SECTION EVC
EV CONTROL SYSTEM

CONTENTS

SPEC CHANGE INFORMATION

MODIFICATION NOTICE

Major Modification Item

INFOID:0000000009344998

- The broadened regeneration range of electric power and weight reduction improve the electrical efficiency, achieving increase in cruising distance.
- DC/DC-J/B has been abolished. PDM (Power Delivery Module) contains DC/DC converter instead.
- Electric shift control module is incorporated into VCM.
- Water pump 2 has been abolished.
- SSOFF relay has been abolished.
- B mode control has been added to models with navigation system. Accordingly, ECO mode switch has been added to the steering switch.
- All charge modes allow the setting of Long Life Charge mode.
- A function allowing arbitrary target temperature setting has been added to the Climate Ctrl. Timer and remote climate control. (Models with navigation system only)

PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:0000000009343247

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 PDM (Power Delivery Module) at normal charge operation may affect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not approach motor room [PDM (Power Delivery Module)] at the hood-opened condition 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:0000000008746944

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:0000000009355080

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

system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SR section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

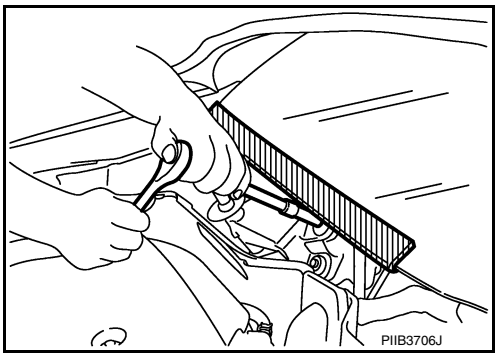
WARNING:

- **When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT 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 Ignition OFF, disconnect the battery and wait at least three minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000008746946

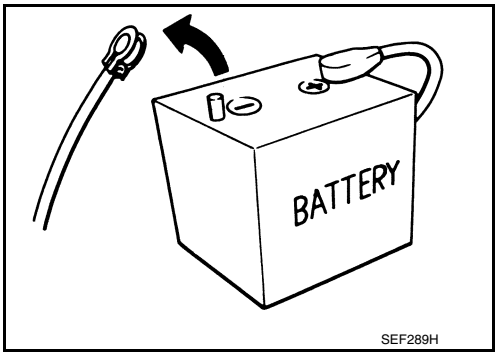
When performing the procedure after removing cowl top cover, cover the lower end of windshield with urethane, etc to prevent damage to windshield.



Precautions for Removing of Battery Terminal

INFOID:0000000008746947

- When removing the 12V battery terminal, turn OFF the power switch and wait at least 5 minutes.
  NOTE:
  ECU may be active for several minutes after the power switch is turned OFF. If the battery terminal is removed before ECU stops, then a DTC detection error or ECU data corruption may occur.
- Always disconnect the battery terminal within 60 minutes after turning OFF the power switch. Even when the power switch is OFF, the 12V battery automatic charge control may automatically start after a lapse of 60 minutes from power switch OFF.
- Disconnect 12V battery terminal according to the following steps.



WORK PROCEDURE

1. Check that EVSE is not connected.
   NOTE:
   If EVSE is connected, the air conditioning system may be automatically activated by the timer A/C function.
2. Turn the power switch OFF → ON → OFF. Get out of the vehicle. Close all doors (including back door).
3. Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.
   NOTE:

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

4. Remove 12V battery terminal within 60 minutes after turning the power switch OFF → ON → OFF.
   CAUTION:
   - **After all doors (including back door) are closed, if a door (including back door) is opened before battery terminals are disconnected, start over from Step 1.**
   - **After turning the power switch OFF, if "Remote A/C" is activated by user operation, stop the air conditioner and start over from Step 1.**

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

- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the power switch.
  NOTE:
  If the power switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.

High Voltage Precautions

INFOID:0000000009343262

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

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

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

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

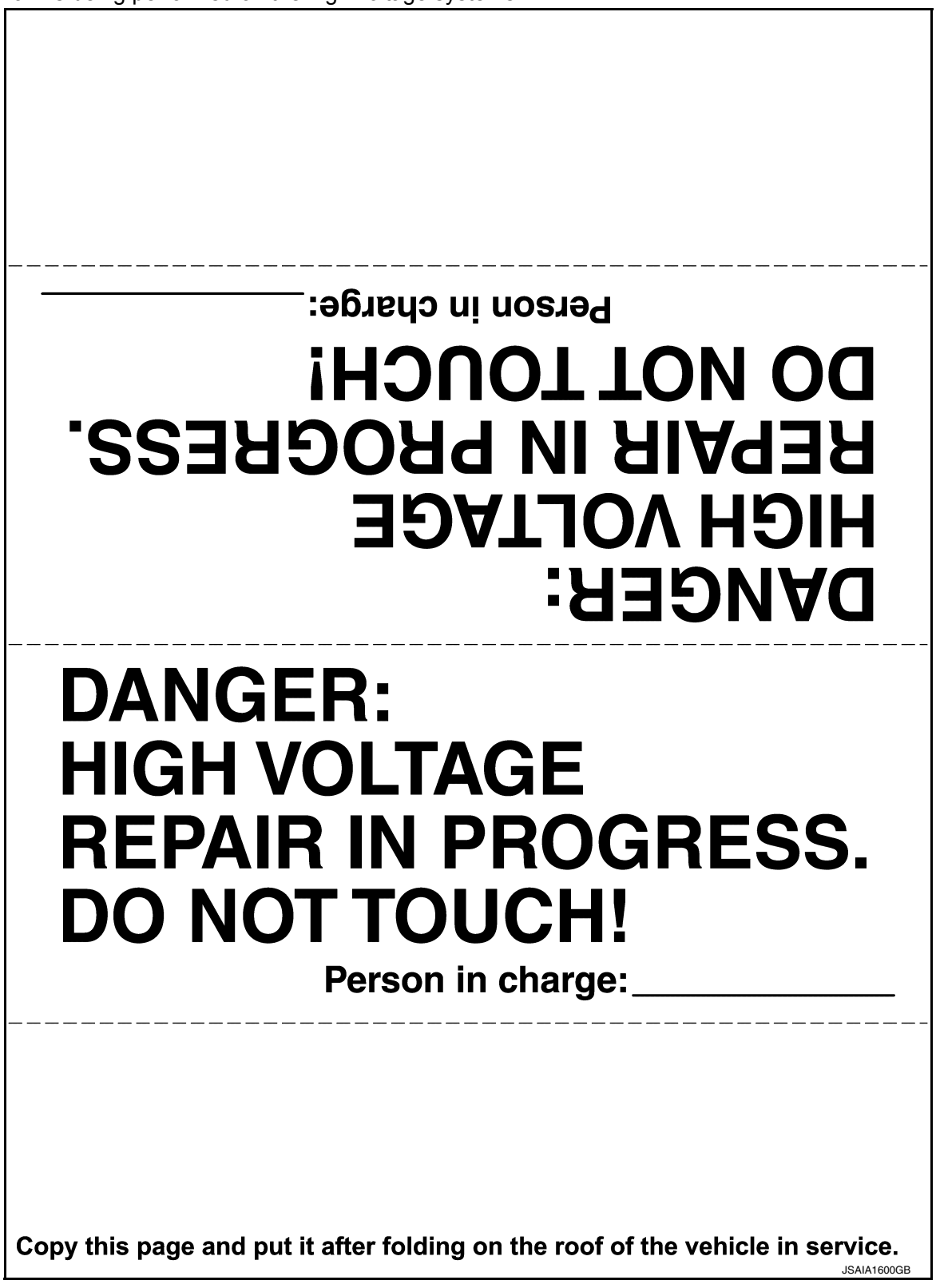
WARNING:
The vehicle contains parts that contain powerful magnets. If a person who is wearing a heart pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

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

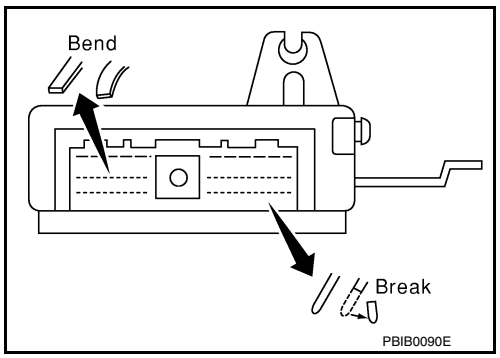


General Precautions

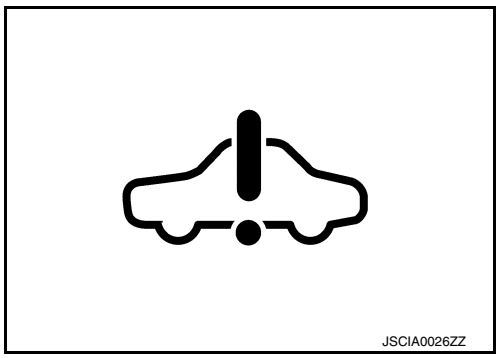
INFOID:0000000008746949

- **Never disassemble VCM.**
- **If the 12V battery is disconnected, the diagnostic information will be lost within 3 minutes.**

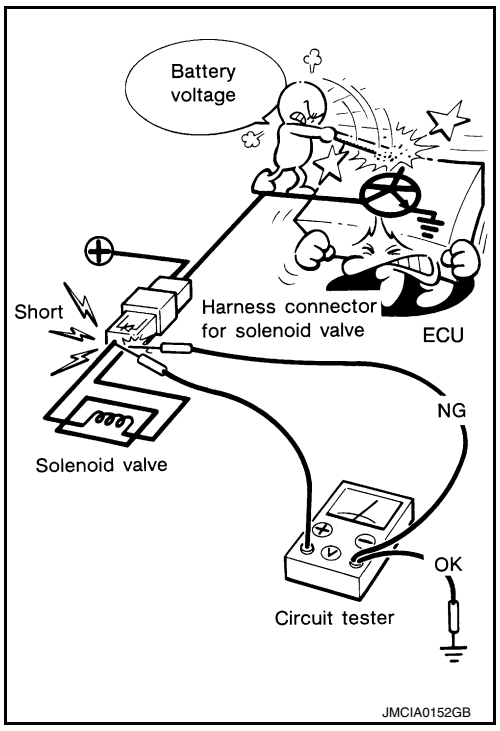
- **When connecting or disconnecting harness connectors into or from VCM, take care not to damage pin terminals (bend or break).**
  Check that there are not any bends or breaks on VCM pin terminal, when connecting harness connectors.



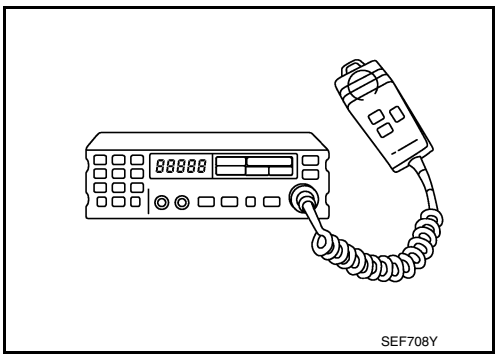
- **After performing each TROUBLE DIAGNOSIS, perform DTC confirmation procedure or Component Function Check.**
  The DTC should not be displayed in the DTC Confirmation Procedure if the repair is completed. The Component Function Check should be a good result if the repair is completed.



- **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.



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

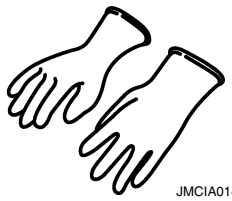
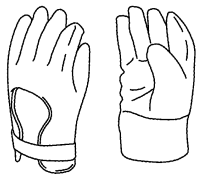
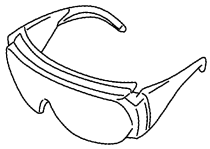
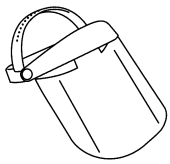
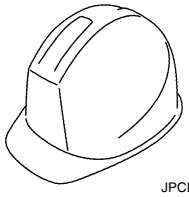


PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000008746950

Tool name		Description
Insulated gloves	 JMCIA0149ZZ	Removing and installing high voltage components [Guaranteed insulation performance for 1000V/300A]
Leather gloves	 JPCIA0066ZZ	• Removing and installing high voltage components • Protect insulated gloves [Use leather gloves that can fasten the wrist tight]
Insulated safety shoes	 JPCIA0011ZZ	Removing and installing high voltage components
Safety glasses	 JPCIA0012ZZ	• Removing and installing high voltage components • To protect eye from the spatter on the work to electric line [ANSI Z87.1]
Face shield	 JPCIA0167ZZ	• Removing and installing high voltage components • To protect face from the spatter on the work to electric line
Insulated helmet	 JPCIA0013ZZ	Removing and installing high voltage components

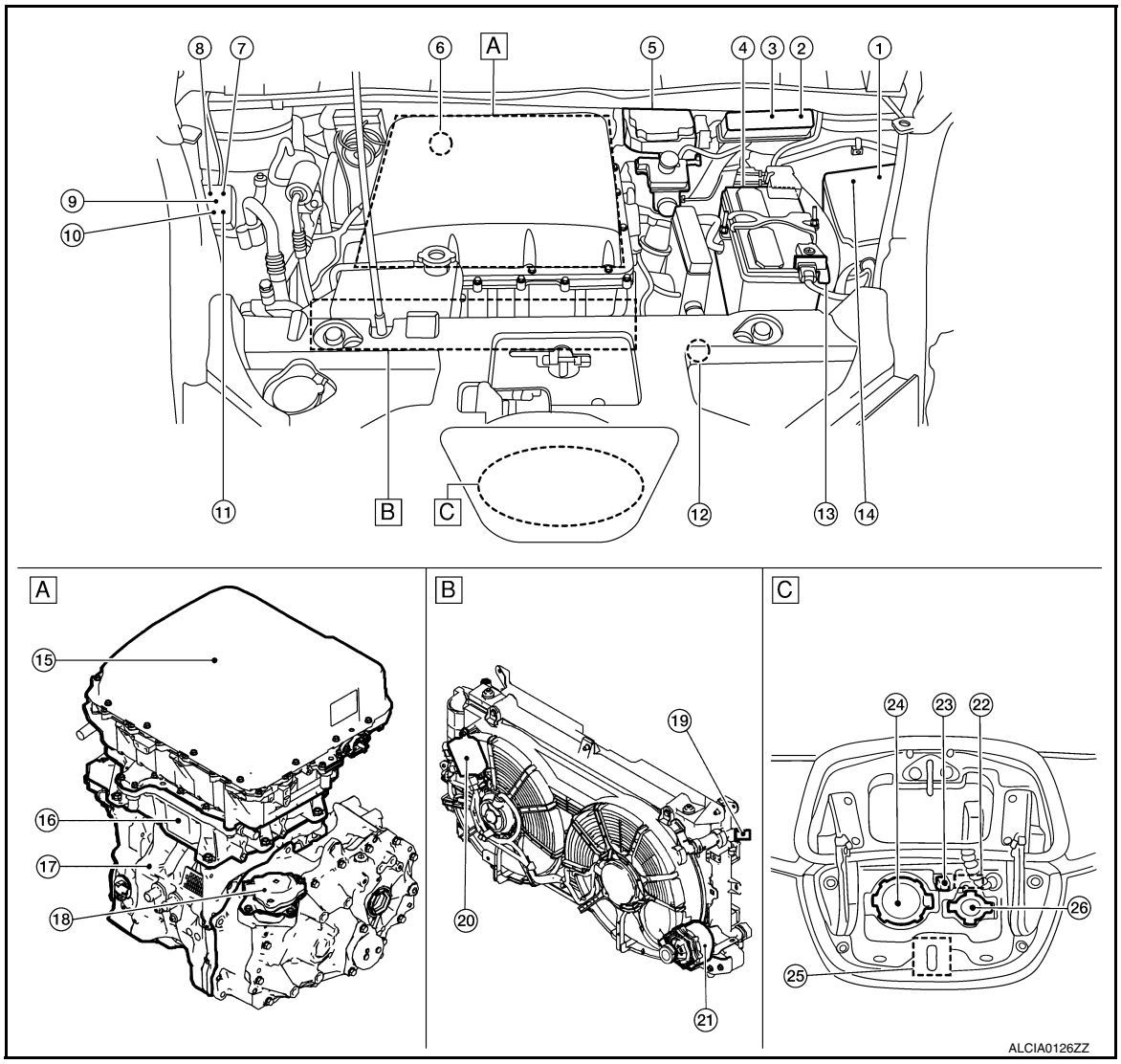
SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000008746951

MOTOR ROOM COMPARTMENT



A Electric power train

B Cooling fan assembly and radiator assembly

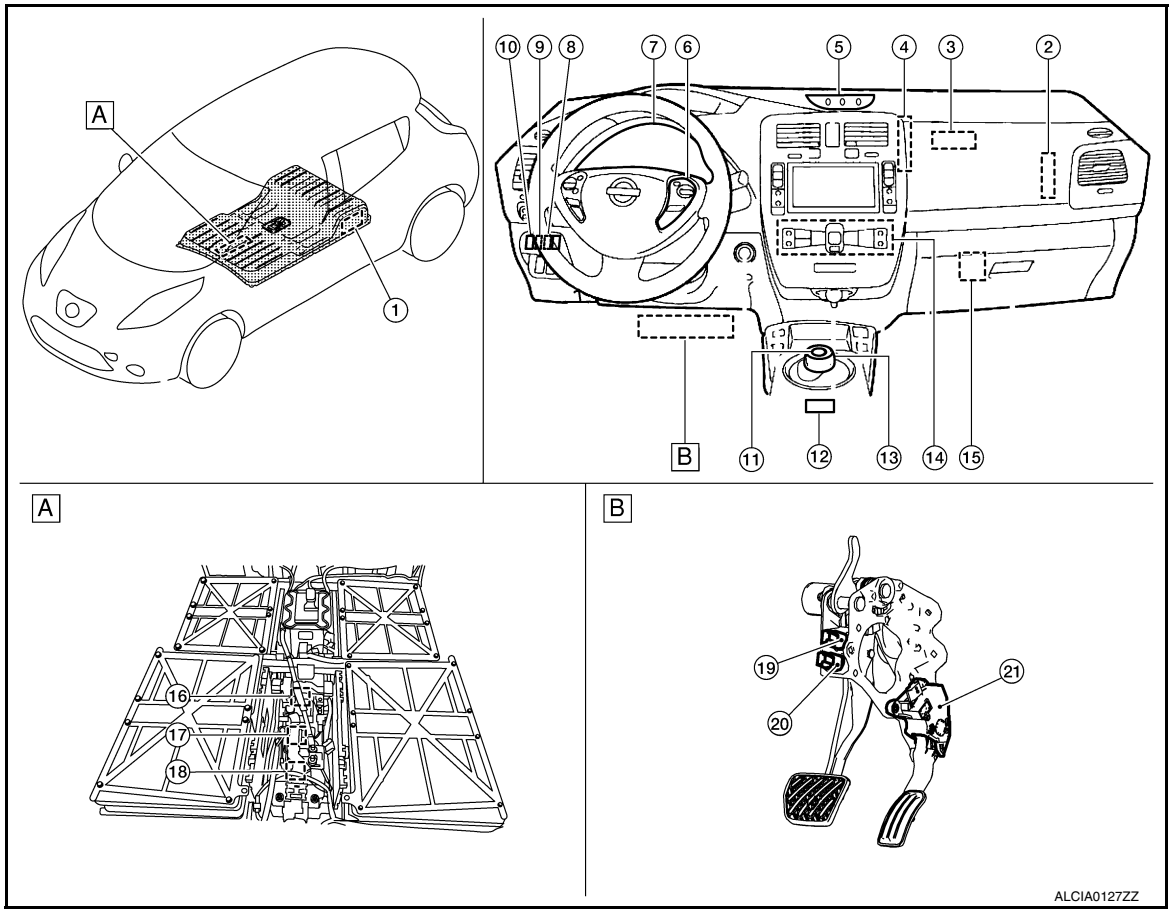
C Charge port

Component Parts Description

No.	Component parts	Function
①	F/S relay (IPDM E/R)	EVC-19, "F/S Relay"
②	M/C relay	EVC-19, "M/C Relay"
③	Reverse lamp relay	EVC-20, "Reverse Lamp Relay"
④	12V battery	PG-8, "12V Battery"
⑤	Electrically-driven intelligent brake unit	BR-13, "Electrically-driven Intelligent Brake Unit"
⑥	Refrigerant pressure sensor (with heat pump)	EVC-20, "Refrigerant Pressure Sensor"

No.	Component parts	Function
⑦	Charge port lid opener actuator relay	EVC-19, "Charge Port Lid Opener Actuator Relay"
⑧	A/C relay	EVC-20, "A/C Relay"
⑨	Cooling fan relay	The cooling fan relay supplies power to the cooling fan control module.
⑩	F/S CHG relay	EVC-19, "F/S CHG Relay"
⑪	Parking actuator relay A	TM-34, "Parking Actuator Relay A"
⑫	Refrigerant pressure sensor (without heat pump)	EVC-20, "Refrigerant Pressure Sensor"
⑬	Battery current sensor (with battery temperature sensor)	EVC-21, "Battery Current Sensor (With Battery Temperature Sensor)"
⑭	Charge connector lock relay (IPDM E/R)	EVC-19, "Charge Connector Lock Relay"
⑮	PDM (Power Delivery Module)	VC-12, "PDM (Power Delivery Module)"
⑯	Traction motor inverter	TMS-13, "Traction Motor Inverter"
⑰	Traction motor	TMS-13, "Traction Motor"
⑱	Parking actuator	TM-33, "Parking Actuator"
⑲	Coolant temperature sensor	EVC-22, "Coolant Temperature Sensor"
⑳	Cooling fan control module	EVC-23, "Cooling Fan Control Module"
㉑	Electric water pump	EVC-22, "Electric Water Pump"
㉒	Charge connector lock actuator	VC-14, "Charge Connector Lock Actuator"
㉓	Charge port light	VC-14, "Charge Port Light"
㉔	Quick charge port	VC-13, "Charge Port"
㉕	Charge port lid opener actuator	DLK-21, "Charge Port Lid Opener Actuator"
㉖	Normal charge port	VC-13, "Charge Port"

BODY COMPARTMENT



A Li-ion battery junction box

B Accelerator pedal and brake pedal upper part

Component Parts Description

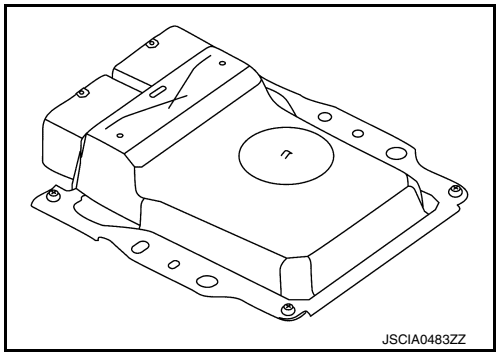
No.	Component parts	Function
①	Li-ion battery controller	EVB-16, "Li-ion Battery Controller"
②	TCU (telematics communication unit)	• AV-98, "TCU" (Navigation without BOSE) • AV-227, "TCU" (Navigation with BOSE) • AV-400, "TCU" (Telematics system)
③	VSP control unit	VSP-9, "Approaching Vehicle Sound For Pedestrians (VSP) Control Unit"
④	BCM (Body Control Module)	BCS-6, "BODY CONTROL SYSTEM : System Description"
⑤	Charge status indicator	VC-15, "Charging Status Indicator"
⑥	ASCD steering switch	EVC-21, "ASCD Steering Switch"
⑦	Combination meter	EVC-23, "Combination Meter"
⑧	Charge port lid opener switch	DLK-21, "Charge Port Lid Opener Switch"
⑨	Charge connector lock switch	VC-14, "Charge Connector Lock Switch"
⑩	Immediate charging switch	VC-14, "Immediate Charging Switch"
⑪	P position switch	TM-35, "P Position Switch"
⑫	Selector indicator	TM-35, "Selector Indicator"
⑬	Electric shift selector	TM-34, "Electric Shift Selector"

No.	Component parts	Function
⑭	A/C auto amp.	• HAC-25, "A/C Auto Amp." [Auto A/C (with heat pump)] • HAC-231, "A/C Auto Amp." [Auto A/C (without heat pump)]
⑮	VCM (vehicle control module)	EVC-19, "VCM"
⑯	System main relay 2	EVC-20, "System Main Relay 2"
⑰	Pre-charge relay	EVC-20, "Pre-charge Relay"
⑱	System main relay 1	EVC-20, "System Main Relay 1"
⑲	Stop lamp switch	EVC-21, "Stop Lamp Switch"
⑳	Brake pedal position switch	EVC-21, "Brake Pedal Position Switch"
㉑	Accelerator pedal position sensor	EVC-20, "Accelerator Pedal Position Sensor"

VCM

INFOID:0000000008746952

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.
In addition, VCM contains an electric shift control module and performs shift control.
For electric shift control module. Refer to TM-31, "Description".


JSCIA0483ZZ

M/C Relay

INFOID:0000000008746953

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:0000000008746954

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:0000000008746955

The F/S CHG (fail-safe charge) relay supplies the driving power for the quick charge relay inside the PDM (Power Delivery Module). 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.

Charge Port Lid Opener Actuator Relay

INFOID:0000000009314140

The charge port lid opener actuator relay is controlled by VCM and supplies power to the charge port lid opener actuator.

Charge Connector Lock Relay

INFOID:0000000009314141

The charge connector lock relay is controlled by VCM and supplies power to the charge connector lock actuator.

