABS actuator and electric unit (control unit).
	—	Vehicle speed is low.
	—	Accelerator pedal is depressed.
—	During braking hard	
—	Brake is ON and making a sharp turn.	
Decelerating force changes		VCM receives power limit request signal sent from the traction motor inverter.
		Li-ion battery temperature is too lower too high.
		Characteristic malfunction of Li-ion battery temperature sensor.
		Bus bar (installed Li-ion battery module) is open.
		Li-ion battery is charged enough.
		VCM receives the torque limit request signal sent from ABS actuator and electric unit (control unit).
		Accelerator pedal is depressed. Brake is ON and making a sharp turn.
Normal charging does not start	—	Power switch is ON.
	—	Timer charge is set.
	—	Quick charge connector is connected.
	—	External AC power does not input.
	—	EVSE malfunction
	Li-ion battery controller does not permit.	
		Li-ion battery gradual capacity loss
		Li-ion battery is charged enough.
Li-ion battery is not charged fully.	—	Li-ion battery temperature is too low or too high.
	—	Too much power consumption during charging
Li-ion battery charging level is difference from set level.	VCM does not receive remote charge request.	The vehicle is outside the communication service area.
	—	External power stoppage
	—	Immediate charging switch circuit is open.
	—	Poor installation of charging connector

EV CONTROL SYSTEM

< SYMPTOM DIAGNOSIS >

Symptom	Possible cause		
Remote charge does not start. Timer charge does not start.	—	VCM judges except P range.	A
	—	Power switch is ON.	
	—	VCM does not receives the EV system activation request signal sent from TCU.	B
	—	The vehicle is outside the communication service area.	EVC
	—	Communication error between a cellular phone and Nissan CARWINGS Data Center.	
	—	Quick charge connector is connected.	D
	—	External AC power malfunction	
	Li-ion battery controller does not permit.	Li-ion battery temperature is too low or too high.	E
	Li-ion battery gradual capacity loss		
	Li-ion battery is charged enough.	F	
Immediate charge does not start.	—	VCM judges except P range.	
	—	Power switch is ON.	
	—	Immediate charging switch circuit is open or shorted.	G
	—	Quick charge connector is connected.	
	—	External AC power malfunction	H
	Li-ion battery controller does not permit.	Li-ion battery temperature is too low or too high.	I
	Li-ion battery gradual capacity loss		
	Li-ion battery is charged enough.		
Quick charge does not start.	—	VCM judges except P range.	J
	—	Power switch is ON.	
	—	Quick charge connector is not connected.	K
	—	Normal charge connector is connected.	
	Li-ion battery controller does not permit.	Li-ion battery temperature is too low or too high.	L
	Li-ion battery gradual capacity loss		
	Li-ion battery is charged enough.		
Timer air conditioner does not operate.	—	A timer is not set.	M
	—	Remote air conditioner is operating.	
	—	Power switch is ON.	
	—	VCM judges except P range.	N
	—	Normal charge connector is not connected.	
	—	Both of quick charge connector and normal charge connector are connected.	O
	—	External AC power malfunction	
	—	EVSE malfunction	P

EV CONTROL SYSTEM

< SYMPTOM DIAGNOSIS >

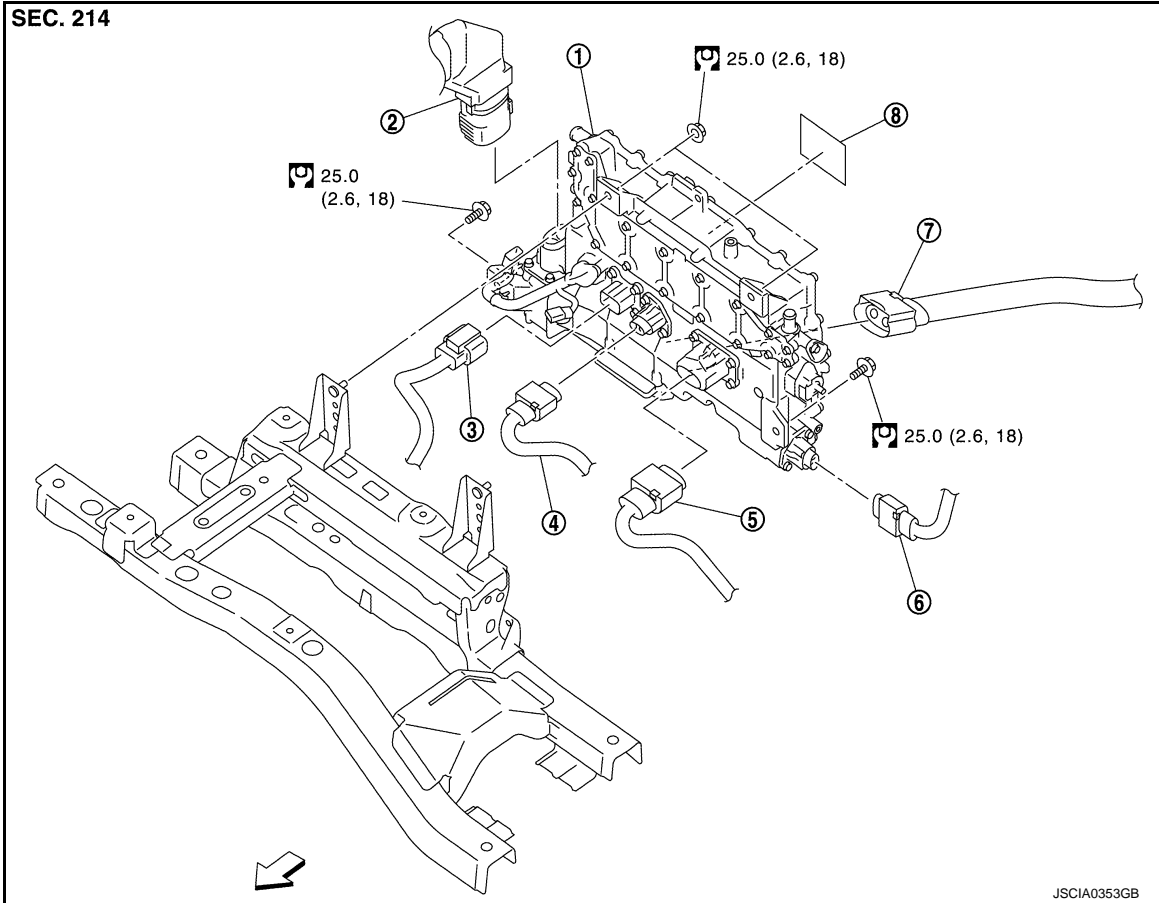
Symptom		Possible cause
Remote air conditioner does not operate.	—	The vehicle is outside the communication service area.
	—	Communication error between a cellular phone and Nissan CARWINGS Data Center.
	—	Power switch is ON.
	—	VCM judges except P range.
	—	Normal charge connector is not connected.
	—	Both of quick charge connector and normal charge connector are connected.
	—	External AC power malfunction
	—	EVSE malfunction

REMOVAL AND INSTALLATION

DC/DC-J/B

Exploded View

INFOID:000000006977394



- | | | |
|---|---|---|
| 1. DC/DC-J/B | 2. Traction motor inverter high voltage connector | 3. Electric compressor high voltage connector |
| 4. PTC elements heater high voltage connector | 5. Quick charge port high voltage connector | 6. On board charger high voltage connector |
| 7. Li-ion battery high voltage connector | 8. High voltage warning label | |

← : Vehicle front

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000006977395

WARNING:

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

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DC/DC-J/B

< REMOVAL AND INSTALLATION >

- 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 [GI-32, "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:

Shut off high voltage circuit. Refer to [GI-31, "How to Cut Off High Voltage"](#).

1. Check voltage in high voltage circuit. (Check that condenser are discharged.)
 - a. Remove Li-ion battery under cover.

WARNING:



To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- b. Disconnect high voltage connector from front side of Li-ion battery.

DANGER:



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



- c. Measure voltage between high voltage harness terminals.