A/C Relay

INFOID:0000000008746957

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:0000000008746958

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:0000000008746959

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:0000000008746960

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

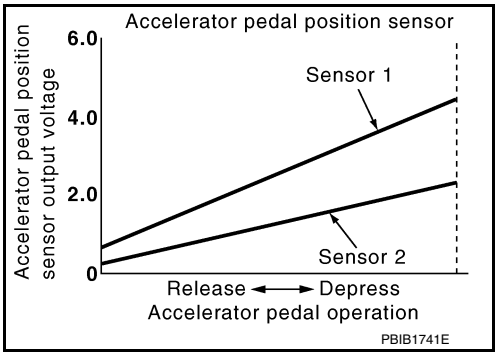
INFOID:0000000008746961

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

Accelerator Pedal Position Sensor

INFOID:0000000008746962

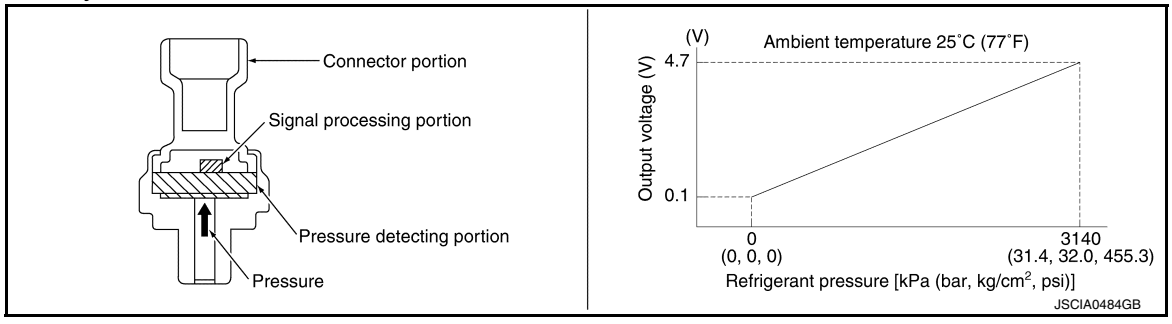
The accelerator pedal sensor is integrated with the accelerator pedal. This sensor is a potentiometer that detects the acceleration pedal stroke, converts it to a voltage signal, and transmits the signal to VCM. The sensor transmits its signals through dual lines, providing a minimum driving function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



Refrigerant Pressure Sensor

INFOID:0000000008746963

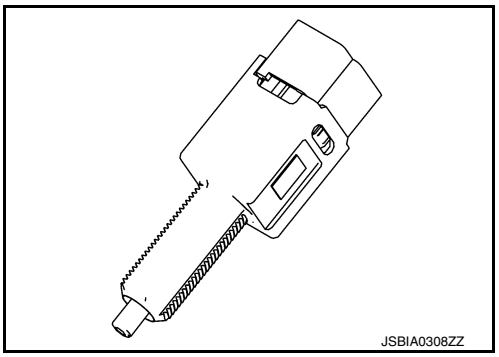
The sensor uses an electrostatic volume pressure transducer to convert refrigerant pressure to voltage. VCM calculates refrigerant pressure based on the voltage and sends a refrigerant pressure signal to the A/C auto amp. via EV system CAN communication.



Stop Lamp Switch

INFOID:0000000008746964

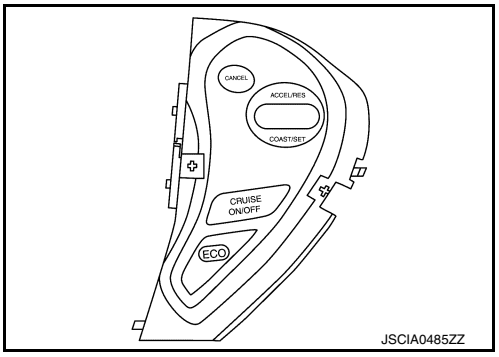
The stop lamp switch is installed to the brake pedal bracket. The switch detects the state of the brake pedal and transmits an ON/OFF signal to VCM.
The contact of the stop lamp switch is usually open. When the brake pedal is depressed, it closes and the stop lamp switch signal is transmitted as a voltage signal.



ASCD Steering Switch

INFOID:0000000008746965

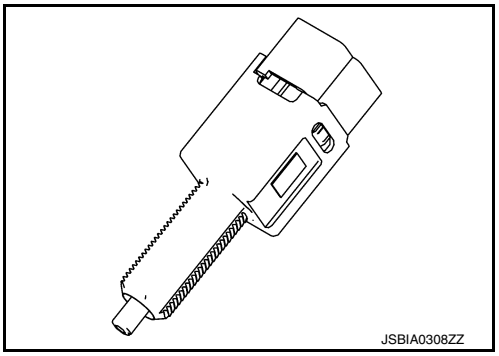
ASCD steering switch has various values of electrical resistance for each button. VCM reads voltage variation of switch, and determines which button is operated.



Brake Pedal Position Switch

INFOID:0000000008746966

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



Battery Current Sensor (With Battery Temperature Sensor)

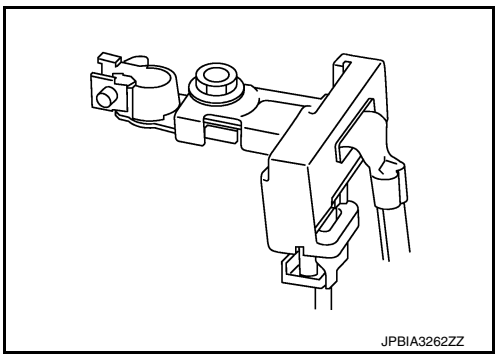
INFOID:0000000008746968

BATTERY CURRENT SENSOR

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

CAUTION:

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



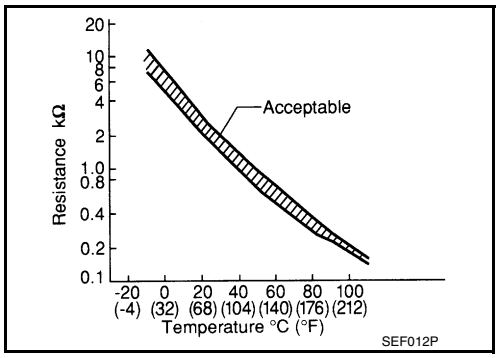
BATTERY TEMPERATURE SENSOR

Battery temperature sensor is integrated in battery current sensor.
The sensor measures temperature around the battery.

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

<Reference data>

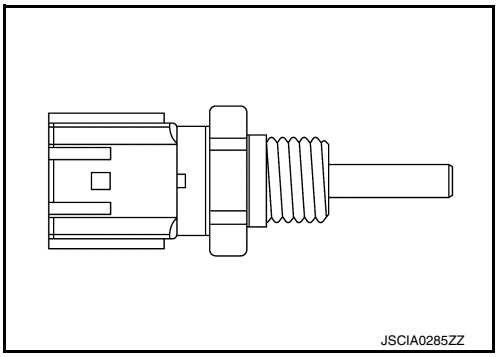
Temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)
25 (77)	3.333	1.9 - 2.1
90 (194)	0.969	0.222 - 0.258



Coolant Temperature Sensor

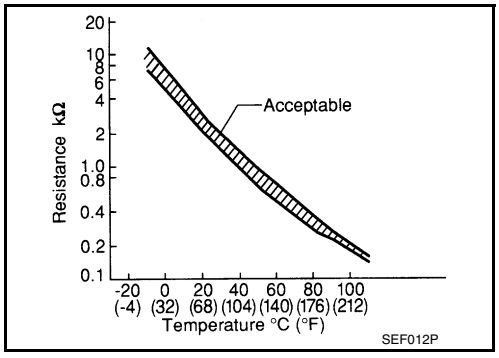
INFOID:0000000008746969

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.



<Reference value>

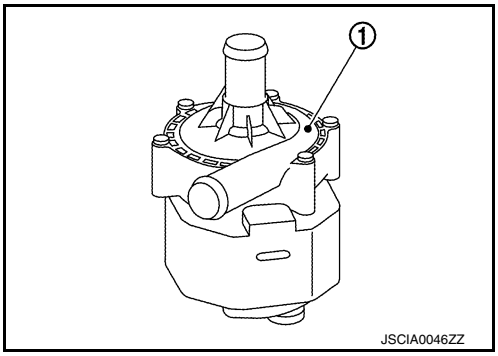
Coolant temperature [°C (°F)]	Voltage (V)	Resistance (kΩ)
–10 (14)	4.4	7.0 - 11.4
20 (68)	3.5	2.35 - 2.73
50 (122)	2.2	0.68 - 1.00
90 (194)	0.9	0.236 - 0.260



Electric Water Pump

INFOID:0000000008746970

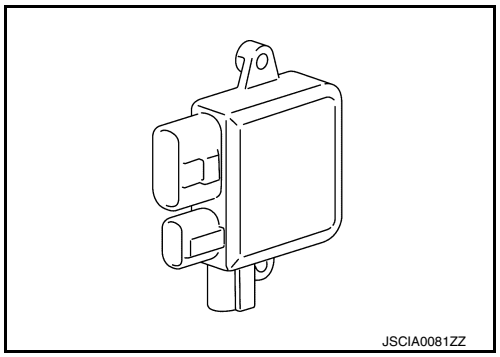
The electric water pump ① feeds coolant by pressure, which circulates in the high voltage system cooling circuit. They are controlled by VCM independently so that the amount of pressure feed is adjusted according to the vehicle speed and water temperature.
The electric water pump also integrates an interface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



Cooling Fan Control Module

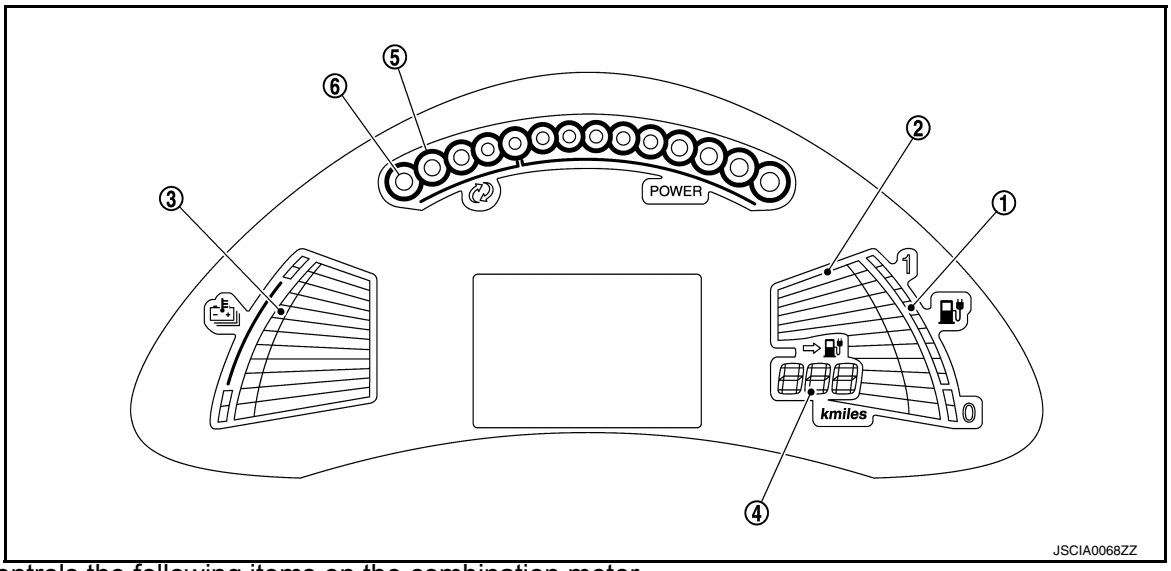
INFOID:0000000008746971

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



Combination Meter

INFOID:0000000008746972



VCM controls the following items on the combination meter.

LI-ION BATTERY INFORMATION

Li-ion Battery Capacity Level Gauge ①
VCM receives the Li-ion battery capacity signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the maximum capacity of the Li-ion battery. When the capacity of the Li-ion battery decreases with age and usage, the level of the gauge is also decreased.

Li-ion Battery Available Charge Gauge ②
VCM receives the Li-ion battery available charge signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the available Li-ion battery charge to run the vehicle.

Li-ion Battery Temperature Gauge ③
VCM receives the Li-ion battery temperature signal from the Li-ion battery controller, and VCM transmits the signal to the combination meter to display the Li-ion battery temperature.

Distance Range ④
The driving range (km or miles) provides an estimated distance that the vehicle can be driven before recharging is necessary. The driving range is constantly being calculated, based on the amount of available Li-ion battery charge and the actual power consumption average.
VCM calculates average electricity consumption at a specified travel distance, according to total power consumption of the vehicle. Based on the average electricity consumption and the Li-ion battery available charge signal received from the Li-ion battery, VCM calculates driving range and transmits a driving range signal to the combination meter.

POWER METER

Maximum Power ⑤

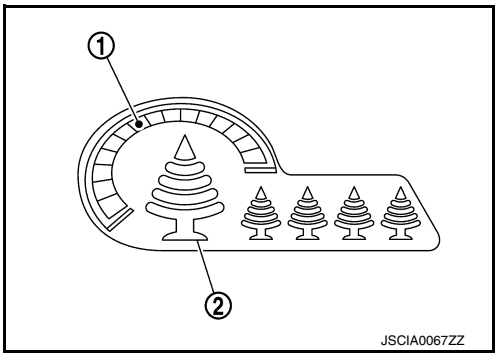
VCM receives a maximum motor output power signal from the traction motor inverter and a maximum regenerative power signal from the Li-ion battery controller. VCM transmits these signals to the combination meter and displays the upper limit of available output power and regenerative electric power.

Current Motor Power ⑥
VCM receives the current motor power signal from the traction motor inverter, and VCM transmits the signal to the combination meter to display the power currently being output.

ECO Indicator

INFOID:0000000008746974

The ECO indicator shows the instantaneous ECO drivability in the instant ECO indicator ①, and shows the cumulative ECO drivability, during 1 trip in the ECO tree ②.
For information regarding control, refer to EVC-66, "ECO INDICATOR CONTROL : System Description".



Approaching Vehicle Sound for Pedestrians (VSP)

INFOID:0000000008746976

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)
When timer charge goes into standby mode	
Press the charge port lid opener switch or the charge port lid opener button of intelligent key (Hazard and buzzer reminder)	Three short beeps
When EVSE is not connected correctly	Three short beeps continue repeatedly for 30 seconds

For details of the charge sound system of VSP, Refer to VSP-19, "CHARGE SOUND SYSTEM : System Description".

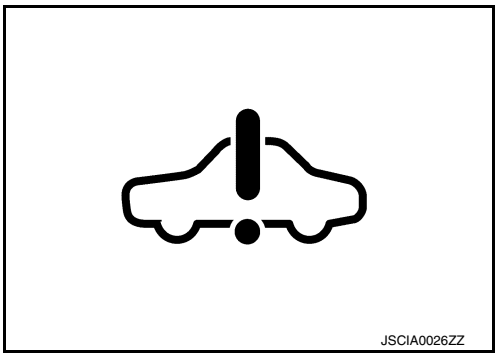
WARNING LAMPS/INDICATOR LAMPS

WARNING LAMPS/INDICATOR LAMPS : EV System Warning Lamp

INFOID:0000000009315488

DESIGN/PURPOSE

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



BULB CHECK

For approximately 2 seconds after the power switch is turned ON.

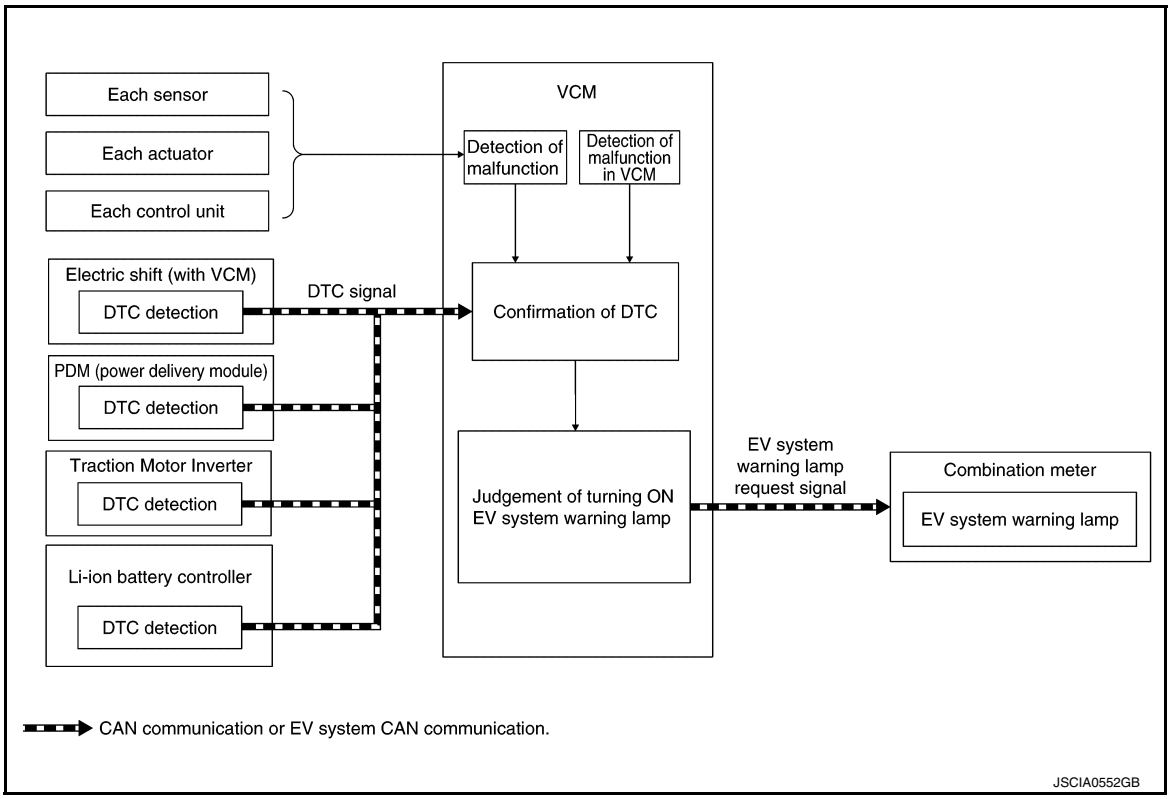
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

OPERATION AT COMBINATION METER CAN COMMUNICATION CUT-OFF OR UNUSUAL SIGNAL

For actions on CAN communications blackout in the combination meter, refer to MWI-15, "METER SYSTEM : Fail-Safe".

SYSTEM DIAGRAM



SIGNAL PATH

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

LIGHTING CONDITION

When all of the following conditions are satisfied:

- Power switch: ON or READY
- EV system-related DTC is confirmed.

NOTE:
For DTCs that the EV system warning lamp turns ON, refer to EVC-102, "DTC Index".

SHUTOFF CONDITION

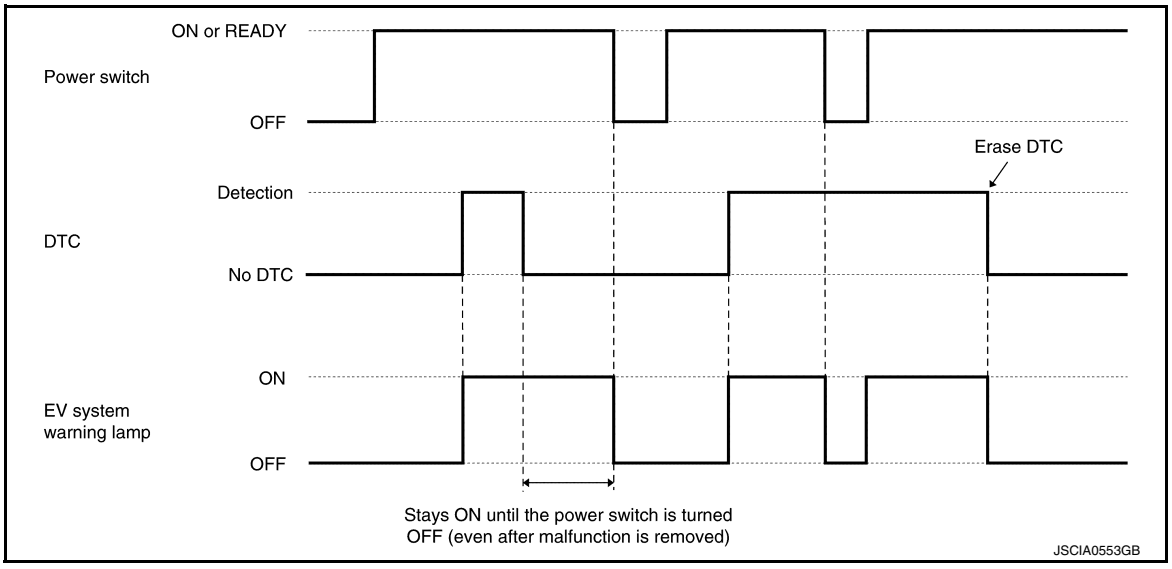
When any of the following conditions are satisfied:

- Power switch: OFF
- DTC is erased.

NOTE:

- The warning lamp may turn ON even after the power switch is turned OFF, depending on a detected DTC.
- For DTC erasing method, refer to EVC-73, "CONSULT Function".

TIMING CHART

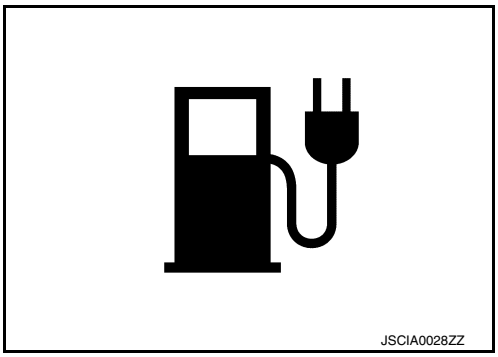


WARNING LAMPS/INDICATOR LAMPS : Low Battery Charge Warning Lamp

INFOID:0000000009315489

DESIGN/PURPOSE

The low battery charge warning lamp turns ON when the Li-ion battery remaining energy is lowered.



BULB CHECK

Not applicable

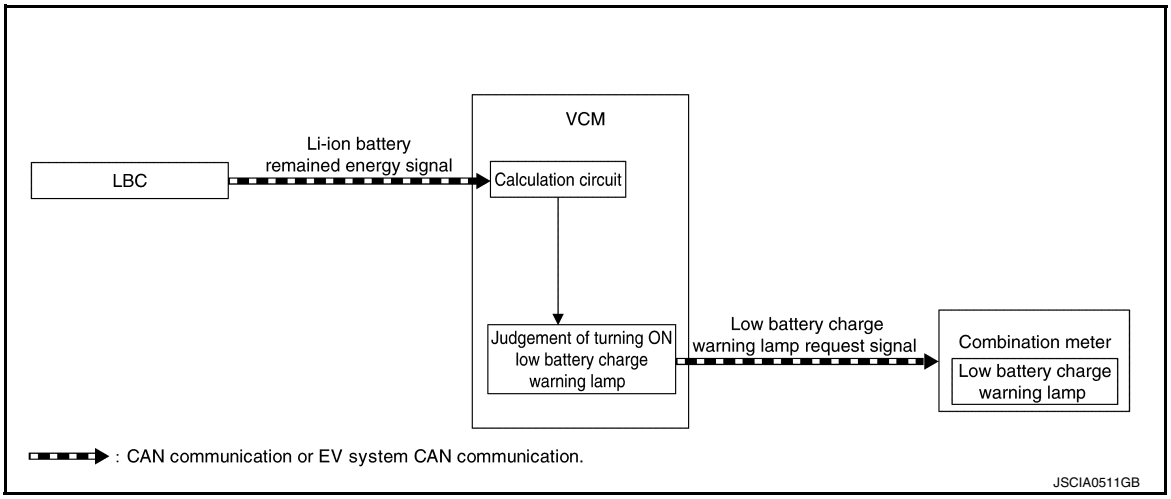
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

OPERATION AT COMBINATION METER CAN COMMUNICATION CUT-OFF OR UNUSUAL SIGNAL

For actions on CAN communications blackout in the combination meter, refer to MWI-15, "METER SYSTEM : Fail-Safe".

SYSTEM DIAGRAM



SIGNAL PATH

- LBC transmits a Li-ion battery remained energy signal to VCM.
- VCM calculates a remaining Li-ion battery power according to a signal received from LBC. When judging low remaining battery power, VCM transmits a low battery charge warning lamp request signal to the combination meter.

LIGHTING CONDITION

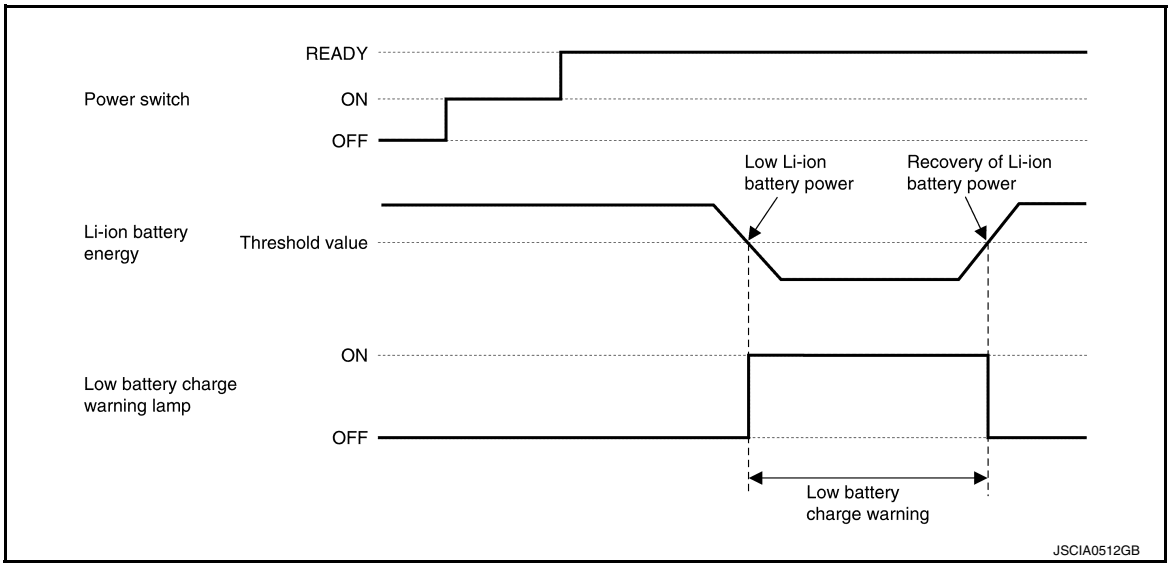
When all of the following conditions are satisfied:

- Power switch: ON or READY
- When Li-ion battery remaining energy is Approx. 4 kWh or less.

SHUTOFF CONDITION

When Li-ion battery remaining energy recovers to 4.5 kWh or more.

TIMING CHART

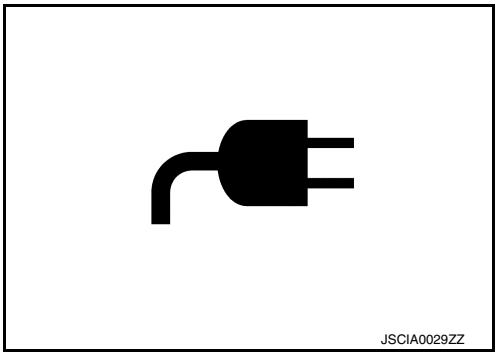


WARNING LAMPS/INDICATOR LAMPS : Plug In Indicator Lamp

INFOID:0000000009315490

DESIGN/PURPOSE

The plug in indicator lamp turns ON when a charge connector is connected to the normal charge port or the quick charge port.



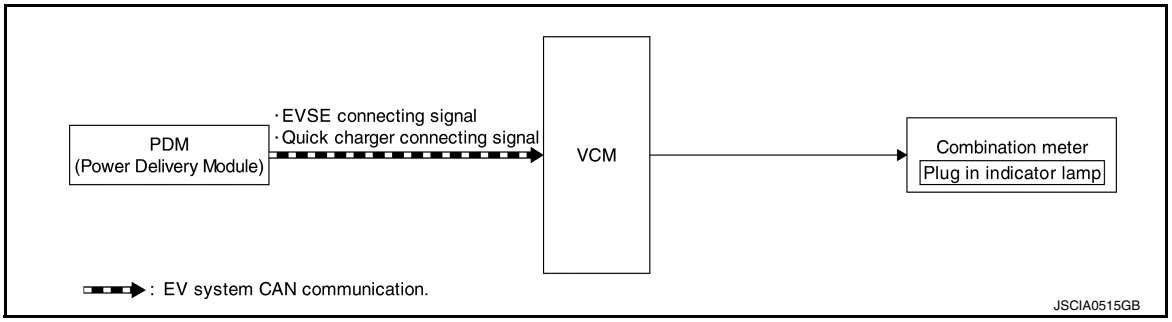
BULB CHECK

For approximately 2 seconds after the power switch is turned ON.

SYNCHRONIZATION WITH MASTER WARNING LAMP

Not applicable

SYSTEM DIAGRAM



SIGNAL PATH

- When the charge connector is connected to the normal charge port, PDM (Power Delivery Module) transmits an EVSE connecting signal to VCM.
- When the charge connector is connected to the quick charge port, PDM (Power Delivery Module) transmits a quick charger connecting signal to VCM.
- When receiving an EVSE connecting signal or quick charger connecting signal, VCM supplies power to the plug in indicator lamp located in the combination meter and turns ON the plug in indicator lamp.
  NOTE:
  When EVSE is connected to the normal charge port, the indicator lamp turns OFF if no operation is performed for ten consecutive seconds or more.

LIGHTING CONDITION

The charge connector is connected to the normal charge port or the quick charge port.

BLINKING CONDITION

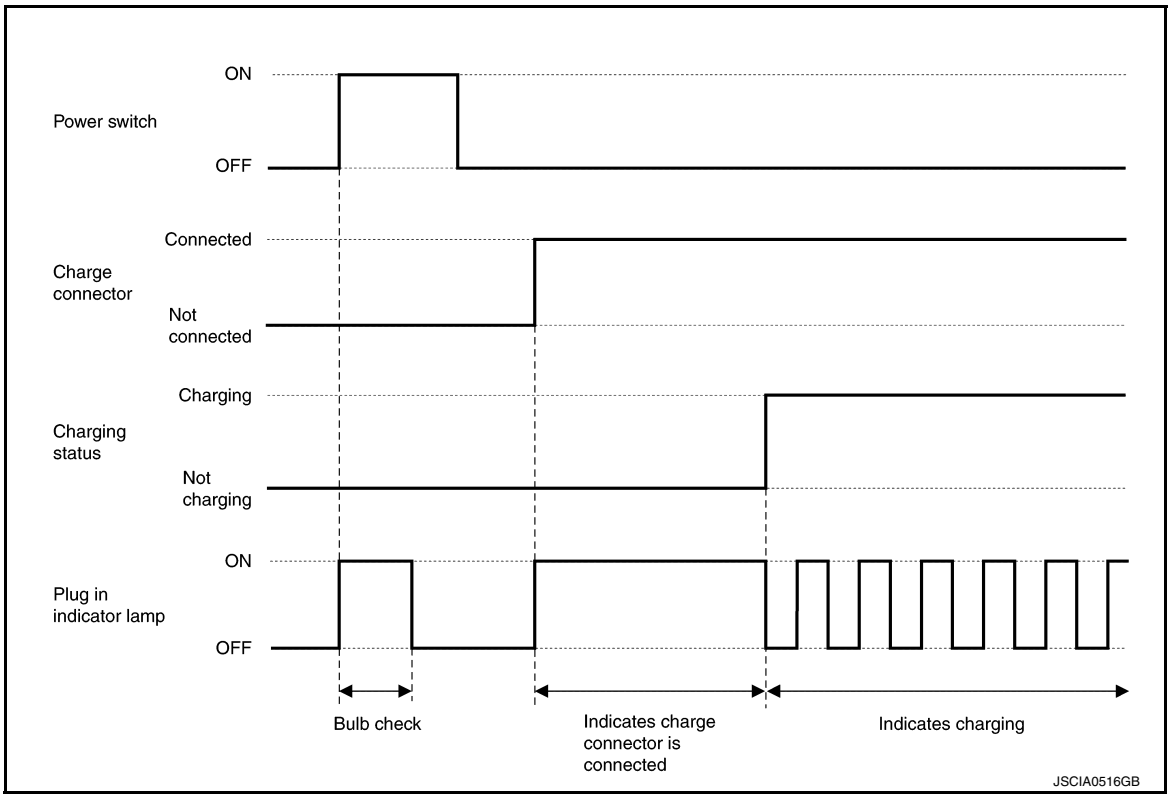
While charging

SHUTOFF CONDITION

When any of the following conditions are satisfied:

- No operation for 10 seconds or more after connecting EVSE
- Disconnect charge connector.

TIMING CHART

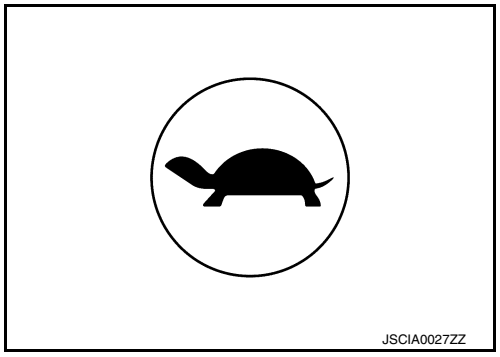


WARNING LAMPS/INDICATOR LAMPS : Power Limitation Indicator Lamp

INFOID:0000000009315491

DESIGN/PURPOSE

The power limitation indicator lamp turns ON when the traction motor output is limited.



BULB CHECK

For approximately 2 seconds after the power switch is turned ON.

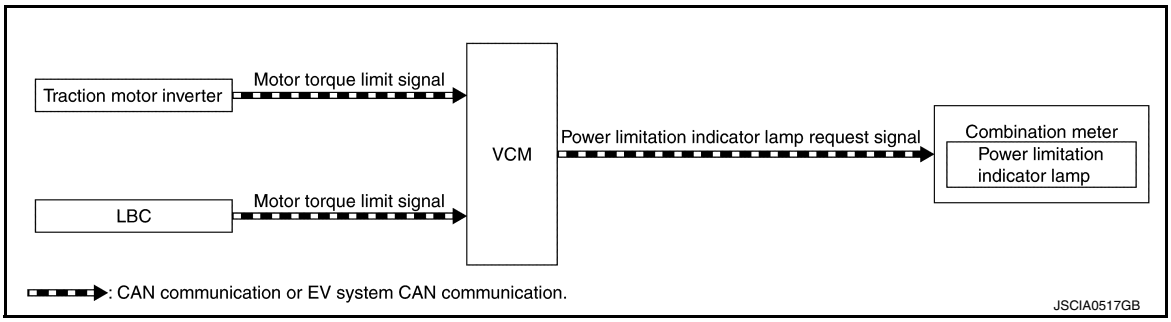
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

OPERATION AT COMBINATION METER CAN COMMUNICATION CUT-OFF OR UNUSUAL SIGNAL

For actions on CAN communications blackout in the combination meter, refer to MWI-15, "METER SYSTEM : Fail-Safe".

SYSTEM DIAGRAM



SIGNAL PATH

- The traction motor inverter transmits a motor torque limit signal to VCM when the traction motor needs to be protected.
- LBC transmits a motor torque limit signal to VCM when Li-ion battery cannot output power normally.
- When receiving a motor torque limit signal from the traction motor inverter or LBC, VCM transmits a power limitation indicator lamp request signal to the combination meter.
- The combination meter turns ON the power limitation indicator lamp according to the signal.

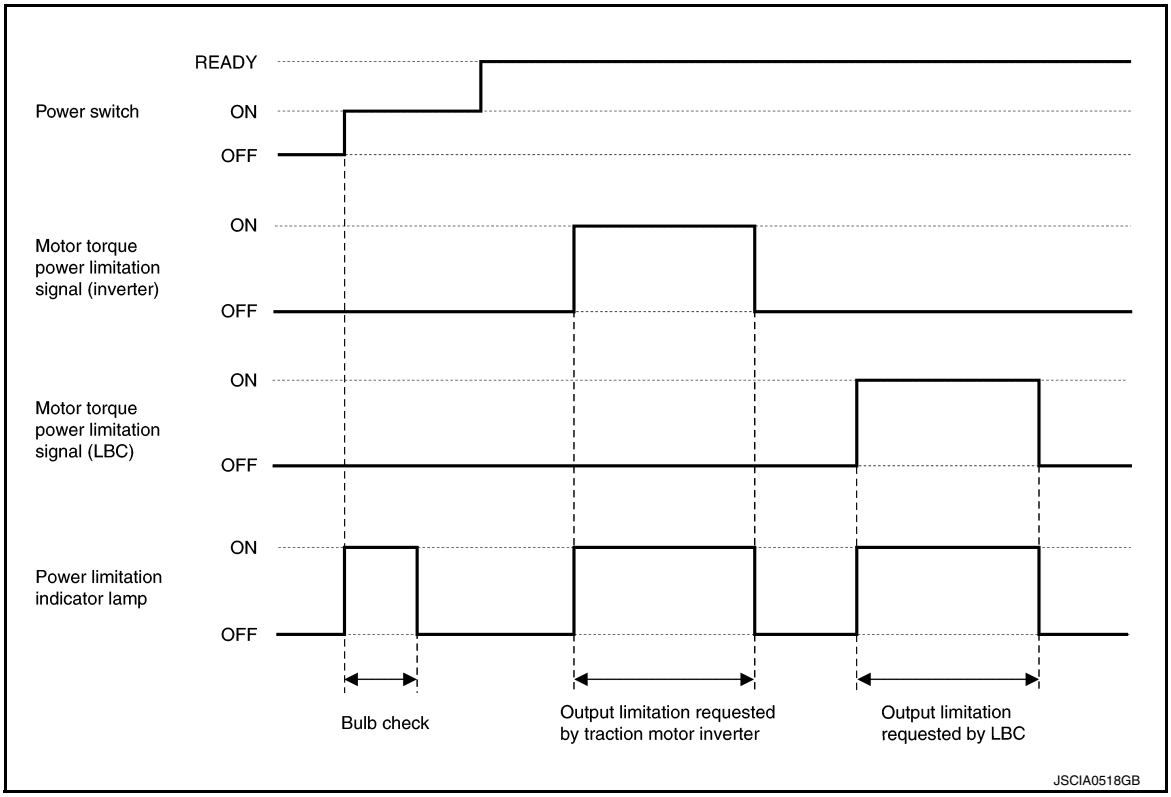
LIGHTING CONDITION

For lighting condition, refer to EVC-50, "MOTOR POWER CONTROL : System Description".

SHUTOFF CONDITION

The traction motor or Li-ion battery returns from the output limiting state.

TIMING CHART

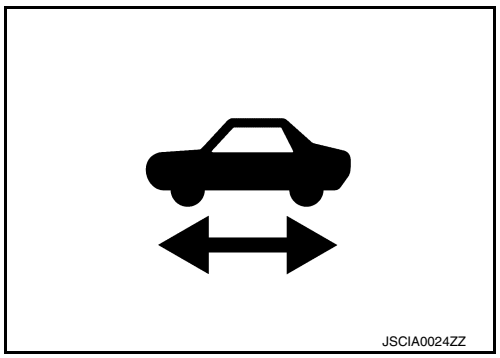


WARNING LAMPS/INDICATOR LAMPS : Ready To Drive Indicator Lamp

INFOID:0000000009315492

DESIGN/PURPOSE

The READY to drive indicator lamp indicates that the vehicle is in a state allowing vehicle travel.



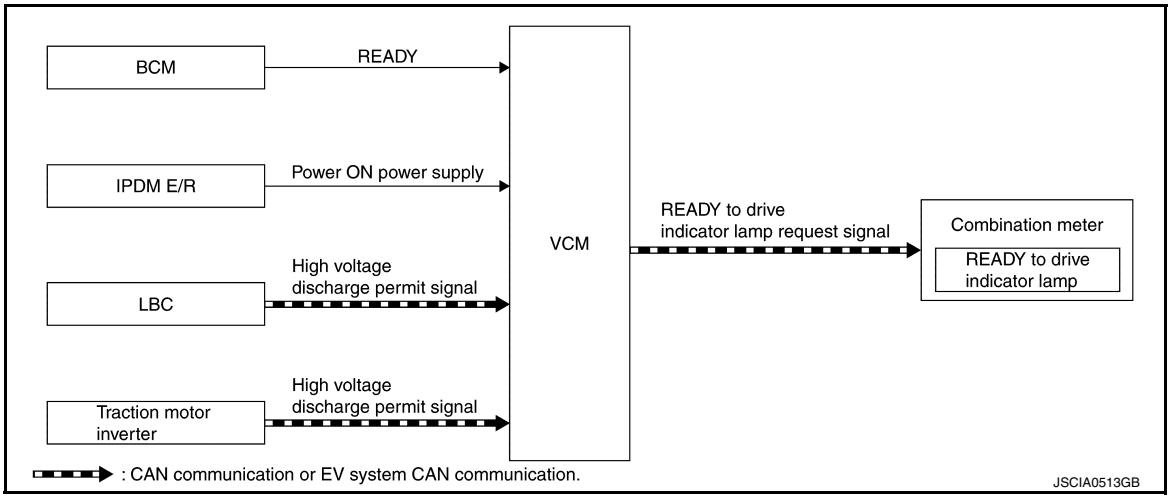
BULB CHECK

Not applicable

SYNCHRONIZATION WITH MASTER WARNING LAMP

Not applicable

SYSTEM DIAGRAM



SIGNAL PATH

- BCM transmits a READY signal to VCM when the driver operates the power switch to READY.
- The high voltage circuit is connected when VCM receives a READY signal. When the high voltage circuit is connected normally, LBC and the traction motor inverter transmit a high voltage discharge permit signal to VCM.
- When receiving a high voltage discharge permit signal, VCM judges that the vehicle is in a drivable condition and transmits a READY to drive indicator lamp request signal to the combination meter for turning ON the READY to drive indicator lamp.

LIGHTING CONDITION

- Vehicle: READY state.

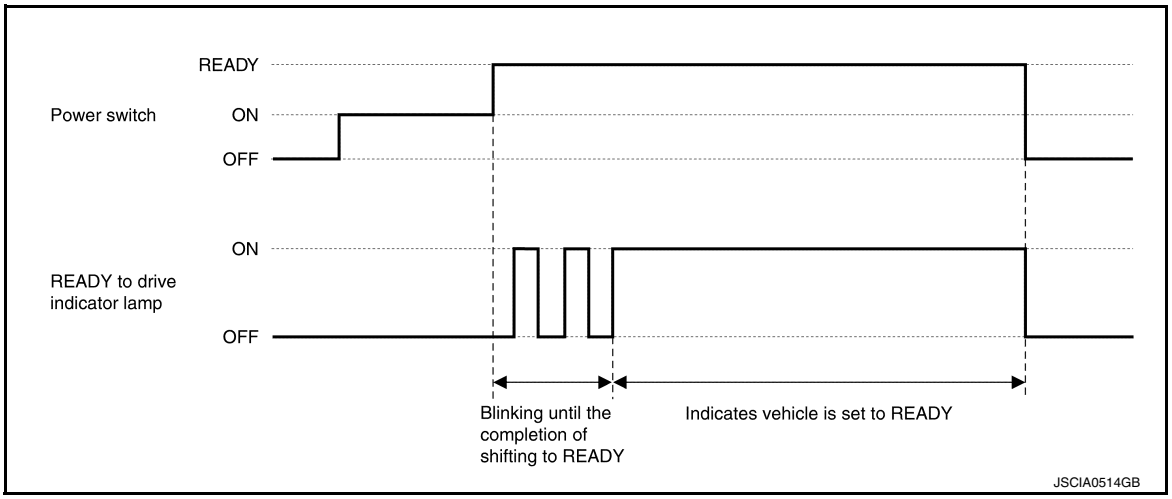
SHUTOFF CONDITION

- Power switch: OFF
- When a malfunction occurs in EV system.

BLINKING CONDITION

- When operating from power switch ON to READY

TIMING CHART

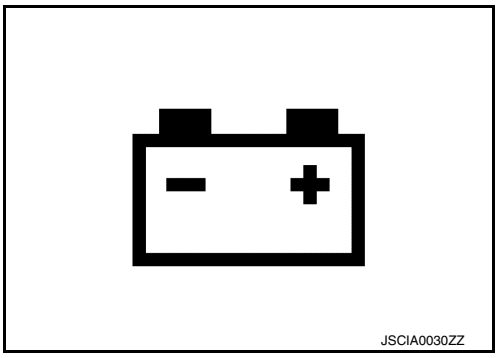


WARNING LAMPS/INDICATOR LAMPS : 12V Battery Charge Warning Lamp

INFOID:0000000009315493

DESIGN/PURPOSE

The 12V battery charge warning lamp turns ON when a malfunction occurs in the DC/DC converter simultaneously with a 12V battery voltage drop.



BULB CHECK

For approximately 2 seconds after the power switch is turned ON.

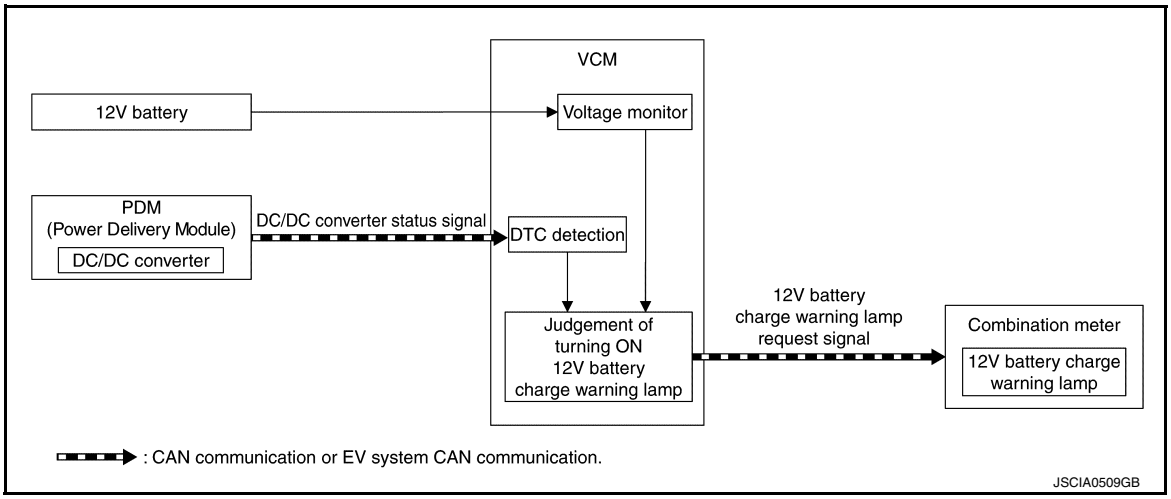
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

OPERATION AT COMBINATION METER CAN COMMUNICATION CUT-OFF OR UNUSUAL SIGNAL

For actions on CAN communications blackout in the combination meter, refer to MWI-15, "METER SYSTEM : Fail-Safe".

SYSTEM DIAGRAM



SIGNAL PATH

- VCM monitors the status of DC/DC converter by receiving a DC/DC converter status signal from PDM (Power Delivery Module).
- When detecting a malfunction in the DC/DC converter simultaneously with a 12V battery voltage drop, VCM transmits a 12V battery charge warning lamp request signal to the combination meter for turning on the 12V battery charge warning lamp.

LIGHTING CONDITION

When any of the following conditions are satisfied:

- Power switch: ON
- When VCM detects a malfunction in the DC/DC converter during the READY state simultaneously with a 12V battery voltage drop (approximately 12.5 V or less) for a few seconds.

NOTE:

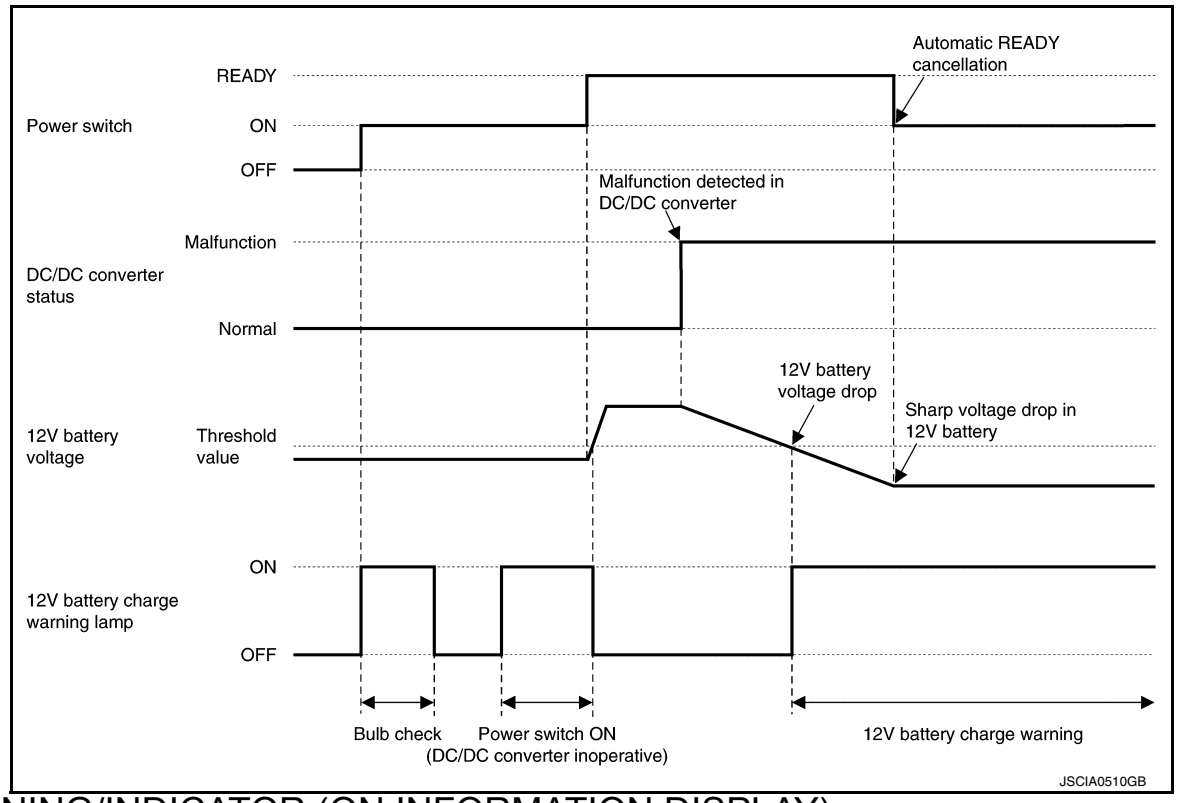
- When 12V battery voltage drops sharply while in READY state, the READY state is also cancelled.
- When 12V battery voltage becomes low, the 12V battery charge warning lamp turns ON and the buzzer sounds if the shift position is not in P position.

SHUTOFF CONDITION

When all of the following conditions are satisfied:

- When 12V battery voltage returns to normal, the 12V battery charge warning lamp turns OFF.
- The DC/DC converter operates normally.

TIMING CHART



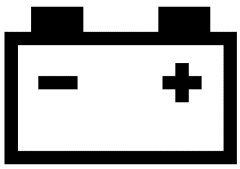
WARNING/INDICATOR (ON INFORMATION DISPLAY)

WARNING/INDICATOR (ON INFORMATION DISPLAY) : DC/DC Converter Warning

INFOID:0000000009315494

DESIGN/PURPOSE

DC/DC converter warning warns the driver of 12V battery voltage drop.

Symbol	Message
 JSCIA0030ZZ	• Stop vehicle*1 • Apply parking brake*2

*1: When 12V battery voltage drops while driving.
*2: When 12V battery voltage drops with the shift position not in P position.

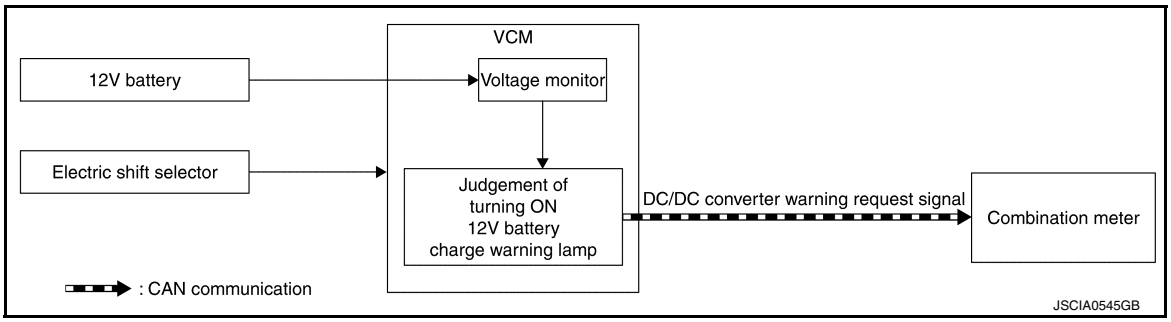
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

SYNCHRONIZATION WITH WARNING CHIME

Synchronization is applied.
For warning chime, refer to EVC-39, "WARNING CHIME : DC/DC Converter Warning Chime".