DANGER:



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

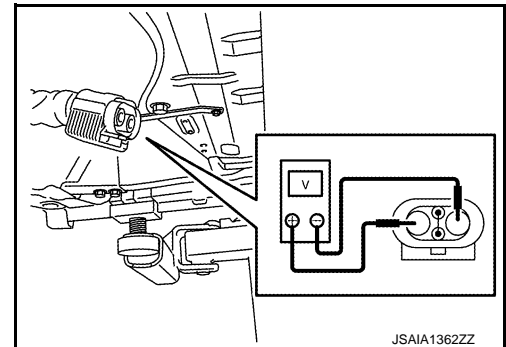


Standard

: 5 V or less

CAUTION:

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



2. Drain coolant from radiator. Refer to [HCO-9, "Draining and Refilling"](#).
3. Drain heater fluid. Refer to [HA-41, "Draining and Refilling"](#).
4. Remove traction motor inverter. Refer to [TMS-115, "Removal and Installation"](#).
5. Remove cowl top extension. Refer to [EXT-17, "Exploded View"](#).
6. Disconnect water hoses from the locations indicated below.

DC/DC-J/B

< REMOVAL AND INSTALLATION >

- a. Disconnect water hose (1) below the floor.

WARNING:

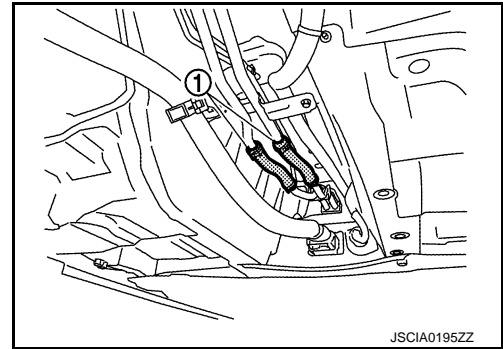


To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- To prevent performance degradation, 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:

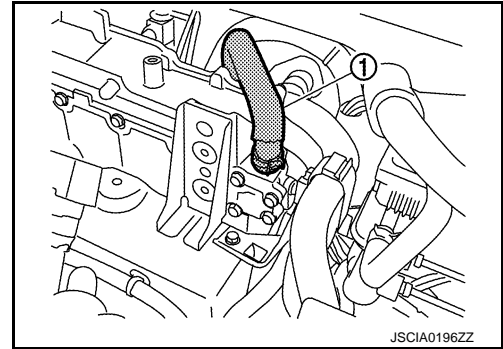


To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- To prevent performance degradation, if coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.



- c. Disconnect water hose (1) between electric water pump 2 and water pipe.

WARNING:

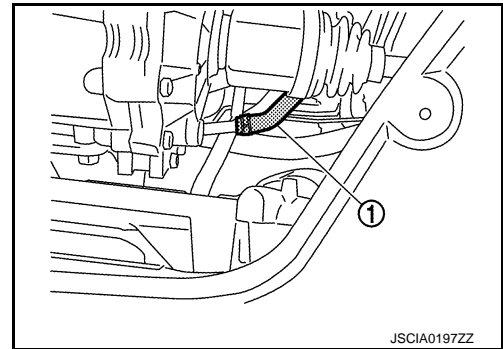


To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- To prevent performance degradation, if coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.

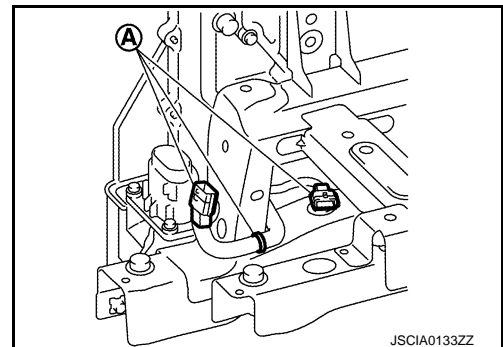


7. Remove the 2 water pipe mounting screws so that water pipe is free. Refer to [HCO-21. "Exploded View"](#).
8. Disconnect 12V system connector and harness clips (A).