SYSTEM DIAGRAM



SIGNAL PATH

- VCM monitors 12V battery voltage, and if the voltage drops, then VCM transmits a DC/DC converter warning request signal to the combination meter to display a DC/DC converter warning.
- When receiving a P range signal from the electric shift selector, VCM cancels a DC/DC converter warning.

WARNING/INDICATOR OPERATING CONDITION

When all of the following conditions are satisfied:

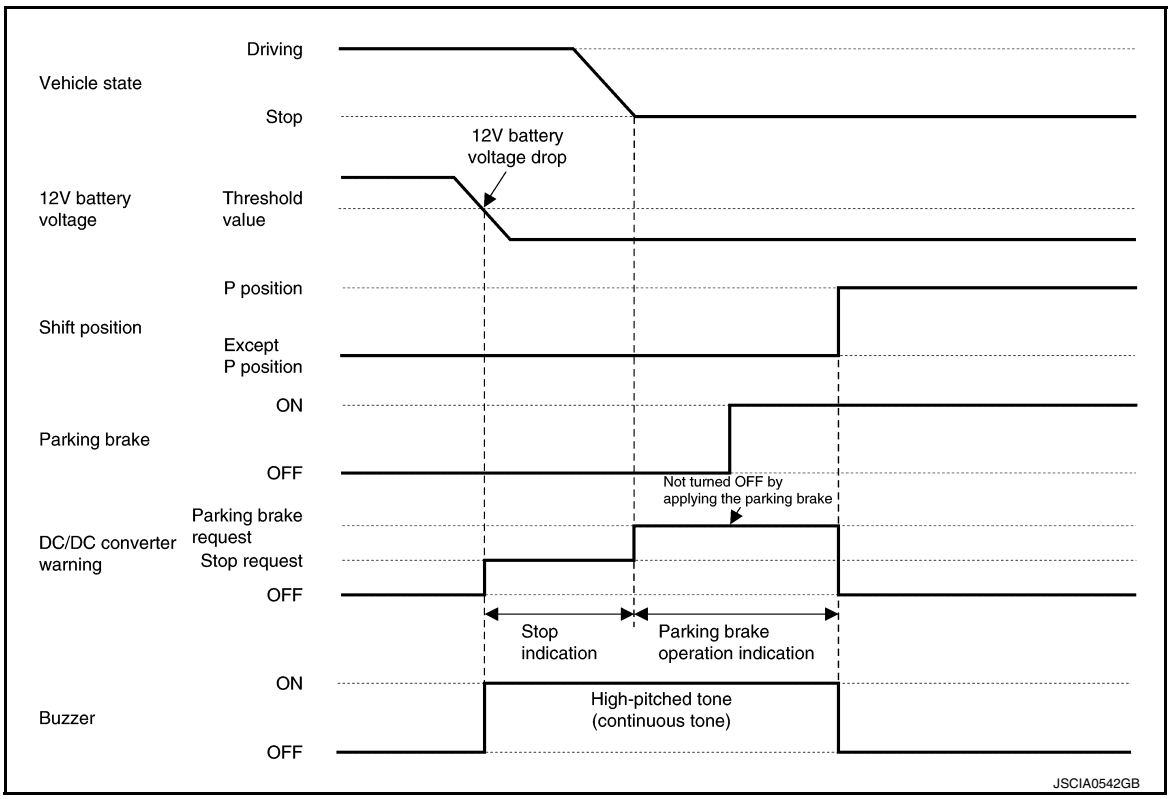
- Shift position: Except P range
- 12V battery voltage stays low (approximately 10 – 12 V or less)* for a few consecutive seconds.
  *: Threshold voltage depends on vehicle speeds.
  NOTE:
  When 12V battery voltage drops sharply while in READY state, the READY state is also cancelled.

WARNING/INDICATOR CANCEL CONDITION

When any of the following conditions are satisfied:

- Shift position: P range
- The 12V battery voltage returns to approximately 12.5 V or more.

TIMING CHART



WARNING/INDICATOR (ON INFORMATION DISPLAY) : Low Battery Charge Warning

INFOID:0000000009315495

DESIGN/PURPOSE

< SYSTEM DESCRIPTION >

Low battery charge warning is displayed when Li-ion battery power becomes low.

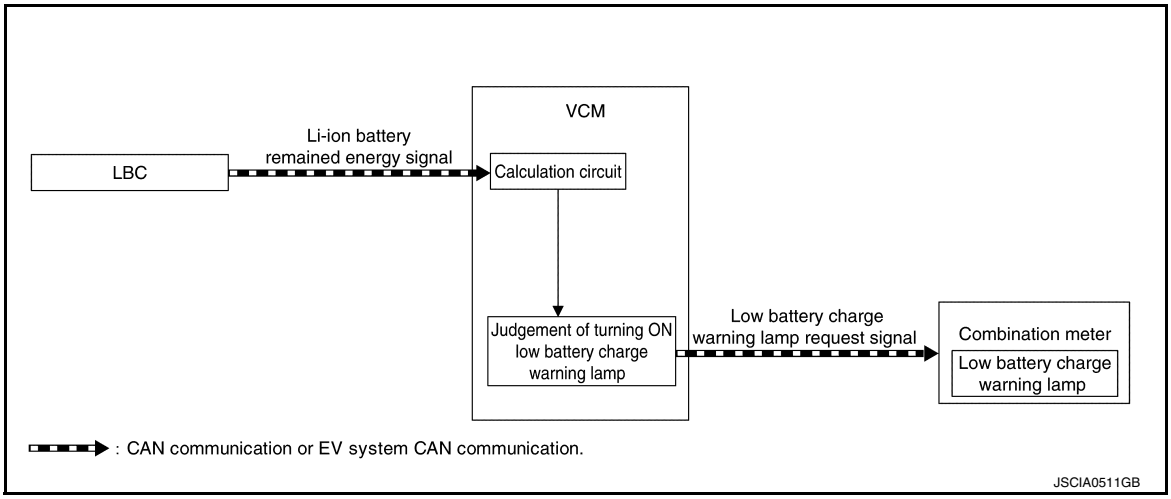
Symbol	Message
—	Battery level is low

SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.

For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

SYSTEM DIAGRAM



SIGNAL PATH

- LBC transmits a Li-ion battery remaind energy signal to VCM.
- VCM calculates a remaining Li-ion battery power according to a signal received from LBC. When judging low remaining battery power, VCM transmits a low battery charge warning lamp request signal to the combination meter.

WARNING/INDICATOR OPERATING CONDITION

When all of the following conditions are satisfied:

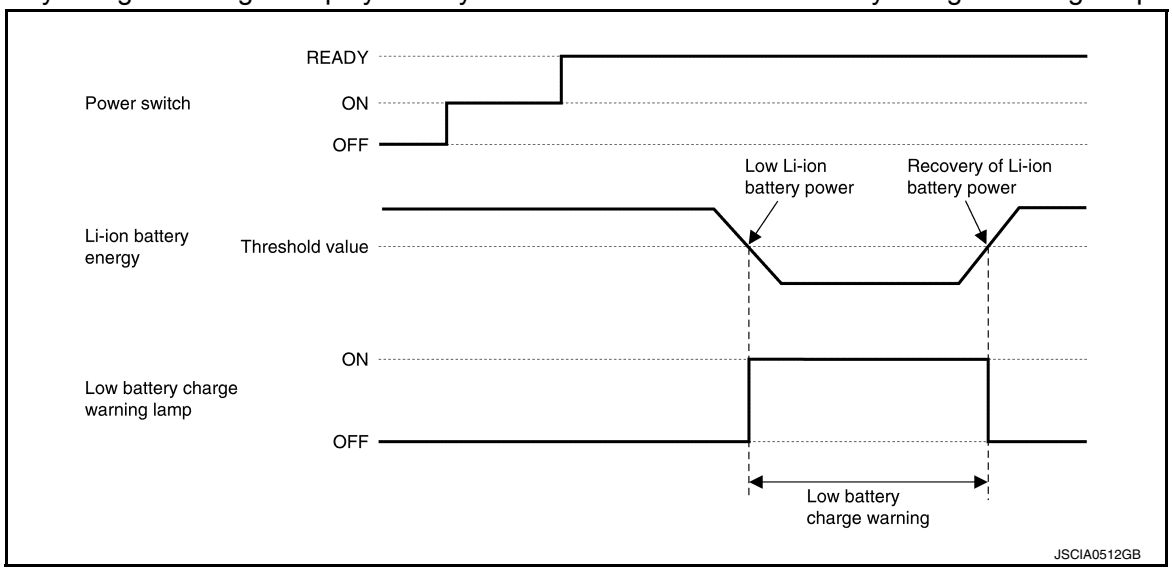
- Power switch: ON or READY
- When Li-ion battery power is 4 kWh or less.

WARNING/INDICATOR CANCEL CONDITION

When Li-ion battery power returns to 4.5 kWh or more.

TIMING CHART

Low battery charge warning is displayed in synchronization with the low battery charge warning lamp.



WARNING/INDICATOR (ON INFORMATION DISPLAY) : Power Limitation Warning

INFOID:0000000009315496

DESIGN/PURPOSE

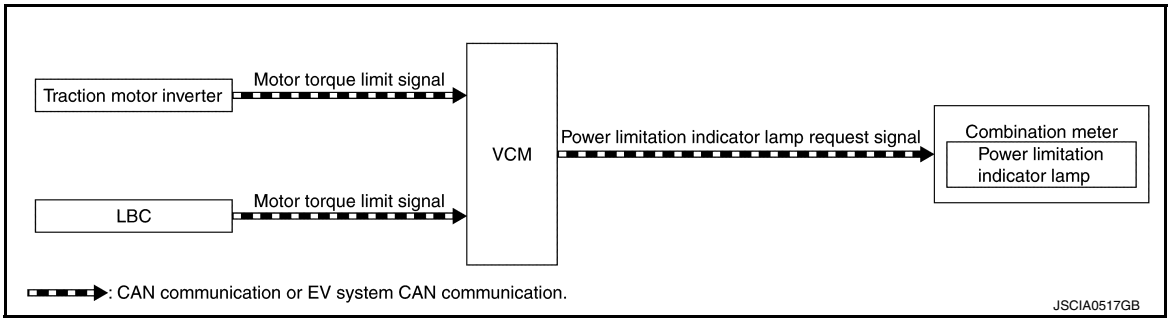
Power limitation warning shows that traction motor output is limited.

Symbol	Message
—	Motor power is limited

SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

SYSTEM DIAGRAM



SIGNAL PATH

- The traction motor inverter transmits a motor torque limit signal to VCM when the traction motor needs to be protected.
- When Li-ion battery cannot output power normally, a motor torque limit signal is transmitted to VCM.

WARNING/INDICATOR OPERATING CONDITION

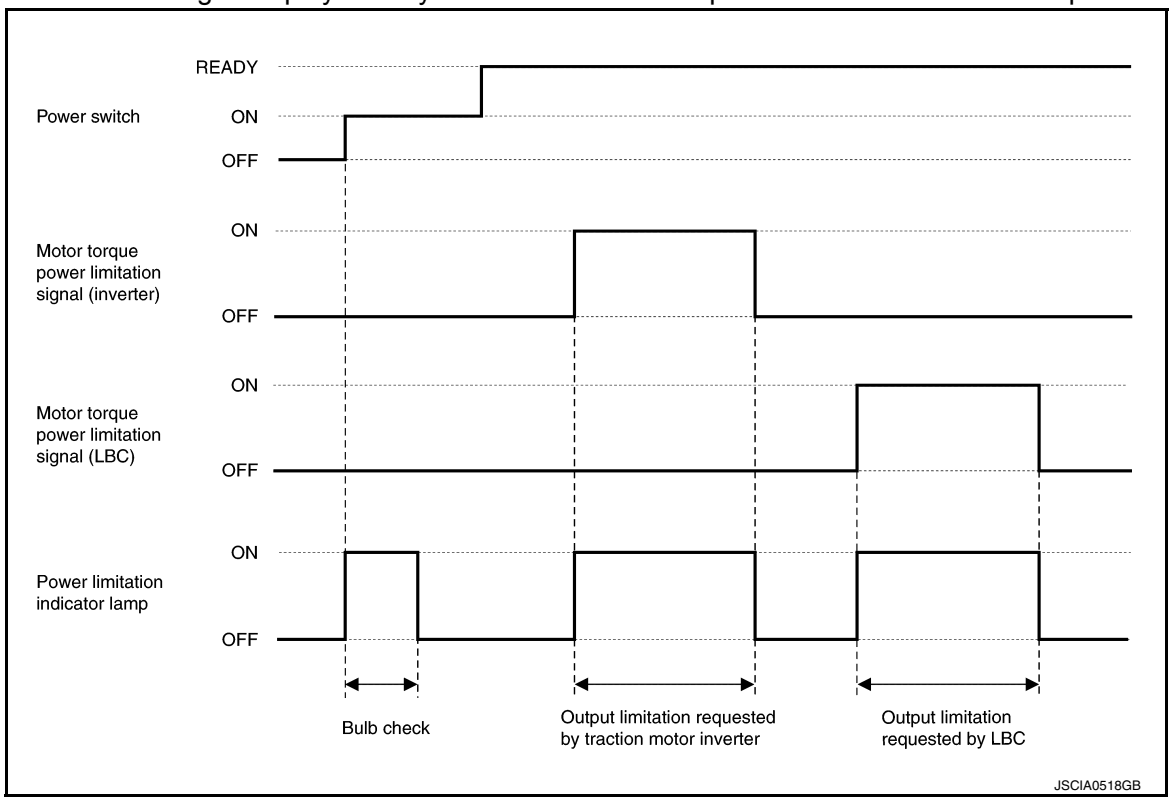
For warning/indicator operating condition, refer to EVC-50, "MOTOR POWER CONTROL : System Description".

WARNING/INDICATOR CANCEL CONDITION

The traction motor or Li-ion battery returns from the output limiting state.

TIMING CHART

Power limitation warning is displayed in synchronization with the power limitation indicator lamp.

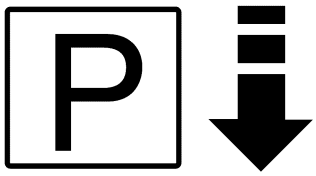


WARNING/INDICATOR (ON INFORMATION DISPLAY) : Shift P Warning

INFOID:0000000009315497

DESIGN/PURPOSE

Shift P warning warns that the driver is getting off the vehicle with the shift position not in P position.

Symbol	Message
 JSCIA0763ZZ	Select P

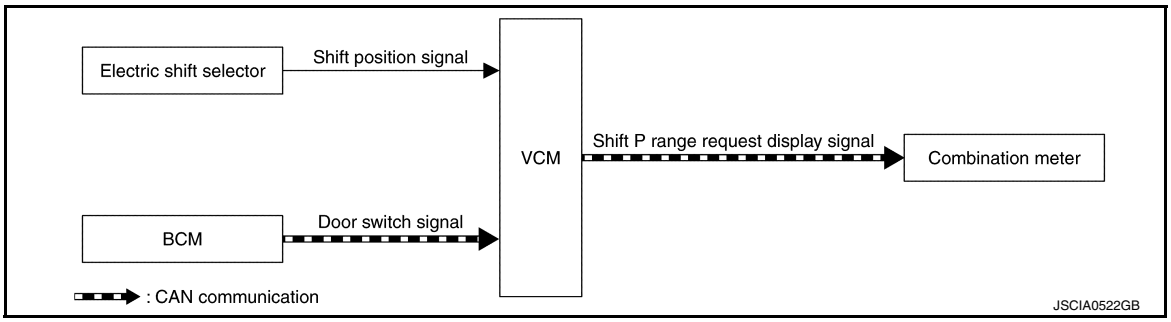
SYNCHRONIZATION WITH MASTER WARNING LAMP

Synchronization is applied.
For master warning lamp, refer to MWI-31, "MASTER WARNING LAMP : System Description".

SYNCHRONIZATION WITH WARNING CHIME

Synchronization is applied.
For warning chime, refer to EVC-41, "WARNING CHIME : Shift P Warning Chime".

SYSTEM DIAGRAM



SIGNAL PATH

- The electric shift selector sends shift position information to VCM.
- BCM transmits a door switch signal to VCM.
- VCM judges the vehicle condition according to shift position information and a door switch signal. VCM transmits a shift P range request display signal to the combination meter if the driver's door is opened with the shift position not in P position.

WARNING/INDICATOR OPERATING CONDITION

When all of the following conditions are satisfied:

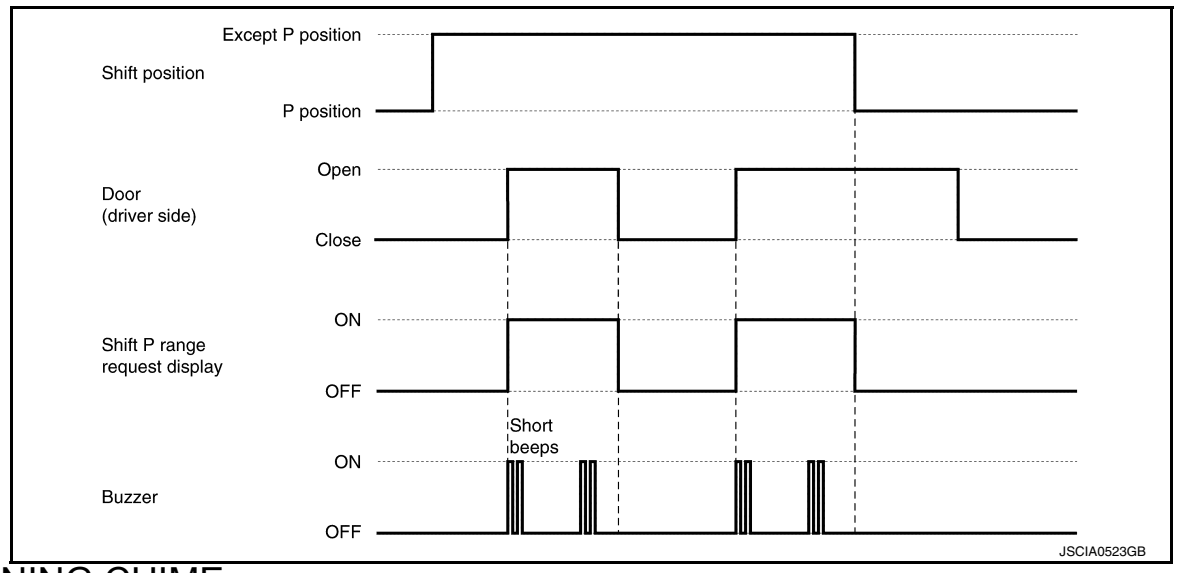
- Shift position: Except P range
- Front door (driver side): Open

WARNING/INDICATOR CANCEL CONDITION

The indication is cancelled when any of the following conditions are satisfied:

- The shift position is changed to P position.
- The driver's door is closed.

TIMING CHART



WARNING CHIME

WARNING CHIME : DC/DC Converter Warning Chime

INFOID:0000000009315498

PURPOSE

The DC/DC converter warning chime warns the driver that 12V battery voltage is low.

SYNCHRONIZATION WITH WARNING LAMP/INDICATOR LAMP

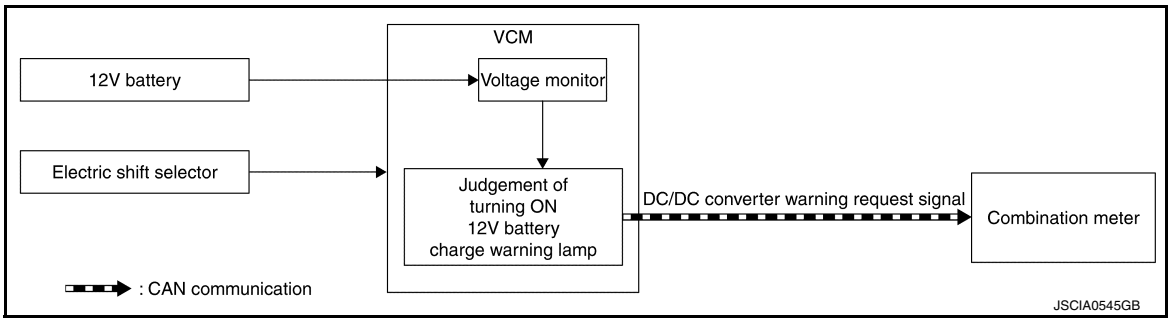
Not applicable

SYNCHRONIZATION WITH WARNING/INDICATOR (INFORMATION DISPLAY)

Synchronization is applied.

For information display, refer to EVC-34, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : DC/DC Converter Warning".

SYSTEM DIAGRAM



SIGNAL PATH

- VCM monitors 12V battery voltage, and if the voltage drops, then VCM transmits a DC/DC converter warning request signal to the combination meter to operate a DC/DC converter warning chime.
- When VCM receives a P position signal from the electric shift selector, the operation of DC/DC converter warning chime is cancelled.

WARNING OPERATING CONDITION

When all of the following conditions are satisfied:

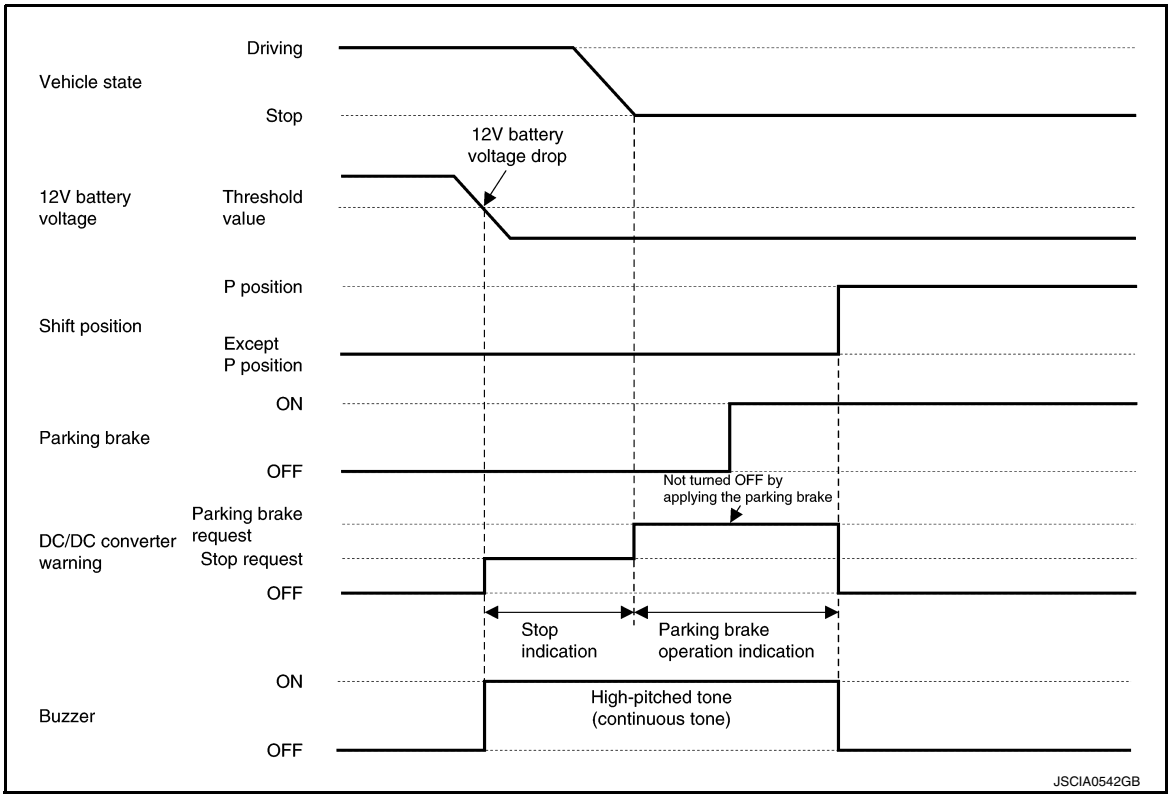
- Shift position: Except P range
- 12V battery voltage stays low (approximately 10 – 12 V or less)* for a few consecutive seconds.
  *: Threshold voltage depends on vehicle speeds.
  NOTE:
  When 12V battery voltage drops sharply while in READY state, the READY state is also cancelled.

WARNING CANCEL CONDITION

When any of the following conditions are satisfied:

- Shift position: P range
- The 12V battery voltage returns to approximately 12.5 V or more.

TIMING CHART



WARNING CHIME : Power Switch Reminder Chime

INFOID:0000000009315499

PURPOSE

The power switch reminder chime warns the driver that the driver's door is opened with power switch ON or in READY state.

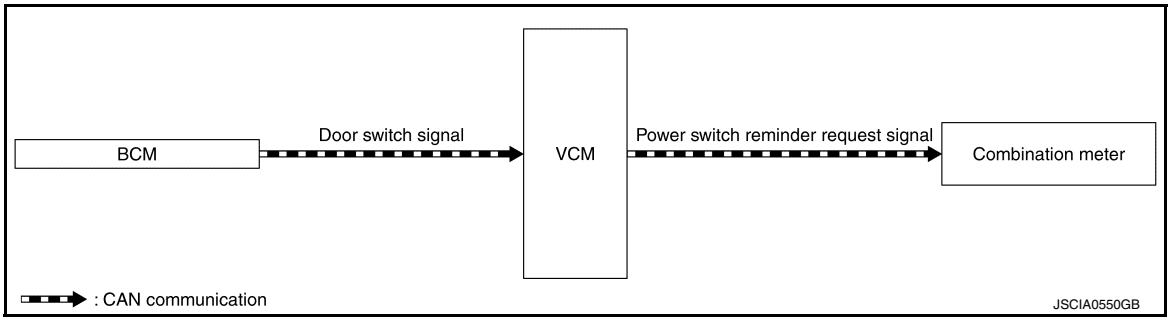
SYNCHRONIZATION WITH WARNING LAMP/INDICATOR LAMP

Not applicable

SYNCHRONIZATION WITH WARNING/INDICATOR (INFORMATION DISPLAY)

Synchronization is applied.
For information display, refer to MWI-35, "INFORMATION DISPLAY : System Description".

SYSTEM DIAGRAM



SIGNAL PATH

- BCM transmits a door switch signal to VCM.
- VCM judges the vehicle condition according to a door switch signal and power supply condition. VCM transmits a power switch reminder request signal to the combination meter if the driver's door is opened with the power switch ON or in READY state.

WARNING OPERATING CONDITION

When all of the following conditions are satisfied:

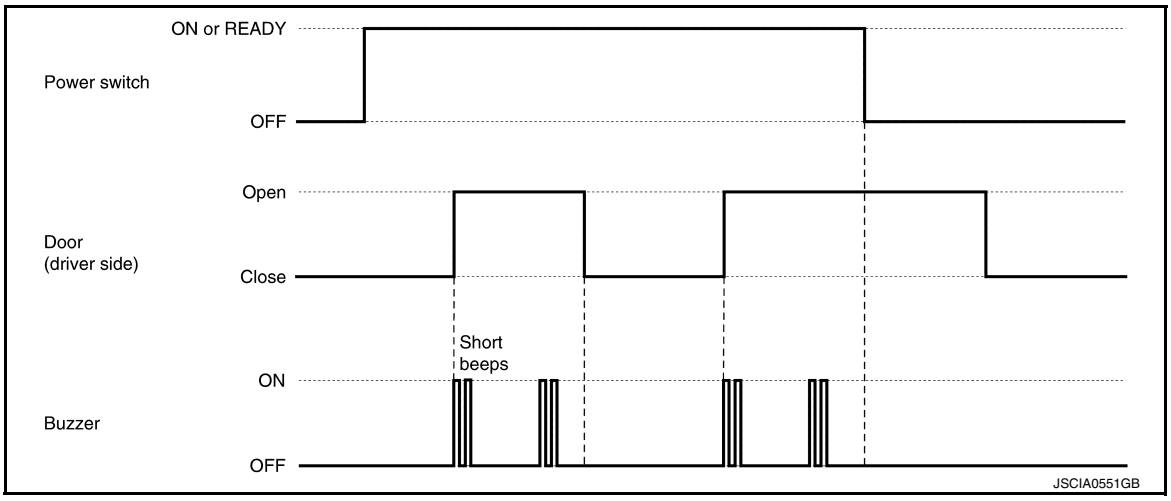
- Power switch: ON or READY
- Door switch: ON (Door is open)

WARNING CANCEL CONDITION

When any of the following conditions are satisfied:

- Power switch: Except ON or READY
- Door switch: OFF (Door is closed)

TIMING CHART



WARNING CHIME : Shift P Warning Chime

INFOID:0000000009315500

PURPOSE

The shift P warning chime warns that the drive is getting off the vehicle with the shift position not in P position.

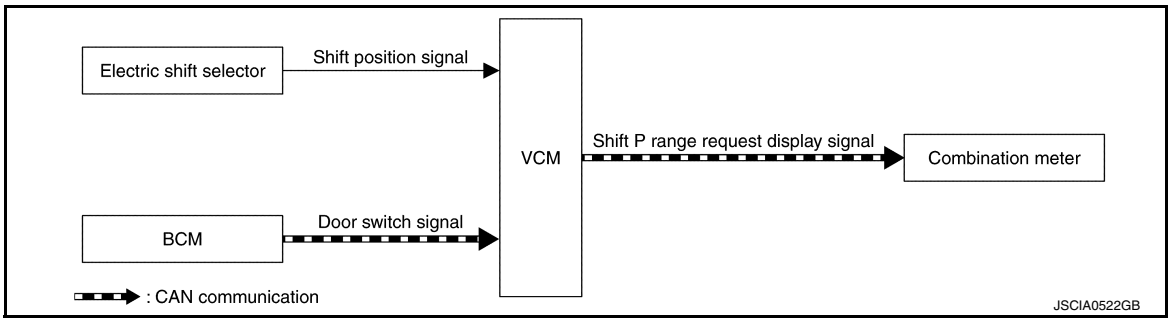
SYNCHRONIZATION WITH WARNING LAMP/INDICATOR LAMP

Not applicable

SYNCHRONIZATION WITH WARNING/INDICATOR (INFORMATION DISPLAY)

Synchronization is applied.
For information display, refer to EVC-38, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : Shift P Warning".

SYSTEM DIAGRAM



SIGNAL PATH

- The electric shift selector sends shift position information to VCM.
- BCM transmits a door switch signal to VCM.
- VCM judges the vehicle condition according to shift position information and a door switch signal. VCM transmits a shift P range request display signal to the combination meter if the driver's door is opened with the shift position not in P position.

WARNING OPERATING CONDITION

When all of the following conditions are satisfied:

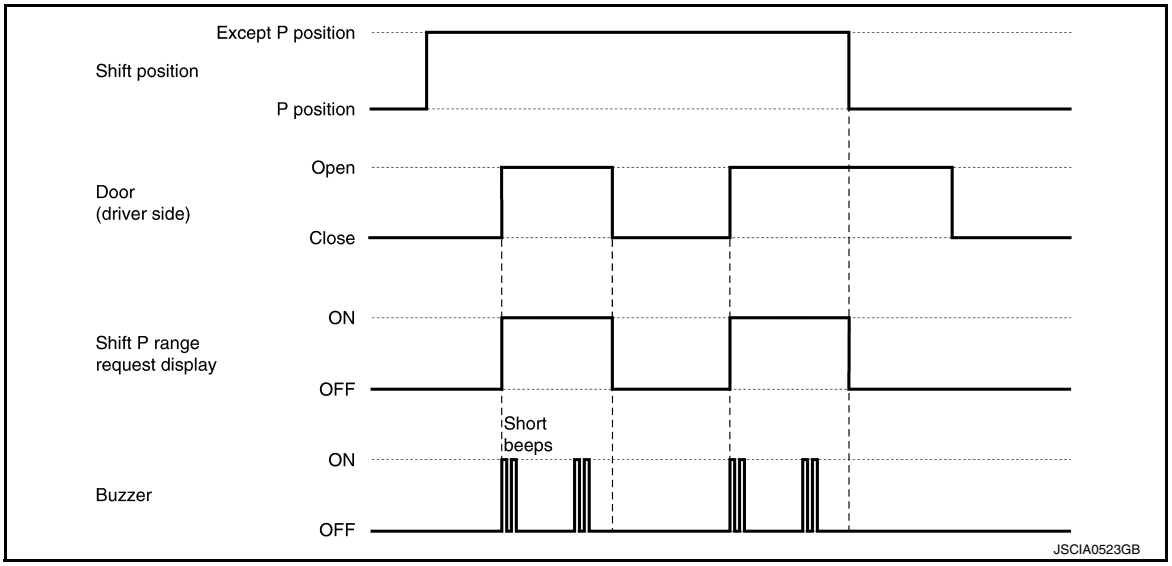
- Shift position: Except P range
- Front door (driver side): Open

WARNING CANCEL CONDITION

The indication is cancelled when any of the following conditions are satisfied:

- The shift position is changed to P position.
- The driver’s door is closed.

TIMING CHART



SYSTEM

ELECTRIC POWER TRAIN SYSTEM

ELECTRIC POWER TRAIN SYSTEM : System Description

INFOID:0000000008746978

CONTROL OUTLINE

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

Main Control Contents of EV

Control	Reference
EV system start-up control	EVC-46, "EV SYSTEM START UP CONTROL : System Description"
High voltage power supply control	EVC-49, "HIGH VOLTAGE POWER SUPPLY CONTROL : System Description"
Motor power control	EVC-50, "MOTOR POWER CONTROL : System Description"
Motor regeneration control	EVC-51, "MOTOR REGENERATION CONTROL : System Description"
ECO mode / B mode	EVC-52, "ECO MODE/B MODE SYSTEM : System Description"
Electric shift control	TM-42, "ELECTRIC SHIFT SYSTEM : System Description"
Li-ion battery charge control	EVC-53, "LI-ION BATTERY CHARGE CONTROL : System Description"
Cooperative Regenerative brake control	BR-15, "System Description"
High voltage system cooling control	EVC-55, "HIGH VOLTAGE SYSTEM COOLING CONTROL : System Description"
Air conditioner control	EVC-58, "AIR CONDITIONER CONTROL : System Description"
Power voltage variable control	EVC-60, "POWER VOLTAGE VARIABLE CONTROL SYSTEM : System Description"
Automatic 12V battery charge control	EVC-61, "AUTOMATIC 12V BATTERY CHARGE CONTROL : System Description"
Power cut off control	EVC-62, "POWER CUT OFF CONTROL : System Description"
Charge port control	EVC-63, "CHARGE PORT CONTROL : System Description"
ASCD (automatic speed control device)	EVC-65, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"
ECO indicator control	EVC-66, "ECO INDICATOR CONTROL : System Description"

ELECTRIC POWER TRAIN SYSTEM : Fail-Safe

INFOID:0000000009314521

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

×:Applicable

DTC		Pattern				Others
		A	B	C	D	
U1010	TYPE 1			×		
	TYPE 2	×	×	×	×	

DTC		Pattern				Others
		A	B	C	D	
P0A8D		×	×	×	×	
P0A8E		×	×	×	×	
P0AA0		×	×	×	×	Start not possible
P0AA1		×	×	×	×	Start not possible
P0AA2		×	×	×	×	
P0AA4		×	×	×	×	Start not possible
P0AA5		×	×	×	×	
P0AA6		×	×			Doing READY again is prohibited.
P1564						ASCD operation prohibited
P1572						ASCD operation prohibited
P1574						ASCD operation prohibited
P1610		×	×	×	×	Start not possible
P1611		×	×	×	×	Start not possible
P1612		×	×	×	×	Start not possible
P2122 P2123 P2127 P2128						• Traction motor output is limited. • Reduced responsiveness during accelerator operation
P2138	TYPE 1			×		
	TYPE 2					• Traction motor output is limited. • Reduced responsiveness during accelerator operation
P3100		×	×	×	×	
P3101	TYPE 1			×		
	TYPE 2	×	×	×	×	Start not possible
	TYPE 3					No fail-safe.
P3102						Traction motor output is limited.
P3117						• VCM inhibits the operation of the electric compressor. • VCM inhibits the operation of the PTC heater.
P312B		×	×	×	×	
P312C		×	×	×	×	
P312D		×	×	×	×	
P312E		×	×	×	×	
P312F		×	×	×	×	
P3130		×	×	×	×	
P3131	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P3137		×	×	×	×	Start not possible
P3141			×			
P315C		×	×	×	×	
P316A				×		
P316C		×				
P316D				×		
P316F	TYPE 1	×	×	×	×	
	TYPE 2	×	×			
P3170			×			

DTC		Pattern				Others
		A	B	C	D	
P3173		×	×			Traction motor output is limited.
P3175				×		
P3176		×	×	×	×	
P3177		×	×	×	×	
P3178		×	×	×	×	
P317A				×		
P317B		×	×	×	×	
P317D				×		
P317E		×	×			
P3182		×	×	×	×	
P3183		×	×			
P3187				×		
P3188	TYPE 1	×	×			Traction motor output is limited.
	TYPE 2					No fail-safe.
P318B	TYPE 1			×		Put the gear position in neutral.
	TYPE 2	×	×	×	×	
P3191	TYPE 1			×		
	TYPE 2					No fail-safe.
P3193	TYPE 1	×	×			Only driving in creep is possible.
	TYPE 2					No fail-safe.
P3196	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P3197				×		
P319C				×		
P319E		×	×			Only driving in creep is possible.
P31A1	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P31A2				×		
P31A7				×		
P31A9		×	×			Only driving in creep is possible.
P31AD				×		
P31AE	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P31B0	TYPE 1					VCM inhibits the timer charge.
	TYPE 2					VCM inhibits the timer charge and the remote climate control.
	TYPE 3					No fail-safe.
P31B3	TYPE 1					When the power is turned on and the vehicle is charging, the cooling fan is operated at a constant speed.
	TYPE 2					No fail-safe.
P31B4	TYPE 1					VCM inhibits the timer charge.
	TYPE 2					VCM inhibits the remote climate control.
	TYPE 3					No fail-safe.

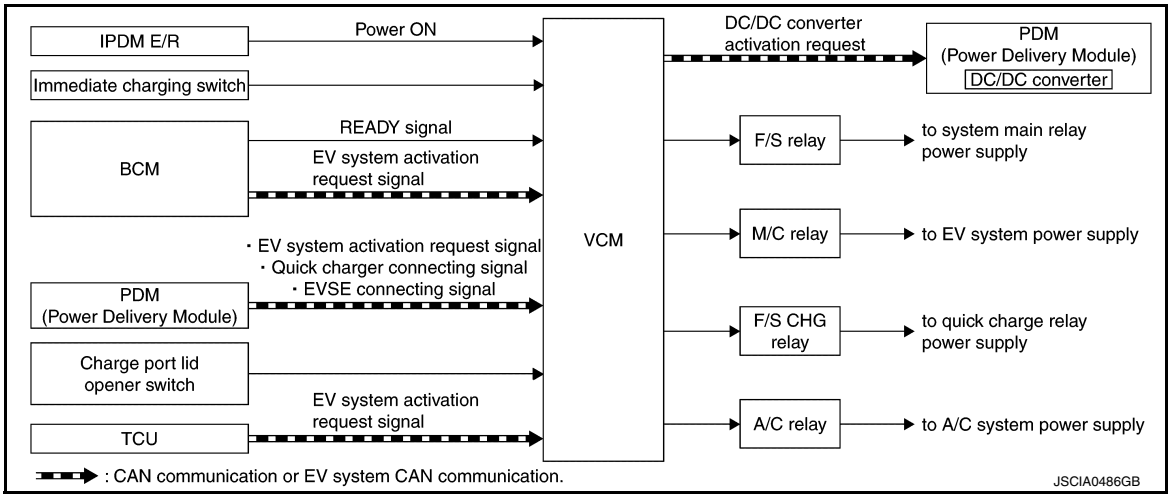
DTC		Pattern				Others
		A	B	C	D	
P31B5	TYPE 1					ASCD operation prohibited **NOTE:** The ECO indicator value also becomes extremely poor.
	TYPE 2					No fail-safe.
P31B6						VCM sets the DC/DC converter output power to a constant 14 V.
P31C5						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.
P31C6						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.
P31C7						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.
P31CA		×				Traction motor output is limited.
P31CB		×				Traction motor output is limited.
P31D5						• Traction motor output is limited. • Vehicle speed is limited. [Approx. 40 km/h (25 MPH)]
P31DB		×	×	×	×	
P31DC		×	×	×	×	
P31DE	TYPE 1					Traction motor output is limited.
	TYPE 2	×	×	×	×	Start not possible
P31E0	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E1	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E7						Doing READY again is prohibited.
P31F2						VCM inhibits the timer charge and the remote climate control.

EV SYSTEM START UP CONTROL

EV SYSTEM START UP CONTROL : System Description

INFOID:0000000008746980

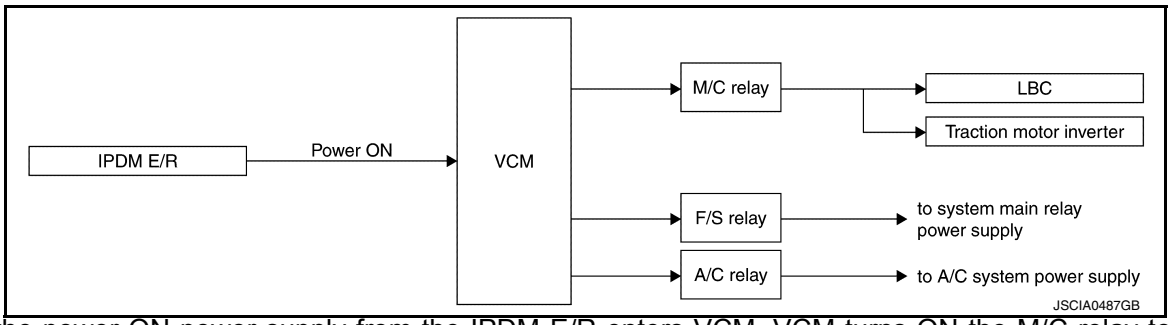
SYSTEM DIAGRAM



CONTROL DESCRIPTION

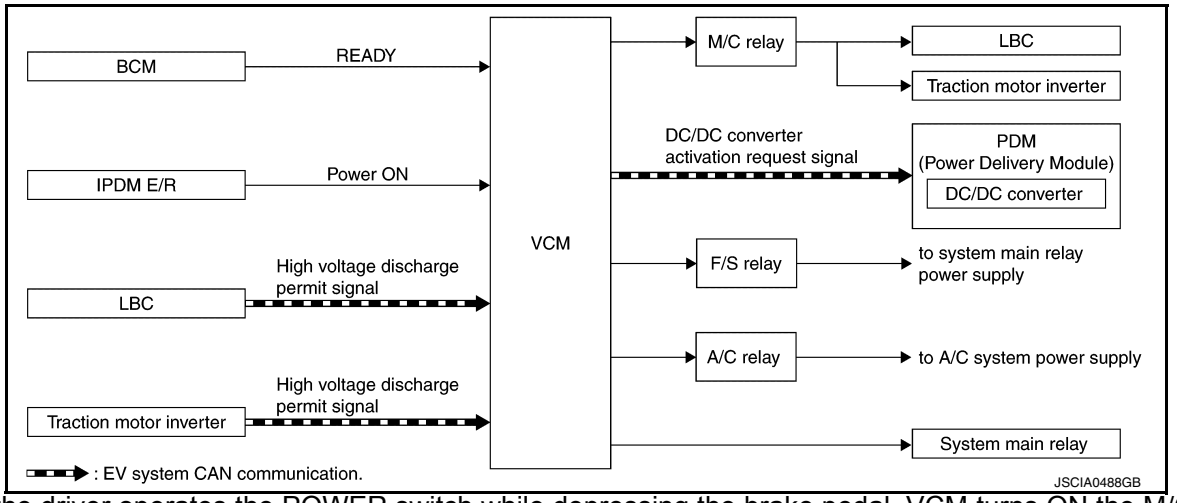
VCM judges the operation mode from signals sent by various sensors, switches, and ECUs, and controls the start/stop of the EV system by activating the relays accordingly.

Power Switch ON



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

READY



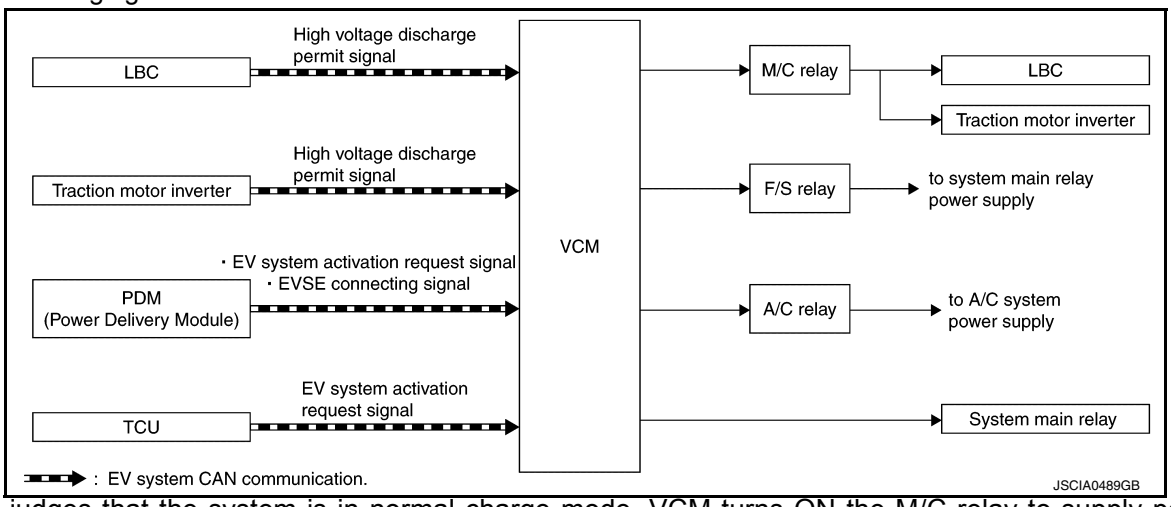
When the driver operates the POWER switch while depressing the brake pedal, VCM turns ON the M/C relay to supply power to each ECU in the EV system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

NOTE:

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

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

In Normal Charging

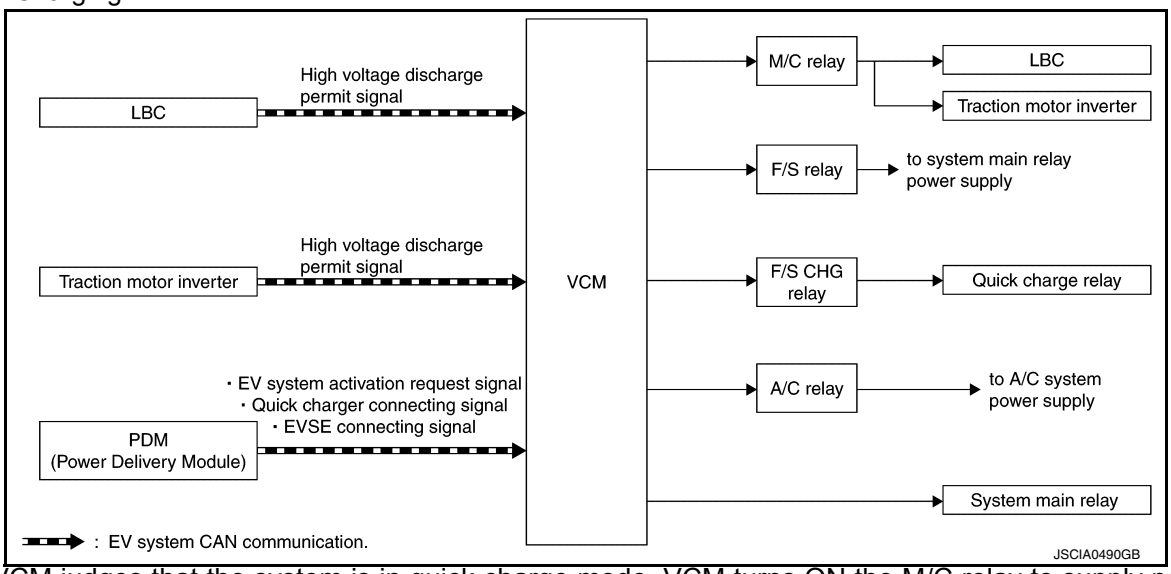


If VCM judges that the system is in normal charge mode, VCM turns ON the M/C relay to supply power to each ECU in the EV system. Furthermore, VCM activates the F/S relay to start the power supply to the system main relay.

NOTE:

Normal charging does not start with the power switch ON.

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 PDM (Power Delivery Module). 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 air conditioner is activated (e.g. remote climate control and Climate Ctrl. Timer), 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	Climate Ctrl. Timer
			Normal charge	Quick charge		
F/S relay	ON	ON	ON	ON	ON	ON
M/C relay	ON	ON	ON	ON	ON	ON
A/C relay	ON	ON	ON	ON	ON	ON
F/S CHG relay	OFF	OFF	OFF	ON	OFF	OFF

POWER OFF

Relay	Condition				
	Charging		When 12V battery is charged	Climate Ctrl. Timer	Remote climate control
	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*

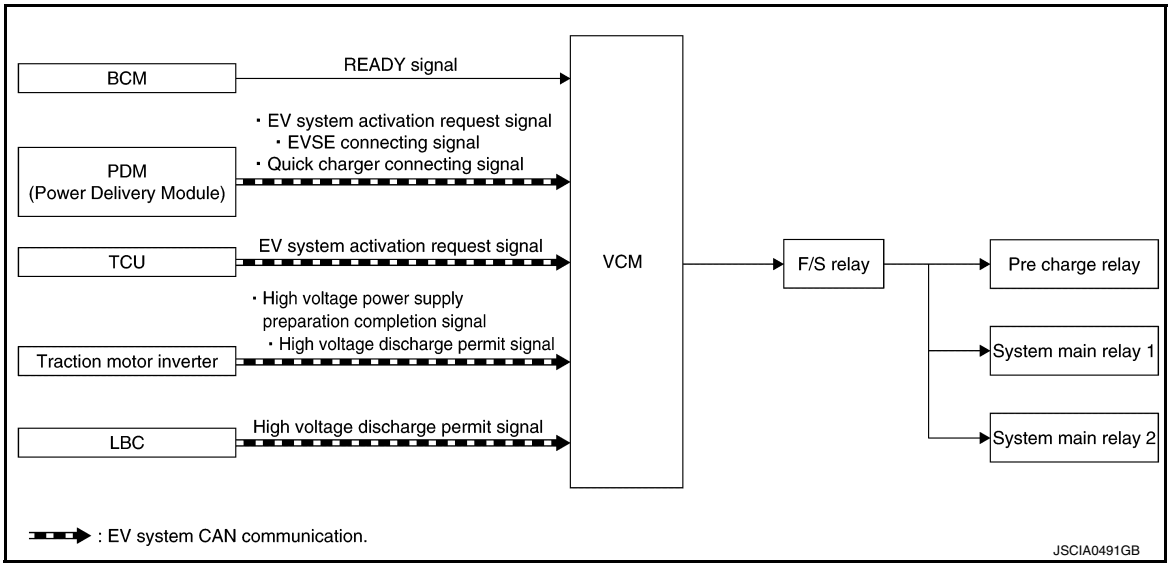
*: Only during quick charging

HIGH VOLTAGE POWER SUPPLY CONTROL

HIGH VOLTAGE POWER SUPPLY CONTROL : System Description

INFOID:0000000008746981

SYSTEM DIAGRAM



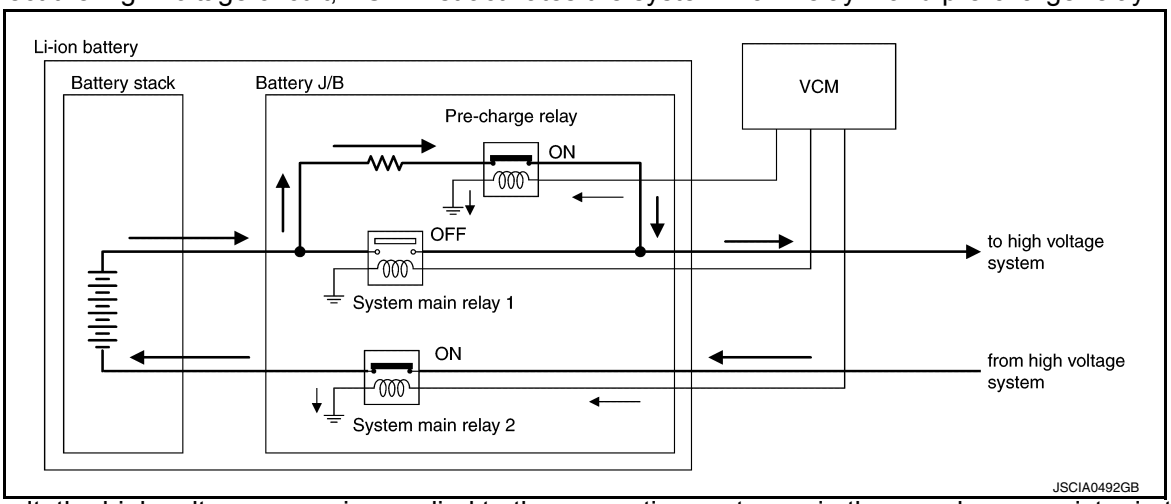
DESCRIPTION

When the driver performs the READY operation or connects the charge cable to a charging port or when VCM starts according to the timer control and judges the necessity of connecting the high voltage circuit to Li-ion battery, VCM activates system main relay 1, system main relay 2, and the pre-charge relay located inside the Li-ion battery to establish the circuit.