WARNING:



To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



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DC/DC-J/B

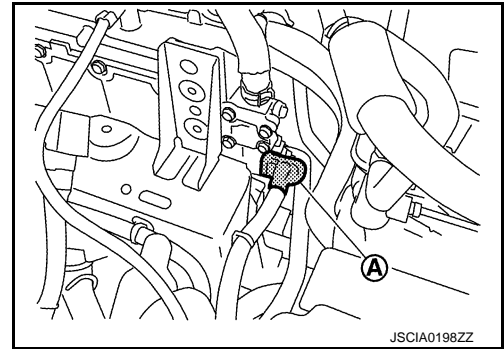
< REMOVAL AND INSTALLATION >

9. Disconnect 14V output terminal.

WARNING:



To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



10. Disconnect high voltage connector from the following 5 locations at DC/DC-J/B.

- a. From below the vehicle, disconnect high voltage harness connector (1) from Li-ion battery.

WARNING:

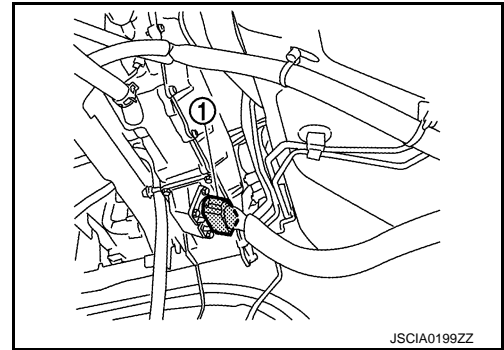


To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

High voltage harness connector from Li-ion battery : 3 step type



- b. Disconnect high voltage harness connector (1) for vehicle left-side on board charger.

WARNING:

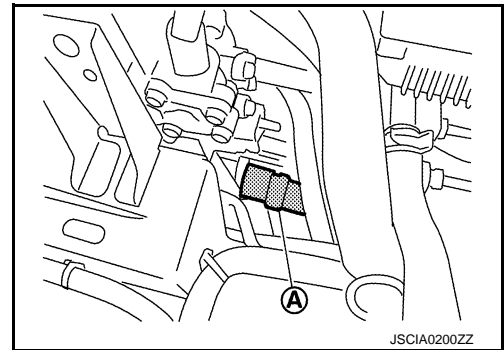


To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

High voltage harness connector for on board charger : 3 step type

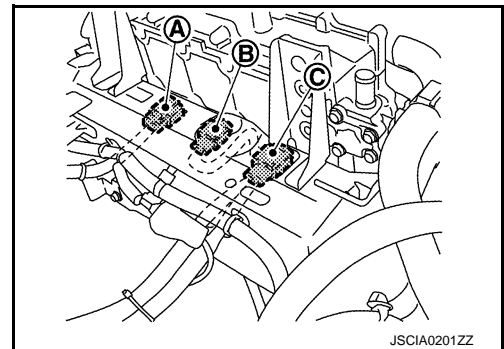


- c. Disconnect high voltage harness connector (A) for vehicle front-side electric compressor, high voltage harness connector (B) for PTC elements heater, and high voltage harness connector (C) for quick charge port.

WARNING:



To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.




< REMOVAL AND INSTALLATION >

- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

High voltage harness connector for electric compressor	: 2 step type
High voltage harness connector for PTC elements heater	: 3 step type
High voltage harness connector for quick charge port	: 3 step type

- i. 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 shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

- 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.

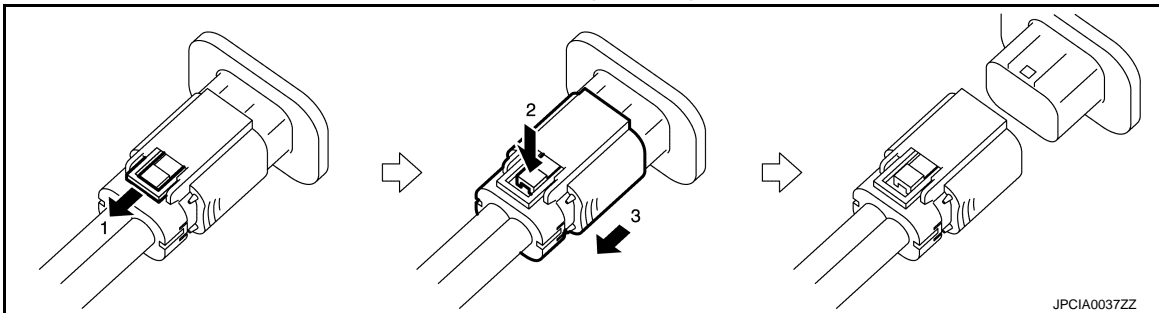
WARNING:

-  To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.