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

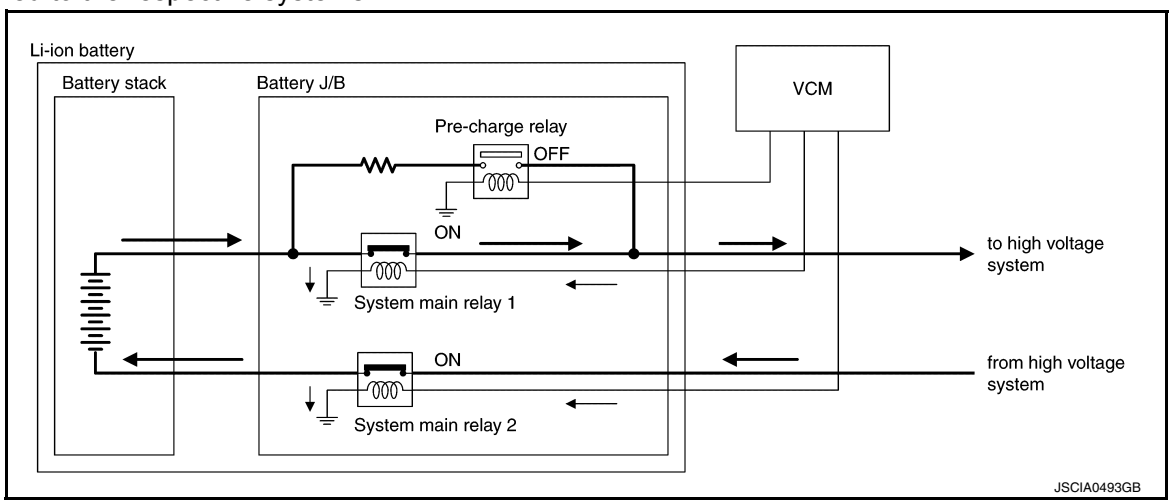
CONTROL FLOW

To connect the high voltage circuit, VCM first activates the system main relay 2 and pre-charge relay.



As a result, the high voltage power is supplied to the respective systems via the pre-charge resistor in the pre-charge circuit. When the condenser inside the traction motor inverter is fully charged by the applied power, the traction motor inverter transmits a high voltage power supply preparation completion signal to VCM. Receiving

the signal, VCM activates the system main relay 1 and deactivates the pre-charge relay. Then, normal power is supplied to the respective systems.

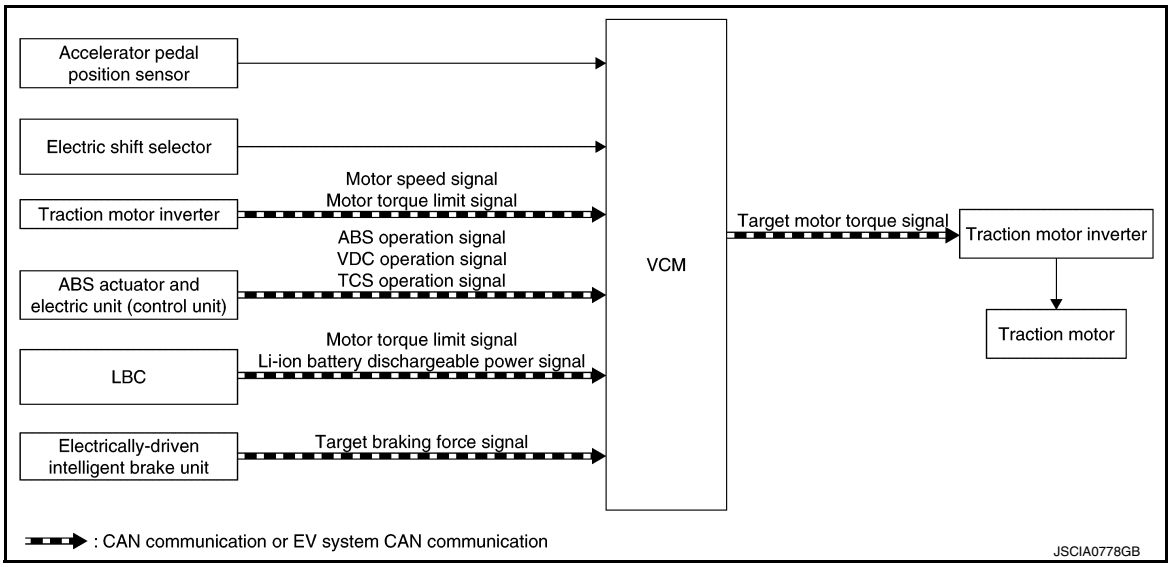


MOTOR POWER CONTROL

MOTOR POWER CONTROL : System Description

INFOID:0000000008746982

SYSTEM DIAGRAM



NOTE:
VCM calculates vehicle speed, based on a motor speed.

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-19, "MOTOR POWER CONTROL : Operating Principle".

OUTPUT LIMIT AND OUTPUT STOP REQUEST LIST

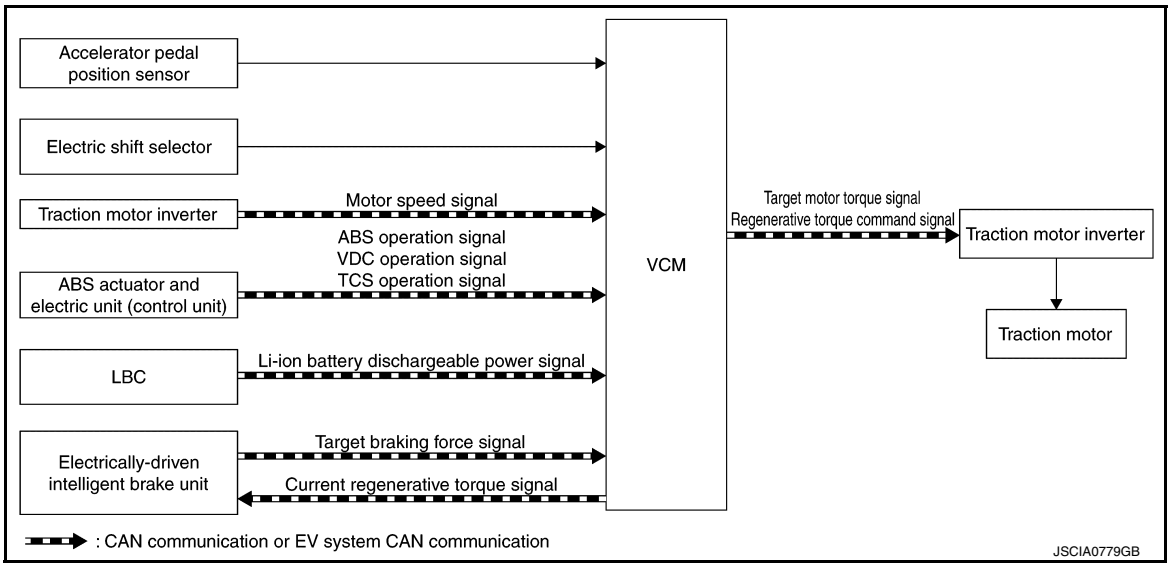
Request ECU	Output limit cause	Power limitation indicator lamp	Condition
Traction Motor Inverter	Traction motor temperature high	ON	When the traction motor or traction motor inverter reaches an abnormally high temperature
	Input power low	ON	When the high voltage power input to the traction motor inverter is 240 V or less
	DTC detected	OFF	Refer to TMS-25, "Fail-safe".
Li-ion battery controller	Li-ion battery remained energy low	ON	When the Li-ion battery cell voltage is low
	Li-ion battery temperature high	ON	When the Li-ion battery reaches an abnormally high temperature [Reference value: Approx. 55°C (131°F) or more]
	Li-ion battery temperature low	ON	When the Li-ion battery reaches an abnormally low temperature. [Reference value: Approx. −10°C (14°F) or less]
	DTC detected	OFF	Refer to EVB-40, "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-97, "Fail-Safe".

MOTOR REGENERATION CONTROL

MOTOR REGENERATION CONTROL : System Description

INFOID:0000000008746983

SYSTEM DIAGRAM



NOTE:
VCM calculates vehicle speed, based on a motor speed.

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-20, "MOTOR REGENERATION CONTROL : Operating Principle".

REGENERATIVE BRAKE CONTROL

When the driver depresses the brake pedal during driving, Electrically-driven Intelligent Brake Unit transmits a target braking force signal to VCM. VCM calculates a target regenerative torque based on the signal and

transmits a target motor torque signal to the traction motor inverter. Moreover, VCM transmits the current regenerative torque signal to Electrically-driven Intelligent Brake Unit so that the Electrically-driven Intelligent Brake Unit can control the overall braking force.
For information on the Electrically-driven Intelligent Brake collaborative control, refer to BR-20, "COOPERATIVE REGENERATIVE BRAKE FUNCTION : System Description".

REGENERATION CHARGE CONTROL

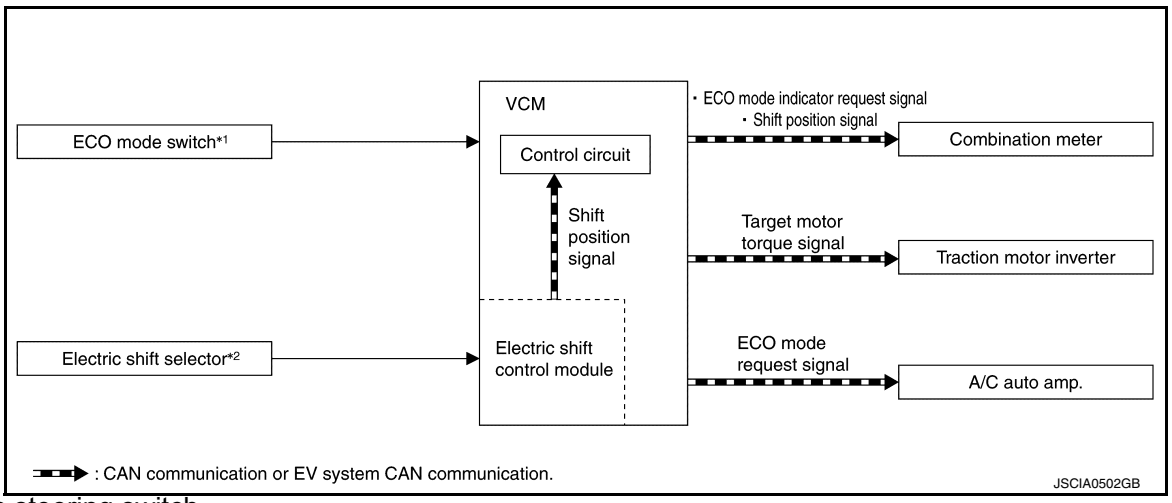
VCM determines the regenerative charging amount from the Li-ion battery maximum chargeable power signal sent from the Li-ion battery. Moreover, VCM determines the energy recovery amount while performing a collaborative control with the electrically-driven intelligent brake system so that a suitable braking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

ECO MODE/B MODE SYSTEM

ECO MODE/B MODE SYSTEM : System Description

INFOID:0000000009314714

SYSTEM DIAGRAM



*1: With steering switch
*2: Without steering switch

DESCRIPTION

ECO mode and B mode provide support for reducing the electricity consumption in actual traffic by reducing power consumption of the drive motor and air conditioner and by increasing the regenerative power from the drive motor.
NOTE:
ECO mode and B mode performs the control according to the normal characteristics when in reverse range.

ECO MODE

When the driver selects ECO mode by operating the shift lever (without steering switch models) or the ECO mode switch (with steering switch models), VCM controls to a gentle acceleration (compared to normal mode) and reduces electricity consumption by reducing waste in acceleration and deceleration. In addition, VCM transmits an ECO mode request signal to the A/C auto amp. and reduces the electricity consumption of A/C compressor by turning down the air conditioner.
VCM transmits an ECO mode indication request signal to the combination meter via CAN communication to turn ON the ECO mode indicator lamp.

B MODE (REGENERATIVE BRAKE MODE)

When the driver selects B mode by operating the shift lever, VCM controls to a strong regeneration (compared to normal mode) and collects more energy.

LIST OF DRIVE FORCE CHARACTERISTICS BY MODE

Mode	Power output	Regeneration
Normal	Normal control	Normal control
ECO mode	Gentle acceleration	Strongish
B mode	Normal control	Strong
B mode + ECO mode	Gentle acceleration	Strong

LI-ION BATTERY CHARGE CONTROL

LI-ION BATTERY CHARGE CONTROL : System Description

INFOID:0000000008746984

CONTROL OUTLINE

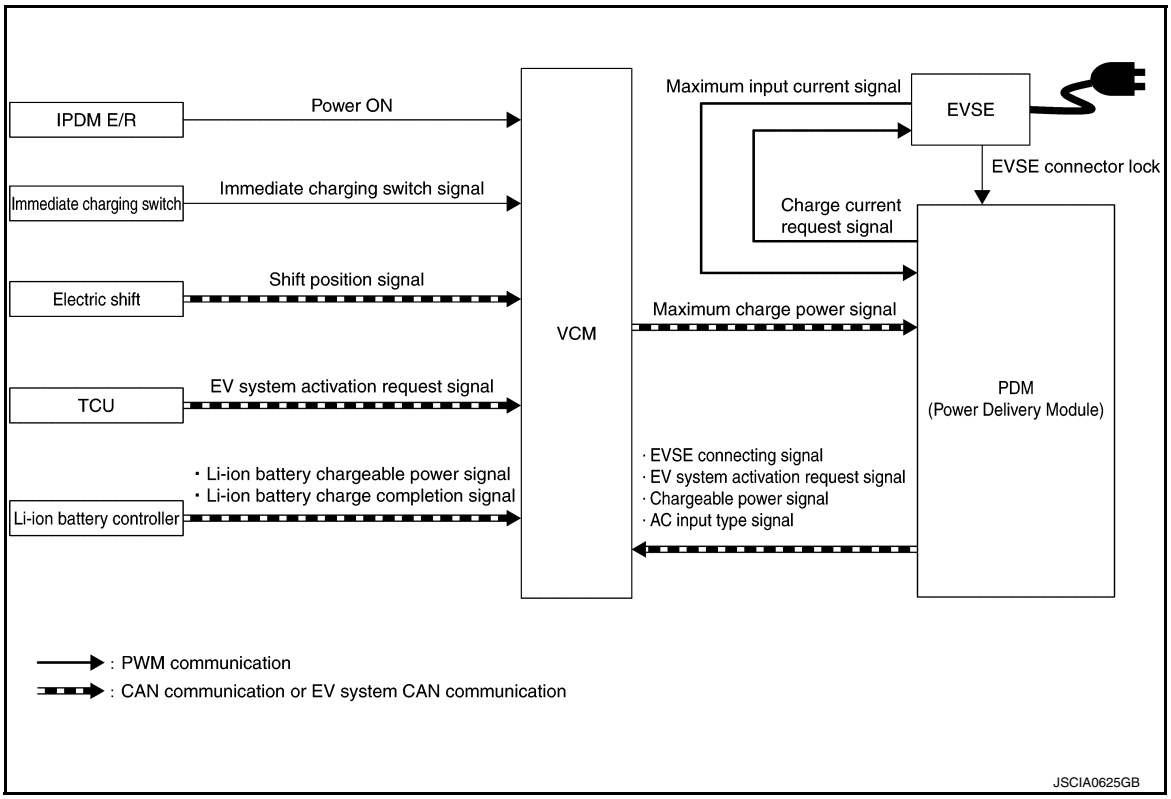
VCM activates the EV system by connecting the charging connector, performing remote control, or using the built-in timer to start charging to the Li-ion battery. The following charge modes are available.

Methods of charging		Description
Normal charge	Immediate charge	VC-17, "LI-ION BATTERY CHARGE CONTROL : System Description"
	Timer charge	
	Remote charge	
Quick charge		
Regeneration charge		EVC-51, "MOTOR REGENERATION CONTROL : System Description"

LI-ION BATTERY CHARGE CONTROL : Normal Charge Control

INFOID:0000000008746985

SYSTEM DIAGRAM



BASIC CONTROL

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

Then, VCM determines the charge power based on the Li-ion battery chargeable power signal received from the Li-ion battery controller and the chargeable power signal received from the PDM (Power Delivery Module). VCM then sends the maximum charge power signal to the PDM (Power Delivery Module).
The PDM (Power Delivery Module) 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 VCM activates the system main relay 1 and system main relay 2. Consequently, Li-ion battery charge starts.

NOTE:

- Li-ion battery charge does not start when the power switch is ON. When it is required to charge with the power switch ON, start charging before turning ON the power switch.
- When the charging connector is connected to the charge port in the READY state, READY is turned OFF, the power switch is turned ON, and the shift position is changed to N position.

IMMEDIATE CHARGE MODE

When EVSE is connected to the normal charge port, the PDM (Power Delivery Module) transmits an EV system activation signal to VCM. Li-ion battery charge then starts immediately.
When the timer charge is set, Li-ion battery charge does not start just after the PDM (Power Delivery Module) transmits an EV system activation signal to VCM. When VCM detects an ON signal from the immediate charging switch in that state, VCM judges that the immediate charge mode is selected and starts charging.
When the charge is finished and VCM receives a Li-ion battery charge completion signal from Li-ion battery controller, VCM stops the charge control.

TIMER CHARGE MODE

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

NOTE:

- The timer setting method varies according to vehicle specifications.
- Models with navigation system: Refer to AV-102, "MULTI AV SYSTEM : System Description" (Navigation without BOSE) or AV-232, "MULTI AV SYSTEM : System Description" (Navigation with BOSE).
- Models without navigation system: Refer to MWI-30, "TIMER CHARGE AND A/C-HEATER TIMER (CLIMATE CTRL. TIMER) (WITHOUT NAVIGATION) : System Description".
- When timer charge and the timer air conditioner operate simultaneously, VCM distributes power to the air conditioner system and the charge system according to the priority set on the navigation screen or combination meter.

REMOTE CHARGE MODE

When TCU transmits an EV system activation signal to VCM, VCM judges that the remote charge mode is selected and starts charge control.
When VCM receives a Li-ion battery charge completion signal from Li-ion battery controller, VCM stops the charge control.

CANCEL CONDITIONS

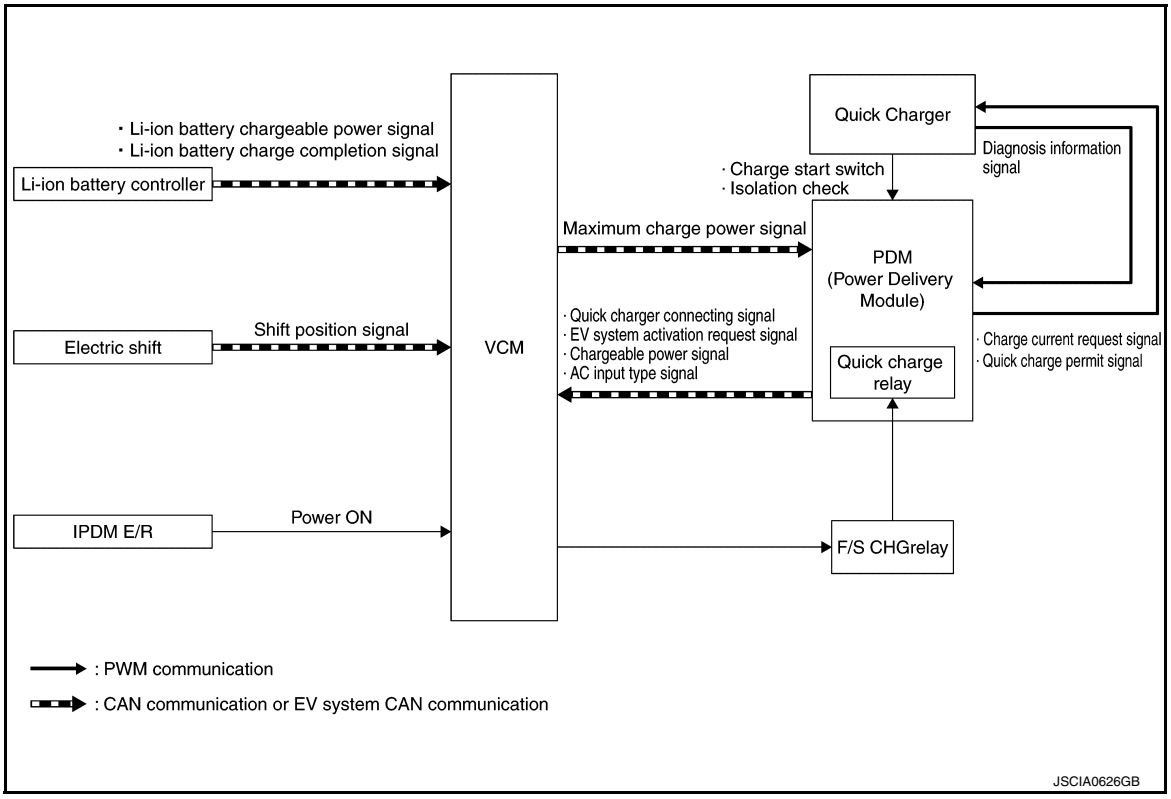
VCM stops the normal charging when VCM detects the EVSE is disconnected.
In addition, under the following conditions, VCM temporarily stops the normal charging and enters standby status.

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

LI-ION BATTERY CHARGE CONTROL : Quick Charge Control

INFOID:0000000008746986

SYSTEM DIAGRAM



BASIC CONTROL

When the quick charge connector is connected to the quick charge port and the start switch of quick charger is pressed, the PDM (Power Delivery Module) transmits an EV system activation request signal to VCM. VCM then activates the 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 chargeable power signal received from the PDM (Power Delivery Module). VCM then sends the maximum charge power signal to the PDM (Power Delivery Module).

The PDM (Power Delivery Module) converts the Maximum charge power signal to a charge current request signal and transmits it to the quick charger.

Simultaneously, the PDM (Power Delivery Module) 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 60ºC (140°F) or higher, VCM temporarily stops quick charging and enters standby status.

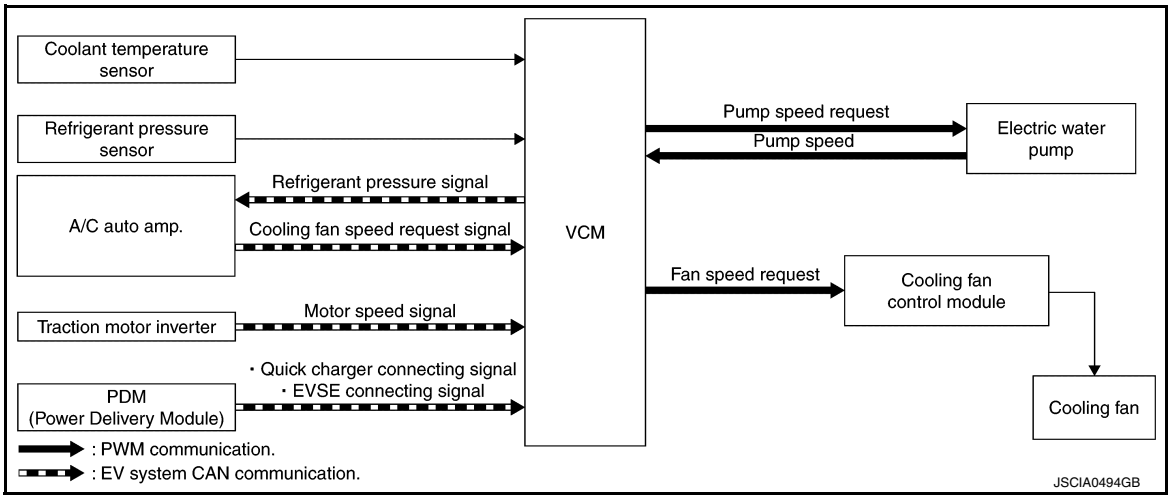
HIGH VOLTAGE SYSTEM COOLING CONTROL

HIGH VOLTAGE SYSTEM COOLING CONTROL : System Description

INFOID:0000000008746987

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

SYSTEM DIAGRAM

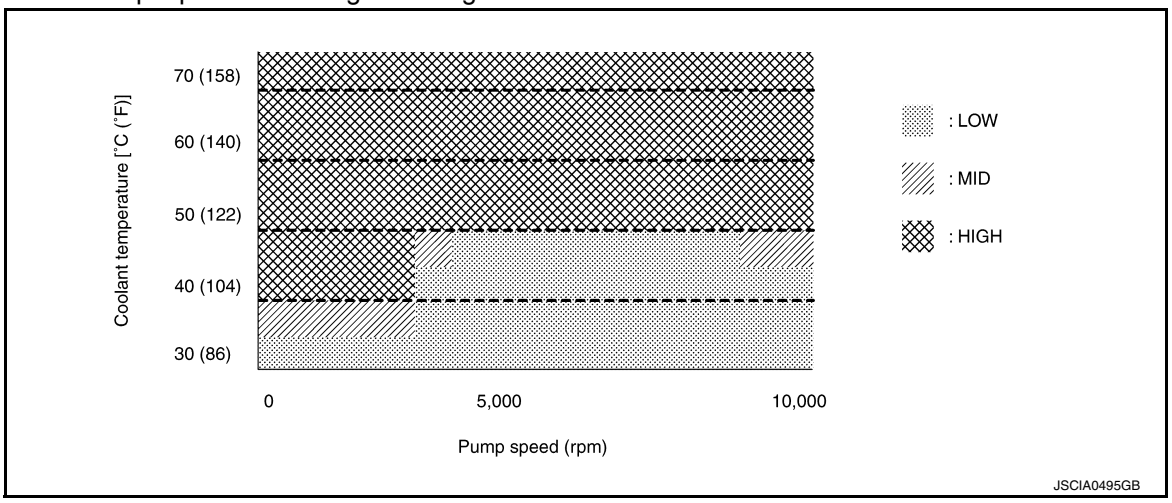


WATER PUMP CONTROL

Control Description

VCM controls the electric water pump to achieve the flow rate corresponding to water temperature and vehicle speed. The electric water pump contains an interface circuit. When a malfunction occurs in the pump, the electric water pump transmits an error signal to VCM and prevents the reduction in coolant flow rate. Since PDM (Power Delivery Module) needs to be cooled during charge, VCM activates the electric water pump to circulate coolant to PDM (Power Delivery Module).

Electric Water Pump Operation During Traveling



< Reference value of electric water pump duty>

Electric water pump operation	Electric water pump control duty (Approx.)
LOW	40%
MID	60%
HIGH	73%

NOTE:
The values listed above may slightly differ from actual measurement values depending on conditions.

Fail-Safe

When a malfunction occurs in the electric water pump, VCM controls the electric water pump as follows:

Feedback to VCM	Control state
Malfunction in pump or abnormal power supply of pump	STOP
• Abnormal feedback signal • A break in communication line or short circuit	Normal control **NOTE:** Water pump operates at a maximum velocity
Abnormal signal input from pump	Normal control
Speed fed back from pump differs largely from VCM-indicated speed.	Normal control

COOLING FAN CONTROL

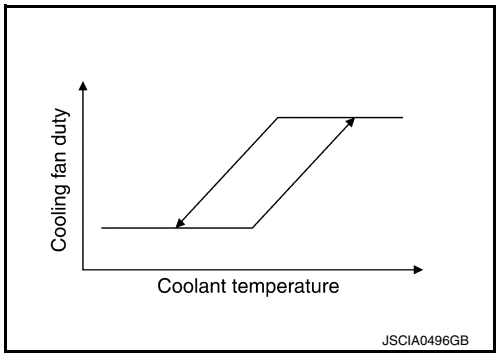
Control Description

VCM calculates an appropriate speed according to coolant temperature, vehicle speed, and a cooling fan speed request signal received from A/C auto amplifier and transmits a duty signal to the cooling fan control module.VCM judges a maximum fan speed according to a cooling fan speed (calculated from coolant temperature and a vehicle speed) and that requested from the A/C auto amplifier and outputs drive duty.

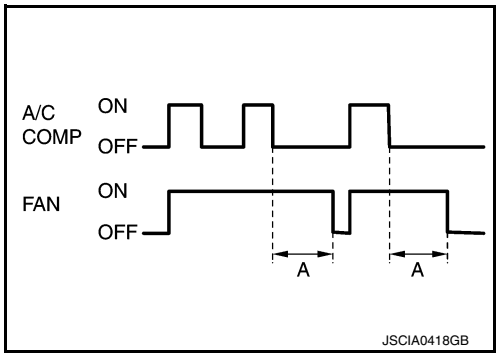
NOTE:

The cooling fan may be activated during charge or deice system operation (only models with heat pump) even when the power switch is OFF.

The cooling fan speed control reduces variations in cooling fan speed by setting a range in operating conditions as shown in the figure.



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.



Cooling fan operation (During traveling or charging)

<With heat pump system>

Cooling fan duty (%)

Engine coolant temperature [°C (°F)]	Vehicle speed [km/h (MPH)]			
	0 (0) – 20 (12)	20 (12) – 50 (31)	50 (31) – 80 (50)	80 (50) or more
60 (140) or less	0	0	0	0
60 (140) – 62 (144)	30 – 75	30 – 75	30 – 75	0
62 (144) or more	100	100	100	100

<Without heat pump system>

Cooling fan duty (%)

Engine coolant temperature [°C (°F)]	Vehicle speed [km/h (MPH)]			
	0 (0) – 20 (12)	20 (12) – 50 (31)	50 (31) – 80 (50)	80 (50) or more
60 (140) or less	0	0	0	0
60 (140) – 62 (144)	40 – 85	40 – 85	40 – 85	0
62 (144) or more	100	100	100	100

Cooling fan operation (Climate Ctrl. Timer ON or remote climate control ON)

<With heat pump system>

Engine coolant temperature [°C (°F)]	Cooling fan duty (%)
60 (140) or less	0
60 (140) – 62 (144)	35 – 100
62 (144) or more	100

<Without heat pump system>

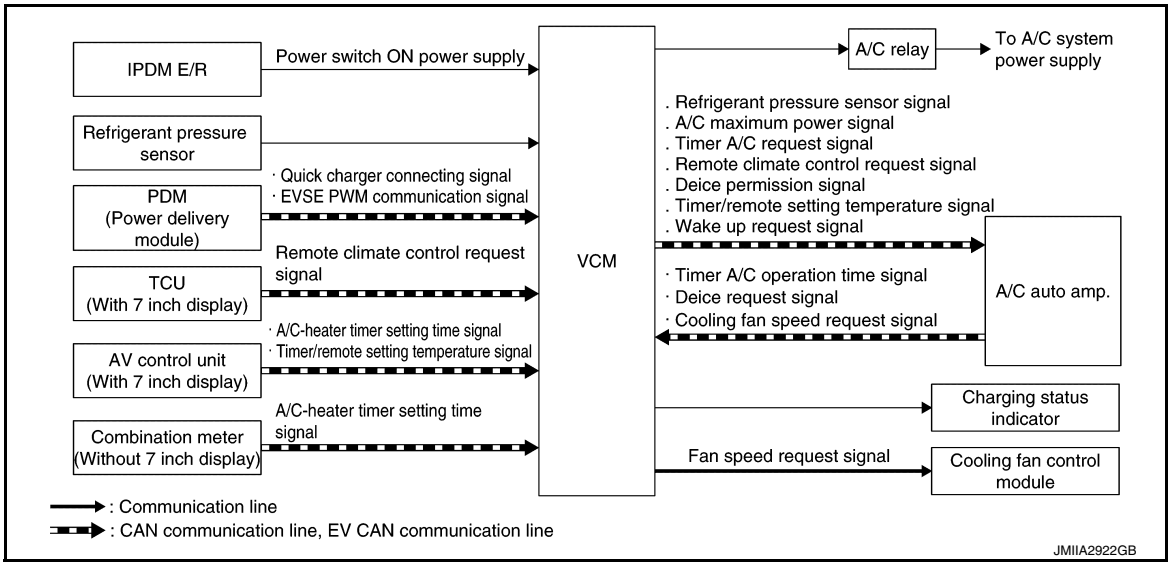
Engine coolant temperature [°C (°F)]	Cooling fan duty (%)
60 (140) or less	0
60 (140) – 62 (144)	40 – 100
62 (144) or more	100

AIR CONDITIONER CONTROL

AIR CONDITIONER CONTROL : System Description

INFOID:0000000009347786

SYSTEM DIAGRAM



NOTE:
TCU is included only in models with TELEMATICS system.

DESCRIPTION

In EV, VCM controls the A/C relay so that the air conditioner can operate even when power switch is OFF. The Climate Ctrl. Timer (A/C-heater timer), remote climate control (models with 7 inch display) and deice control (automatic air conditioning system with heat pump system) functions are enabled by this control.
When VCM recognizes a need for air conditioner activation due to driver operation, Climate Ctrl. Timer function, remote climate control function (models with 7 inch display), or deice control function (automatic air conditioning system with heat pump system), VCM activates the A/C relay to supply power to the air conditioning system.
In addition, VCM calculates the power that can be used by the air conditioning system based on the Li-ion battery status and vehicle status and sends it to the A/C auto amp.

When ECO mode is selected, VCM sends the ECO mode signal to the A/C auto amp. to control the air conditioner at a lower rate than normal.
For an overview of air conditioner types, refer to HAC-30, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description" (automatic air conditioning system with heat pump system) or HAC-235, "AUTOMATIC AIR CONDITIONING SYSTEM : System Description" (automatic air conditioning system without heat pump system).

CONTROL DESCRIPTION

Cooling/heating Function Control During Power Supply Position ON

When the power supply position is ON (vehicle condition is not READY while power switch is ON), VCM allows the operation of cooling/heating function control in the status that EVSE is connected.However, start of cooling/heating function is allowed only while charging is in progress. Refer to HAC-45, "Description" (automatic air conditioning system with heat pump system) or HAC-248, "Description" (automatic air conditioning system without heat pump system) for details of cooling/heating function control during power supply position ON.

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

Climate Ctrl. Timer Control

When all of the following conditions are satisfied, VCM activates the timer air conditioner so that the in-vehicle temperature reaches in-vehicle setting temperature*1 before the scheduled departure time*2.

- Timer of Climate Ctrl. Timer is ON
- There is AC power input during charging (or in a state where AC power input is possible).

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

NOTE:
- When turning ON the power switch during Climate Ctrl. Timer is activated, the air conditioning control switches to normal.
- When the timer charge and timer air conditioner operate simultaneously, perform air conditioner power distribution according to the following settings.
- Models with 7 inch display: timer priority setting that are set on the navigation screen
- Models without 7 inch display: Climate Ctrl. Timer priority
- *1: The in-vehicle setting temperature can be set as per the following.
- Models with 7 inch display: A/C temperature that are set on the navigation screen
- Models without 7 inch display: 25°C (unchangeable)
- *2: Set the scheduled departure time from the navigation screen (models with 7 inch display) or from the vehicle information display on the combination meter (models without 7 inch display).

Remote Climate Control

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

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

NOTE:
When the power is turned ON during remote climate control is activated, the remote air conditioning is ended.

Deice Control (Automatic Air Conditioning System With Heat Pump System)

- When VCM receives a deice request signal from A/C auto amp. and it is in the normal charge mode or quick charge mode, VCM turns the A/C relay ON and sends a deice permission signal (permission) to A/C auto amp. A/C auto amp. operates the deice function due to receiving a deice permission signal
- When the charge mode is completed due to full charge or timer charge completion while the deice function is operating, the deice function continues to operate. The charge status indicator 3 blinks while the deice function operates after charge completion.

NOTE:
If the charge connector is disconnected from the charge port, VCM sends a deice permission signal (prohibition) and the deice function is stopped.

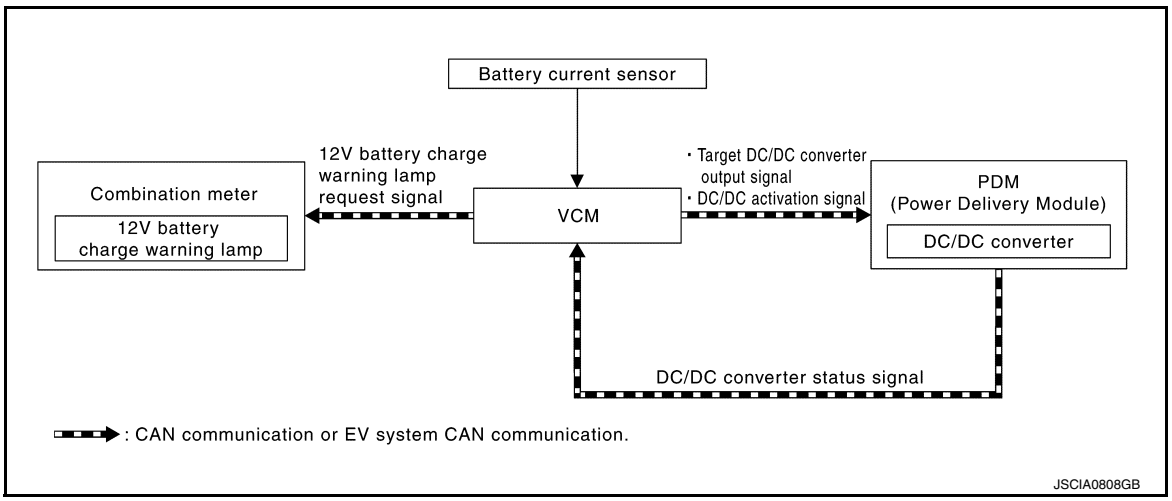
- After the compressor operation is stopped due to deice control function, VCM operates the cooling fan according to a cooling fan speed request signal that is received from the A/C auto amp.
- For detail of deice control function, refer to HAC-37, "AUTOMATIC AIR CONDITIONING SYSTEM : Heat Pump System Control".

POWER VOLTAGE VARIABLE CONTROL SYSTEM

POWER VOLTAGE VARIABLE CONTROL SYSTEM : System Description

INFOID:0000000008746989

SYSTEM DIAGRAM



DESCRIPTION

The power voltage variable control system changes the output from the DC/DC converter built-in PDM (Power Delivery Module) to 13-15 V to reduce the power consumption according to the status of use of electrical equipment and that of 12 V battery.

CONTROL DESCRIPTION

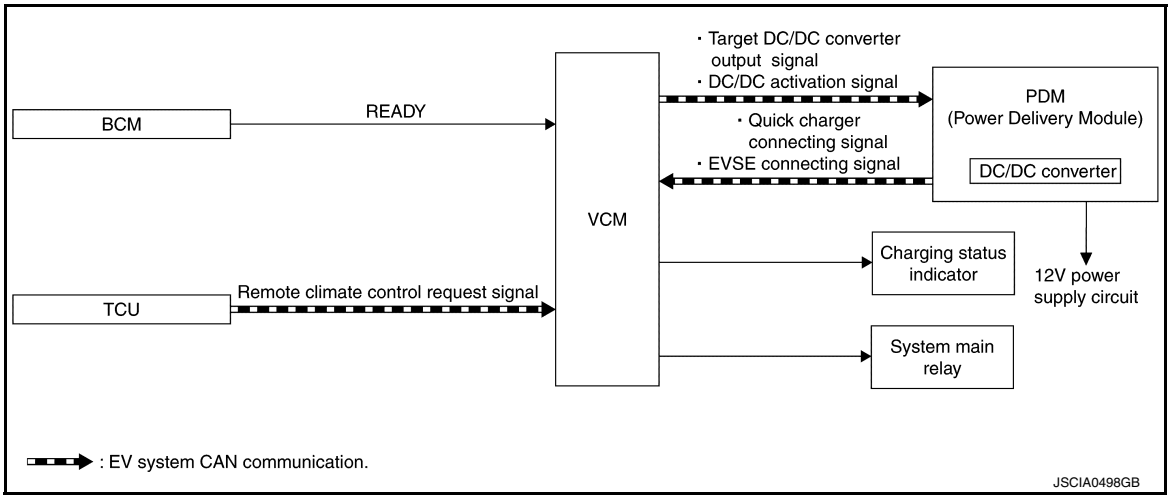
The battery current sensor (with battery temperature sensor) measures the battery charge/discharge current and the battery ambient temperature.
VCM judges the state of use of electric equipment and that of battery according to the measurement, decides target output voltage of the DC/DC converter, and transmits a target DC/DC converter output signal to PDM (Power Delivery Module). PDM (Power Delivery Module) changes the output voltage of the DC/DC converter according to the target DC/DC converter output signal. When an error occurs in the power voltage variable control system or when a target DC/DC converter output signal is not transmitted to the DC/DC converter due to error, the DC/DC converter outputs 14 V. VCM detects an error in the DC/DC converter according to a DC/DC converter status signal transmitted from PDM (Power Delivery Module).

AUTOMATIC 12V BATTERY CHARGE CONTROL

AUTOMATIC 12V BATTERY CHARGE CONTROL : System Description

INFOID:0000000008746990

SYSTEM DIAGRAM



DESCRIPTION

The automatic 12V battery charge control is a control to reduce the frequency of battery discharge by automatically charging the 12V battery in case the 12V battery voltage is low when the key switch is turned to ON or the vehicle is left unattended for a long time.
When VCM judges a need for automatic charge, VCM controls the DC/DC converter and the system main relay and charges the 12V battery using the Li-ion battery power.
For 12V battery charge control during READY condition, refer to EVC-60, "POWER VOLTAGE VARIABLE CONTROL SYSTEM : System Description".

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

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

CONTROL DESCRIPTION

Power Switch ON

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

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

When Vehicle is Not Used for A Long Time

VCM measures the time of no operation using its internal timer. If the time of no operation reaches 24 hours, VCM performs automatic charge for 4 minutes.
VCM resets the no operation status continuous time when the vehicle satisfies one of the following conditions.

- READY continues for more than 4 minutes.
- Normal charge continues for more than 4 minutes.
- Quick charge continues for more than 4 minutes.
- Climate Ctrl. Timer or remote climate control continues for more than 4 minutes.
- Discharge current of 12 V battery is 1.5 A or more.

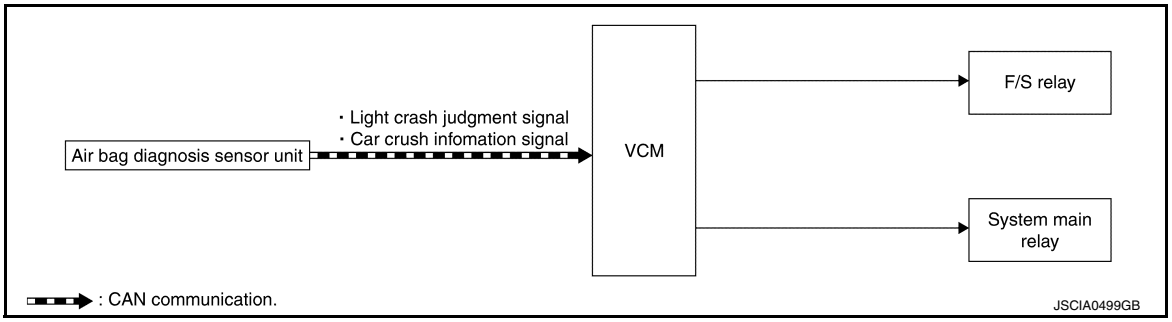
NOTE:
- During automatic 12V battery charge, the charging status indicator blinks.
- The automatic 12V battery charge control does not start within approximately one hour when the power switch is turned ON/OFF.

POWER CUT OFF CONTROL

POWER CUT OFF CONTROL : System Description

INFOID:0000000008746991

SYSTEM DIAGRAM



DESCRIPTION

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

When detecting a serious collision

When receiving a car crash information signal from the air bag diagnosis sensor unit, VCM turns OFF the system main relay and quickly interrupts the high voltage circuit. In addition, VCM detects DTC P3137 and prohibits the READY operation until the DTC is erased.

NOTE:

The collision detection level of VCM may differ from an actual vehicle damage state.

When detection a minor collision

When receiving a light crash judgment signal from the air bag diagnosis sensor unit, VCM turns OFF the system main relay and quickly interrupts the high voltage circuit. The READY operation becomes possible after a lapse of 20 seconds or more (VCM performs self shutoff) after the power switch is turned OFF.

NOTE:
- The collision detection level of VCM may differ from an actual vehicle damage state.
- When a collision occurs more than once during the same trip (no history of turning OFF the power switch), VCM judges “detection of serious collision” and prohibits the READY operation.

Vehicle behavior by collision status

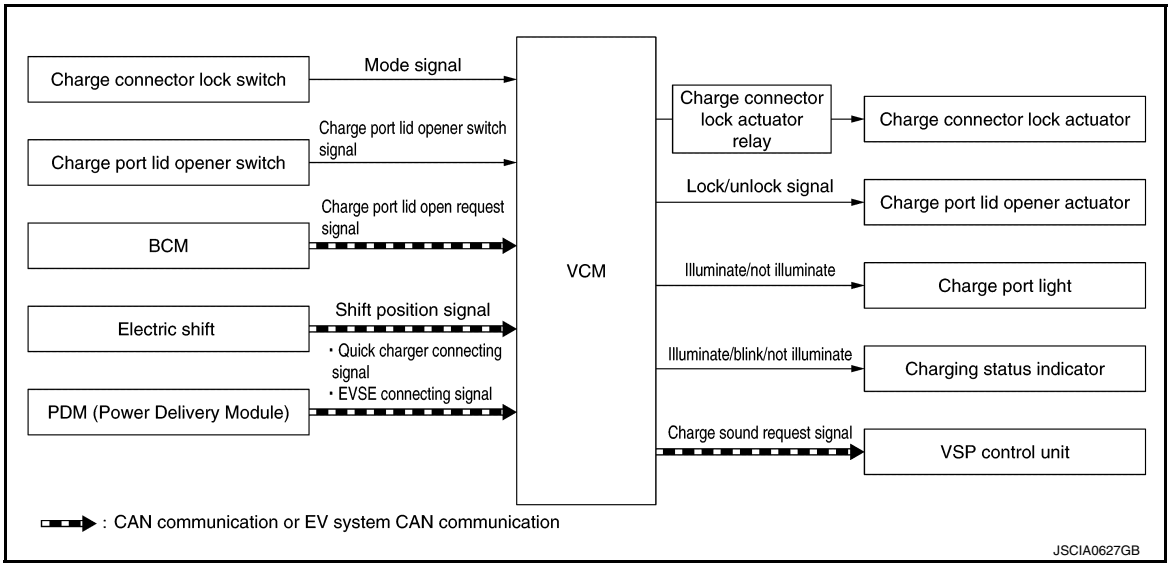
Collision status	Detected DTC	CONSULT data monitor screen		Reset
		Item	Indication	
Serious	P3137	CLASH DETECT INFO	HEAVY MID	EVC-258, "DTC Logic"
Minor	P3135	LIGHT CRASH JUDGMENT	On	After maintaining the power switch OFF state (self shutoff) for 20 seconds or more, perform the READY operation.

CHARGE PORT CONTROL

CHARGE PORT CONTROL : System Description

INFOID:0000000009315601

SYSTEM DIAGRAM



SYSTEM DESCRIPTION

The following charge port controls related to charging are performed comprehensively by the VCM according to the vehicle conditions and signals from the switches.

- Charge connector lock/unlock control
- Charge port light control
- Charge port lid open control
- Answer-back control

CHARGE CONNECTOR LOCK/UNLOCK CONTROL

Control Outline

The VCM judges the lock operation conditions according to the mode signal from the charge connector lock switch, and the EVSE connection signal received from the PDM (Power Delivery Module) via CAN communication. If the conditions are met, VCM turns ON the charge connector lock actuator relay and operates the charge connector lock actuator in the close direction to lock the normal charge connector.

When the charge port lid opener switch signal from the charge port lid opener switch is received, or when the charge port lid open request signal for the charge port lid opener button is received from the BCM via CAN communication. If normal charging is stopped and other unlock conditions are met, the VCM turns ON the charge connector lock actuator relay and operates the charge connector lock actuator in the open direction to unlock the normal charge connector.

The lock modes are as per the following.

Lock mode	FUNCTION DESCRIPTION
LOCK mode	Automatically locks when the normal charge connector is connected.
AUTO mode	Locks only during normal charging. (Unlocks automatically when charging is completed.)
UNLOCK mode	Charging connector is not locked.

NOTE:

For details of the functions in each mode and the actuator operations, refer to VC-19, "CHARGE PORT CONTROL : System Description".

Lock Operating Conditions

When all of the following conditions are met, the VCM locks the charge connector.

LOCK mode

- Charge connector lock switch: LOCK mode
- Shift position: P
- Normal charge connector: Connected (fully engaged)

AUTO mode

- Charge connector lock switch: AUTO mode
- Shift position: P
- Normal charge connector: Connected (fully engaged)
- Normal charge start

CAUTION:
Does not lock when only automatic charging of the 12V battery is operating.

Unlock Conditions
When any of the following conditions is met, the VCM releases the lock of the charge connector.

LOCK mode
- Charge port lid opener switch or charge port lid opener button is ON.
- Charge connector lock switch is moved to the neutral position (UNLOCK mode).
- Shift position is any position other than P position.
- Vehicle READY state is engaged.

AUTO mode
- Charge port lid opener switch or charge port lid opener button is ON.
- Charge connector lock switch is moved to the neutral position (UNLOCK mode).
- Shift position is any position other than P position.
- Vehicle READY state is engaged.
- Normal charging stops.

CAUTION:
After the charge port lid opener switch or charge port lid opener button is ON, the charge connector is automatically locked again after 30 seconds if it is not disconnected.

CHARGE PORT LIGHT CONTROL

Control Outline
When the charge port lid opener switch signal is input from the charge port lid opener switch, or the charge port lid open request signal for the charge port lid opener button is received from the BCM via CAN communication, then based on charge connector connected/disconnected and other vehicle conditions, the VCM outputs power supply to the charge port light to turn it ON.
For details of the function, refer to VC-19, "CHARGE PORT CONTROL : System Description".

ON Conditions
When all of the following conditions are met, the VCM turns ON the charge port light.
- Vehicle state: Other than READY
- Shift position: P position
- Any of the following conditions is met.

- Charge port lid opener switch or charge port lid opener button: ON
- Normal or quick charge connector: Disconnected (removed)

NOTE:
If the normal or quick charge connector is connected, then the light turns ON for approximately 5 seconds after the charge connector is disconnected.

OFF Conditions
When any of the following conditions is met, the VCM turns OFF the charge port light.
- Vehicle READY state is engaged.
- Shift position is any position other than P position.
- 5 seconds pass after the normal or quick charge connector is connected (inserted).
- 5 seconds pass after the normal or quick charge connector is disconnected (removed).
- 3 minutes pass after the charge port lid opener switch or charge port lid opener button is turned ON.
- 5 seconds pass after charge connector lock operation.

CHARGE PORT LID OPEN CONTROL

Control Outline
When the charge port lid opener switch signal is input from the charge port lid opener switch, or the charge port open request signal for the charge port lid opener button is received from the BCM via CAN communication, then according to the vehicle conditions, the VCM operates the charge port lid actuator to unlock the charge port lid.