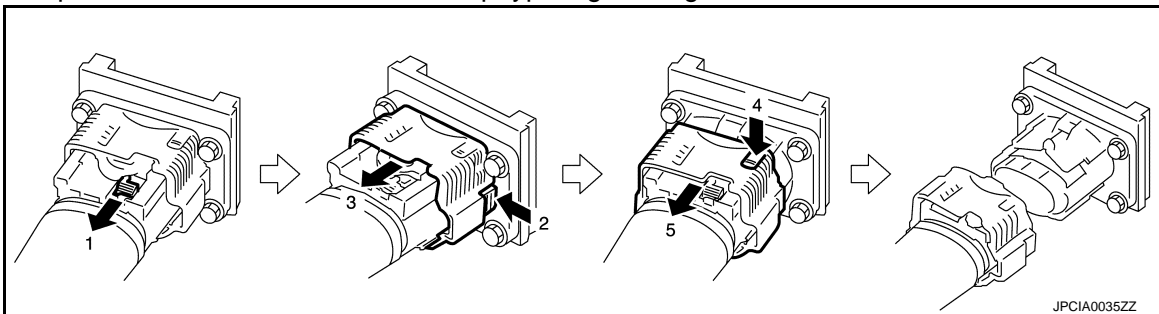


- To prevent shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

- 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.



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DC/DC-J/B

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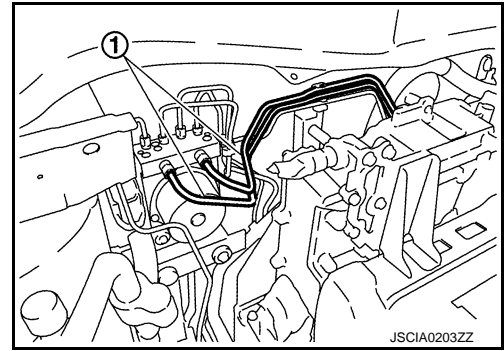
11. Disconnect 2 brake tubes (1). Refer to [BR-214, "FRONT : Exploded View"](#).

WARNING:

- ⚡ To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



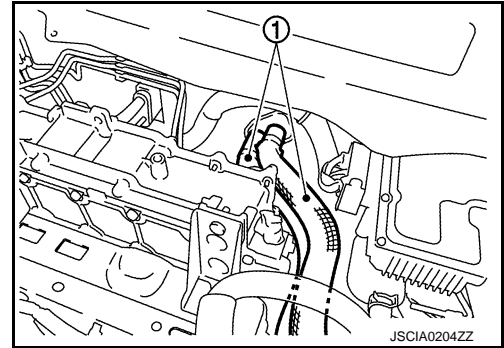
- Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.



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.
- To prevent performance degradation, if coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.

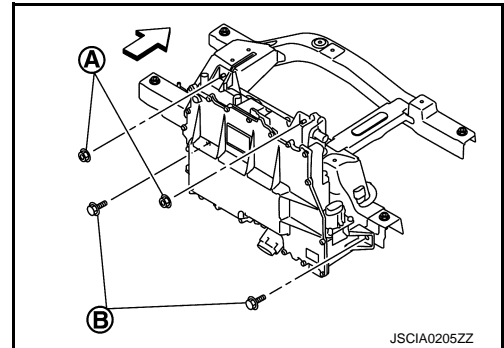


13. Remove DC/DC-J/B fastening nut (A) and fastening bolt (B).

← :Vehicle front

WARNING:

- ⚡ To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



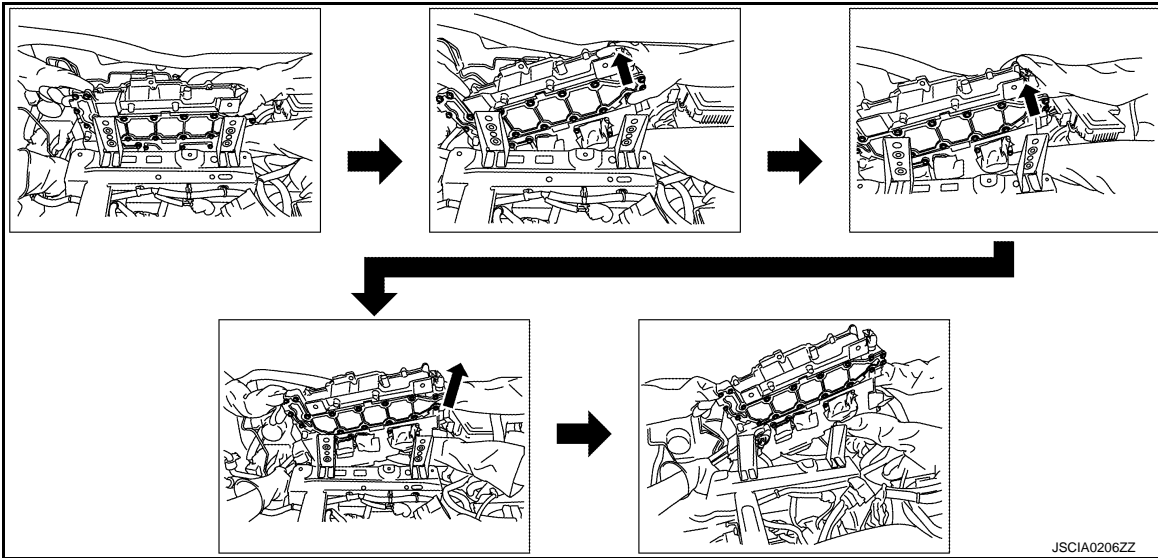
14. Move DC/DC-J/B to rear of vehicle. Then remove DC/DC-J/B, keeping the side on left of vehicle raised so that it does not contact high voltage harness connector for quick charge port or inverter member.

WARNING:

- ⚡ To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.

DC/DC-J/B

< REMOVAL AND INSTALLATION >



INSTALLATION

Pay attention to the following and install by following the procedure for removal in the reverse order.

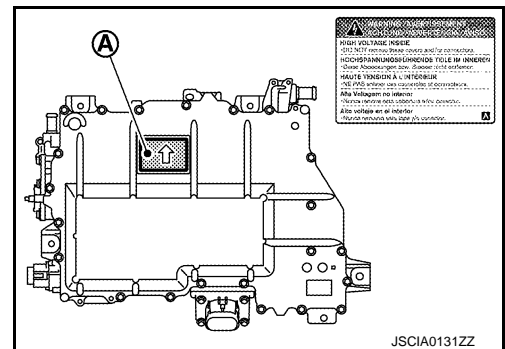
WARNING:

 To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.

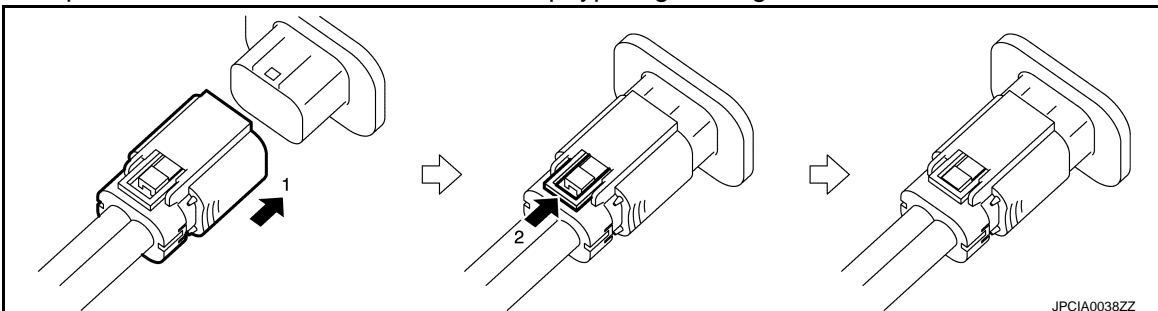


CAUTION:

- 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 [HCO-9, "Draining and Refilling"](#).
- 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.

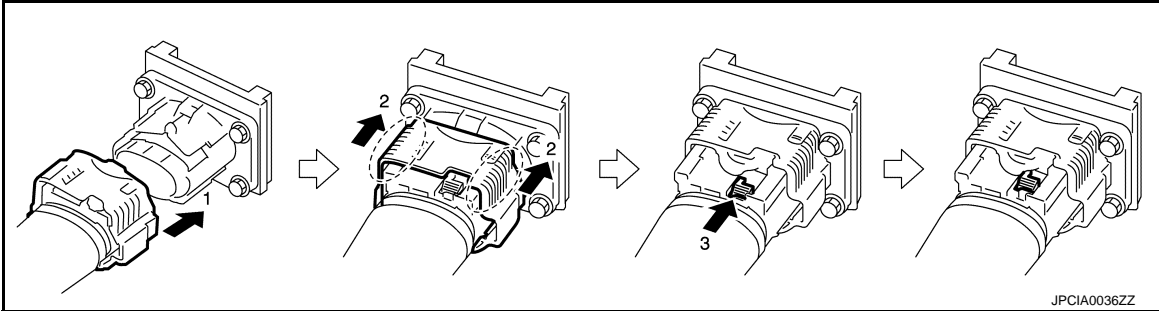


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DC/DC-J/B

< REMOVAL AND INSTALLATION >

- 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 [EVC-314, "Inspection"](#).
 - Traction motor inverter: Refer to [TMS-121, "Inspection"](#).

Inspection

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INSPECTION AFTER INSTALLATION

After installing DC/DC-J/B, measure resistance between DC/DC-J/B (aluminum part) and body (ground bolt) and check equipotential.

WARNING:

 To prevent shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



Between DC/DC-J/B – Body ground : 0.1 Ω or less

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.

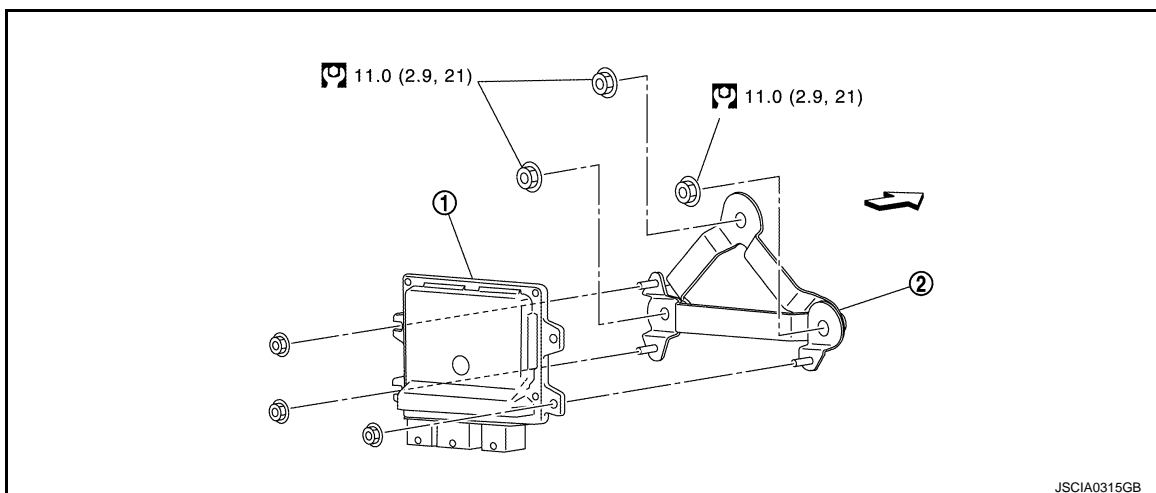
VCM

< REMOVAL AND INSTALLATION >

VCM

Exploded View

INFOID:000000006977397



- 1. VCM
- 2. VCM bracket

← Vehicle front

Removal and Installation

INFOID:000000006977398

REMOVAL

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-12, "Exploded View"](#).
4. Disconnect VCM harness connector.
5. Remove VCM mounting nuts.
6. 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-100, "Work Procedure"](#).