Charge Port Lid Unlock Conditions

When all of the following conditions are met, the VCM unlocks the charge port lid.
- Shift position: P position
- Vehicle state: Other than READY
- Charge port lid opener switch or charge port lid opener button: ON

ANSWER-BACK CONTROL

Control Outline

When the charge port lid opener switch signal is received from the charge port lid opener switch, or the charge port open request signal for the charge port lid opener button is received from the BCM via CAN communication, then according to the vehicle conditions, the VCM transmits the charge sound request signal to the VSP control unit. When the VSP control unit receives the signal, it operates the VSP speaker and sounds the charge port lid unlock sound/normal charge connector unlock sound. The VCM also turns ON the charging status indicator.
- For charge connector unlock sound, refer to VSP-19, "CHARGE SOUND SYSTEM : System Description".
- For charging status indicator, refer to VC-15, "Charging Status Indicator".

Answer-back Conditions

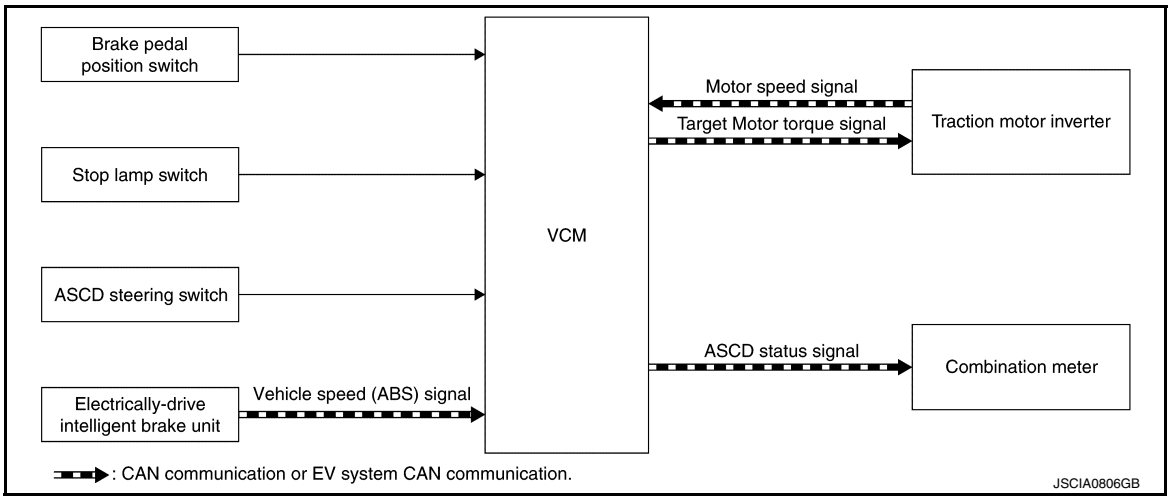
When all of the following conditions are met, the VCM performs answer-back control.
- Shift position: P position
- Vehicle state: Other than READY
- Charge port lid opener switch or charge port lid opener button: ON

AUTOMATIC SPEED CONTROL DEVICE (ASCD)

AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description

INFOID:0000000008746992

SYSTEM DIAGRAM



BASIC ASCD SYSTEM

Automatic Speed Control Device (ASCD) allows a driver to keep vehicle at a predetermined constant speed without depressing accelerator pedal. Driver can set vehicle speed in advance between approximately 40 km/h (25 MPH) and 144 km/h (89 MPH).

VCM controls the traction motor to regulate vehicle speed.

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

For the switch function, Refer to EVC-70, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : Switch Name and Function".

For the ASCD indicator, Refer to EVC-67, "WARNING/INDICATOR/CHIME LIST : Indicator/Information".

CAUTION:

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

CANCEL OPERATION

When any of following conditions exist, cruise operation is cancelled.
- CANCEL switch is pressed
- More than two switches on ASCD steering switch are pressed at the same time (Set speed is cleared)
- Brake pedal is depressed

- Selector lever position is N, P or R position
- TCS system is operated

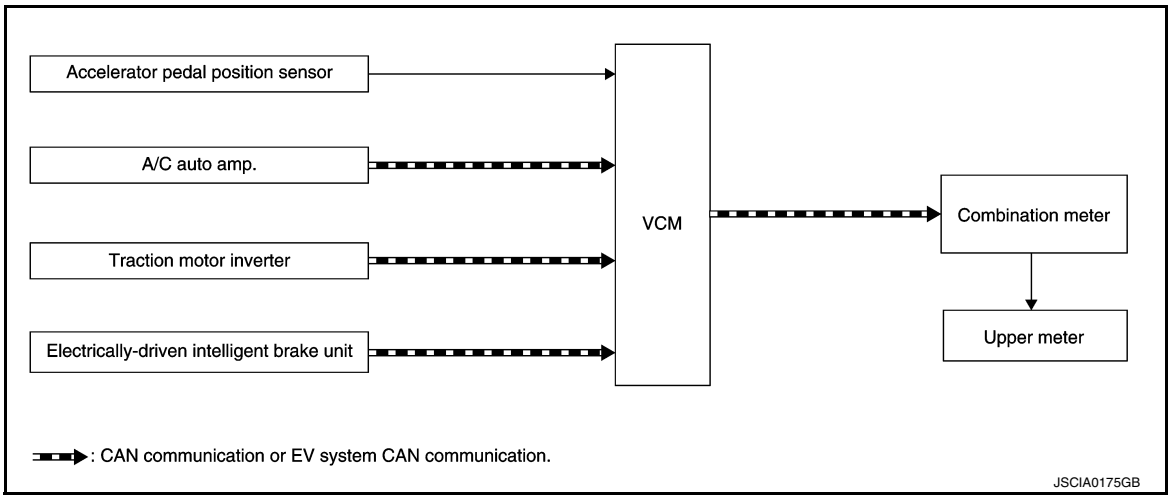
When VCM detects malfunction for some self-diagnoses regarding ASCD system, VCM cancels the cruise operation and informs the driver by blinking SET indicator lamp quickly.
If ASCD MAIN switch is turned to OFF while ASCD is activated, all of ASCD operations are cancelled and vehicle speed memory is erased.

ECO INDICATOR CONTROL

ECO INDICATOR CONTROL : System Description

INFOID:0000000008746993

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		EV system CAN
	Air conditioner ON signal		
	A/C maximum power signal		
	PTC maximum power signal		
Traction motor inverter	Motor speed signal		
	Regeneration brake torque signal		
Electrically-driven intelligent brake unit	Target brake force signal		CAN
VCM	ECO indicator signal	Combination meter	
	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 illuminates.

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

NOTICE:
The idle time is the status when not driving in the READY state.
For details regarding the ECO indicator functions, refer to MWI-27, "ECO INDICATOR : System Description".

WARNING/INDICATOR/CHIME LIST

WARNING/INDICATOR/CHIME LIST : Warning lamps/Indicator lamps

INFOID:0000000009314516

Item	Design	Reference
EV system warning lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-24, "WARNING LAMPS/INDICATOR LAMPS : EV System Warning Lamp".
Low battery charge warning lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-26, "WARNING LAMPS/INDICATOR LAMPS : Low Battery Charge Warning Lamp".
Plug in indicator lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-27, "WARNING LAMPS/INDICATOR LAMPS : Plug In Indicator Lamp".
Power limitation indicator lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-29, "WARNING LAMPS/INDICATOR LAMPS : Power Limitation Indicator Lamp".
Ready to drive indicator lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-30, "WARNING LAMPS/INDICATOR LAMPS : Ready To Drive Indicator Lamp".
12v battery charge warning lamp		For layout, refer to MWI-6, "METER SYSTEM : Combination Meter". For function, refer to EVC-32, "WARNING LAMPS/INDICATOR LAMPS : 12V Battery Charge Warning Lamp".

WARNING/INDICATOR/CHIME LIST : Warning Chime

INFOID:0000000009314518

Item	Reference
DC/DC converter warning chime	Refer to EVC-39, "WARNING CHIME : DC/DC Converter Warning Chime".
Power switch reminder chime	Refer to EVC-40, "WARNING CHIME : Power Switch Reminder Chime".
Shift P warning chime	Refer to EVC-41, "WARNING CHIME : Shift P Warning Chime".

WARNING/INDICATOR/CHIME LIST : Warning/Indicator (On Information Display)

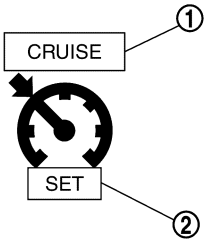
INFOID:0000000009314517

Item	Reference
DC/DC Converter Warning	Refer to EVC-34, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : DC/DC Converter Warning".
Low Battery Charge Warning	Refer to EVC-35, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : Low Battery Charge Warning".
Power Limitation Warning	Refer to EVC-37, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : Power Limitation Warning".
Shift P Warning	Refer to EVC-38, "WARNING/INDICATOR (ON INFORMATION DISPLAY) : Shift P Warning".

WARNING/INDICATOR/CHIME LIST : Indicator/Information

INFOID:0000000009314912

ASCD INDICATOR

Symbol	Function
 JSCIA0519ZZ	EVC-65, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description"

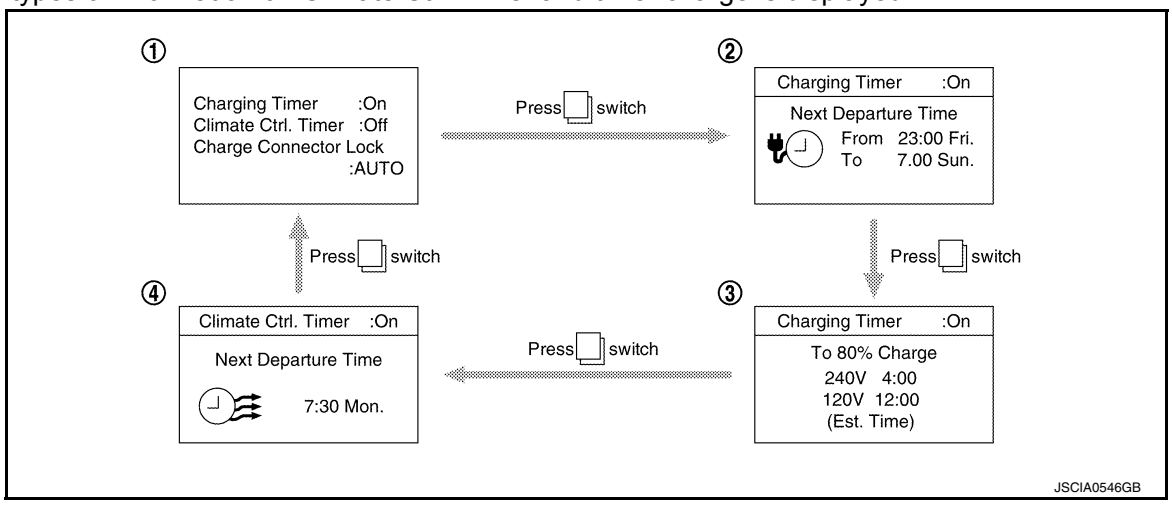
①CRUISE indicator
②SET indicator

ECO MODE INDICATOR

Symbol	Function
 JPNIA1941ZZ	EVC-52, "ECO MODE/B MODE SYSTEM : System Description"

TIMER SETTING STATUS

Design/Purpose
Various types of information on Climate Ctrl. Timer and timer charge is displayed.



No.	Name	Function
①	Timer setting (charging and Climate Ctrl.) and charge connector lock setting status	The timer settings status (On or Off) and the air conditioning/heater or climate control and the charge connector lock setting status (AUTO, LOCK or UNLOCK)
②	Charging timer setting confirmation	The charging timer starting and ending (where fitted) hour, minute and day (where fitted) for the next charge time that has been set can be checked.

No.	Name	Function
③	Charging time	Displays the estimated time to charge the battery to the customer selected charge level (80% or 100%)
④	Climate Ctrl. Timer setting confirmation	The set time for ending hours and days (where fitted) of the Climate Ctrl. Timer is displayed.

Display condition

Timer setting status is displayed for ten seconds when the power switch is turned OFF and the indication switches every time when the ❑switch is pressed. The indication can be shown for approximately 10 seconds by operating the switch.

Display cancel condition

When any of the following conditions is satisfied.

- power switch ON
- A lapse of 10 seconds or more with no switch operation.

CAN COMMUNICATION

CAN COMMUNICATION : System Description

INFOID:0000000008746994

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.

For CAN communication details, Refer to LAN-30, "CAN COMMUNICATION SYSTEM : System Description".

OPERATION

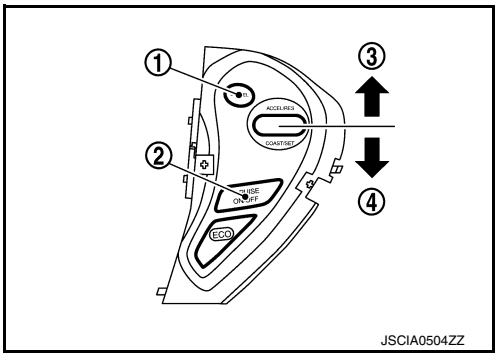
AUTOMATIC SPEED CONTROL DEVICE (ASCD)

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

INFOID:0000000008746995

Function

Functions of each switch are listed in the following table.



JSCIA0504ZZ

Switch Function

No.	Name	Function
①	CANCEL switch	When the switch is pressed, the ASCD control is cancelled.
②	ASCD MAIN switch	Turns the ASCD ON/OFF.
③	RESUME/ACCEL switch	• When the switch is pressed after the cruise control is cancelled in any method other than main switch operation, the vehicle speed is reset to the previous speed setting before the cancellation*. • When the switch is pressed during cruise control, the setting speed is increased and the vehicle speed increases.
④	SET/COAST switch	• When the switch is pressed at the preferred vehicle speed, the cruise control starts to operate. • When the switch is pressed during cruise control, the set speed is reduced and the vehicle speed reduces.

*: To reset vehicle speed, the vehicle condition must be as follows:
- Brake pedal is released
- Selector lever is in a position other than P, R, and N.
- Vehicle speed is greater than 40 km/h (25 MPH) and 144 km/h (89 MPH)

ECO MODE SWITCH

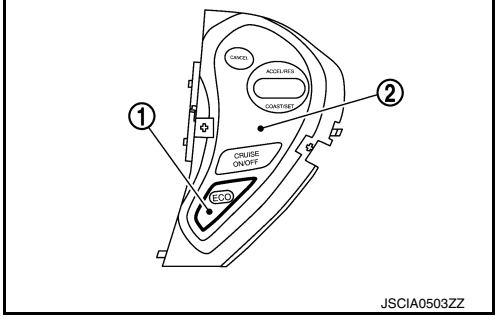
ECO MODE SWITCH : Switch Name and Function

INFOID:0000000009325577

Function

When the ECO mode switch ① is operated with the power switch ON, the mode switches between ON and OFF.

② : ASCD steering switch



JSCIA0503ZZ

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

INFOID:0000000008746996

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:0000000008746997

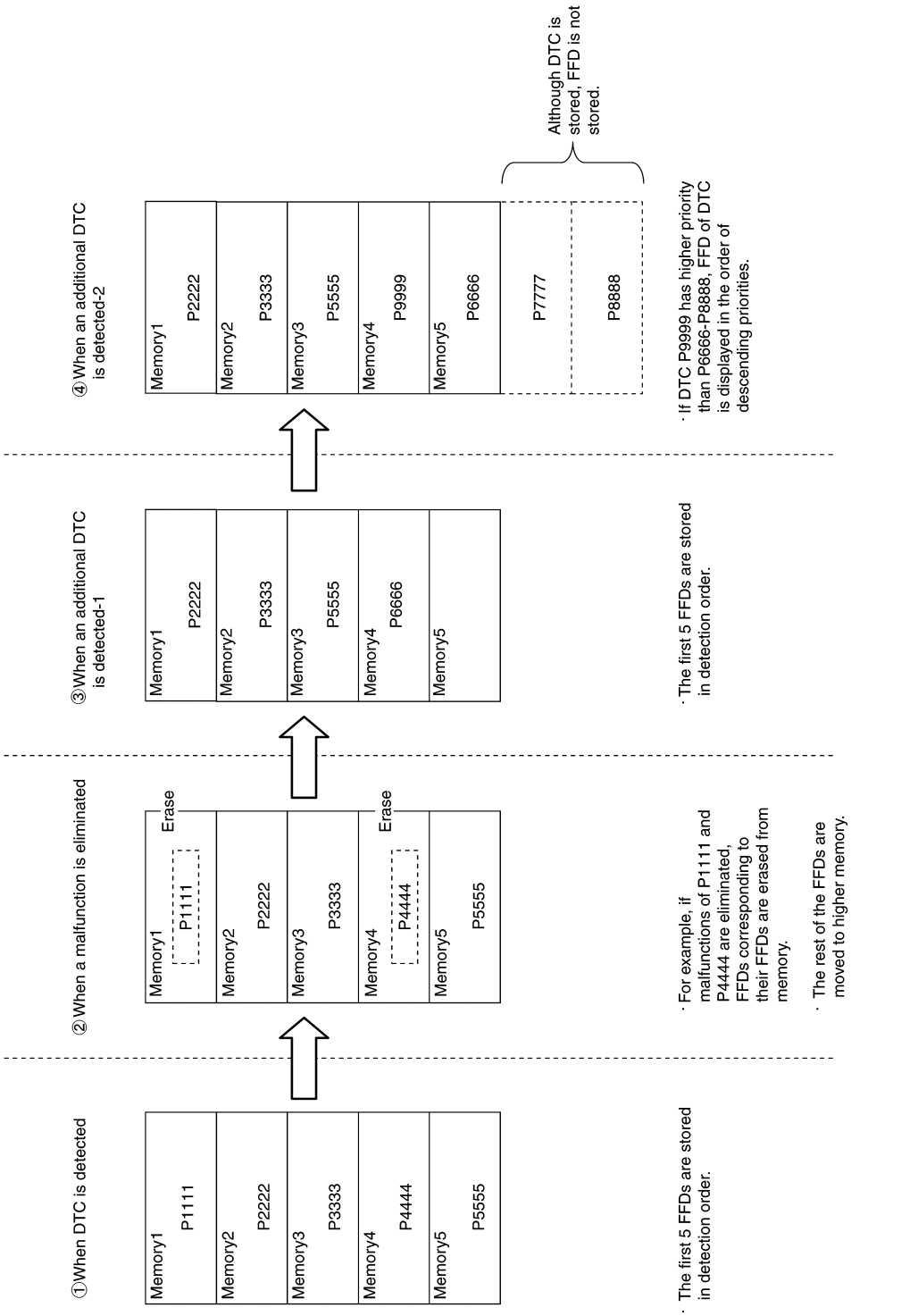
In this system, “Power switch is turned OFF⇒ON” is defined as 1 trip. VCM detects malfunctions while saving the DTC and freeze frame data and continues saving this data for a maximum of 40 trips. In addition, if a DTC that is the same as the saved DTC is detected again, the counter is reset and the count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

DTC and Freeze Frame Data

INFOID:0000000008746998

VCM can store multiple DTCs and up to five Freeze Frame data.
After the detection of a malfunction and storing of DTC and Freeze Frame data by VCM, if a different malfunction is detected, multiple DTCs can be identified. In contrast, only up to five FFDs are stored according to the preset priority. For priority, refer to EVC-100, "DTC Inspection Priority Chart".
The DTC and freeze frame data are deleted when the self-diagnostic is deleted.

FREEZE FRAME DATA MEMORY IMAGE



JSCIA0585GB

DIAGNOSIS SYSTEM (VCM)

CONSULT Function

INFOID:0000000008746999

FUNCTION

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

*1: DTC P0AA1 is not cleared even when “Self-diagnostic Result” is cleared. To clear DTC P0AA1, perform “SPECIFIC DTC CLEAR” in “WORK SUPPORT”.

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

- Diagnostic trouble codes
- Freeze frame data
- Applicable operational history and count

SELF-DIAG RESULTS MODE

Self Diagnostic Item

Regarding items of DTC, refer to EVC-102, "DTC Index".

How to Erase DTC

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

CAUTION:

DTC P0AA1 is not cleared even when “Self-diagnostic Result” is cleared. To clear DTC P0AA1, perform “SPECIFIC DTC CLEAR” in “WORK SUPPORT”.

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.

Freeze Frame Data Item List

Freeze frame data item	Description
DTC	Displays a DTC.
VCM MODE	Displays VCM status. • 0-7: During VCM starts-up • 10: Power switch is ON and the charge connector is not connected. • 11-29: Mode changing to READY • 30: READY • 31-49: During system shutdown • 50-59: Mode changing to charge mode. • 60, 90: During charging • 80-89: Mode changing to charge mode. • 110-120: When connected to high voltage circuit except when READY or charge* • 131-144: During system shutdown
NORMAL CHARGE CONNECTOR CONNECTION	Displays the connection status of the normal charge connector. • 0: EVSE is not connected. • 1: EVSE is semi-engaged. • 2: EVSE is connected. • 3: EVSE is malfunctioning.

Freeze frame data item	Description
QUICK CHARGE CONNECTOR CONNECTION	Displays the connection status of the quick charge connector. • 0: Quick charge connector is not connected. • 1: Quick 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 [%]	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.
INVERTER DC INPUT VOLT [V]	Displays DC input voltage of traction motor inverter.
DTC DETECTED MONTH [month]	Displays detection date of DTC applicable to stored FFD.
DTC DETECTED DAY [day]	Displays detection date of DTC applicable to stored FFD.
DTC DETECTED HOUR [hour]	Displays detection date of DTC applicable to stored FFD.
DTC DETECTED MINUTE [min]	Displays detection date of DTC applicable to stored FFD.
INSULATION RESISTANCE VALUE[kohm]	Displays insulation resistance of high voltage circuit.
12V BATTERY VOLTAGE[mV]	Displays voltage of 12 V battery.
ESTMT PWR CNSM (A/C CMP)[W]	Displays the amount of electric power used by electric compressor.
ESTMT PWR CNSM (PTC HTR)[kW]	Displays the amount of electric power used by PTC heater.
OBC OUT PWR[kW]	Displays electric power output of PDM (Power Delivery Module).

*: During 12 V battery automatic charge, remote air conditioner operation, and deice system operation.

DATA MONITOR MODE

NOTE:
The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

Monitored Item

For reference values of the following items, refer to EVC-84, "Reference Value".

X: Applicable

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
VCM MODE	—		X	Displays VCM status. • 0-7: During VCM starts-up • 10: Power switch is ON and the charge connector is not connected. • 11-29: Mode changing to READY • 30: READY • 31-49: During system shutdown • 50-59: Mode changing to charge mode. • 60, 90: During charging • 80-89: Mode changing to charge mode. • 110-120: When connected to high voltage circuit except when READY or charge* • 131-144: During system shutdown
VCM ACTIVATION	On/READY			Displays that VCM has the EV system READY. • On: Other than READY • READY: READY control in progress
MOTOR SPEED	rpm	X	X	Displays the traction motor revolution received from the traction motor inverter.
INVERTER DC INPUT VOLT	V			Displays the high-voltage power supply voltage being input to the traction motor inverter.
VEHICLE SPEED	km/h or mph	X	X	The vehicle speed computed by the motor speed signal sent from the traction motor inverter is displayed.
HI SPEC VEHICLE SPEED	km/h or mph			Displays the high accuracy vehicle speed from “VEHICLE SPEED”
AMBIENT TEMP	degC	X		Displays the outside air temperature received from the A/C auto amp.
CLASH DETECT INFO	• MID • HEAVY • ##	X		Displays the car crush information received from the air bag diagnosis sensor unit. • MID: A non-serious impact was detected. • HEAVY: A serious impact was detected. • ##: When the impact is not detected
12V BATTERY VOLTAGE	V	X	X	The 12 V power supply voltage of VCM is displayed.
VCM POWER SUPPLY (ACT)	V	X		Displays the 12 V power supply voltage of VCM when VCM is started.
F/S RELAY VOLT	V	X		Displays the voltage on the F/S relay contact side that is being input to VCM.
12V BATTERY TEMP	degC	X		The 12V battery temperature (determined by the signal voltage of the battery temperature sensor) is displayed.
12V BATTERY CURRENT AVG	A	X	X	Displays the average current of 12V battery.
ACCEL SENSOR 1 VOLT	V	X	X	Accelerator pedal position sensor 1 signal voltage is displayed.
ACCEL SENSOR 2 VOLT	V	X	X	Accelerator pedal position sensor 2 signal voltage is displayed.
ACCEL OPEN ANGLE	%			The accelerator pedal opening angle (determined by the signal voltage of the accelerator pedal position sensor) is displayed.
CURRENT MOTOR TORQ	N·m			Displays the traction motor actual output value (estimated value) received from the traction motor inverter.
TRG MOTOR TORQ 1	N·m		X	Displays the motor torque demand value VCM is requesting of the traction motor inverter.

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
MOTOR PWR LIMIT REQ (INV)	%			Displays the traction motor output limit value received from the traction motor inverter.
PRTCTN CNT OPERAT HIST 1	0/1/2/3			The operation history of the Charge Insulation Resistance Loss Protection Control is indicated. For details of the protection control, refer to EVC-425, "Description". • 1-3: Operation history exists. (The number of operations is indicated.) • 0: No operation history **NOTE:** This history can be cleared by “Self-diagnostic Result Clear”.
GEAR POSITION DISPLAY	P/R/N/D/B	X	X	Displays the in-meter gear display request status. • P: When there is a P display request • R: When there is an R display request • N: When there is an N display request • D: When there is a D display request • B: When there is an B display request
PRTCTN CNT OPERAT HIST 2	0/1/2/3			The operation history of the Charging Connector-connecting Protection Control is indicated. For details of the protection control, refer to EVC-425, "Description". • ON: Operation history exists. • OFF: No operation history **NOTE:** This history can be cleared by “Self-diagnostic Result Clear”.
NEXT GEAR POSITION	• R • N/P • D			Displays the position of the selected selector lever. • R: When R range is selected • N/P: When N or P range is selected • D: When D, B, or ECO range is selected
GEAR POSITION	• R • N/P • D			Displays the position of the currently selected selector lever. • R: R range • N/P: N or P range • D: D, B, or ECO range
COOLANT TEMP	degC	X	X	The coolant temperature (determined by the signal voltage of the coolant temperature sensor) is displayed.
WATER PUMP 1 TRG DUTY	%	X		Displays the water pump target rotation command duty.
W/P 1 CRNT SPD DUTY	%		X	Displays the water pump actual rotation duty.
COOLING FAN REQ DUTY	%		X	Displays the cooling fan operation request duty.
DC/DC CONV STAT	On/STOP			Displays the status of DC/DC converter operation request sent from VCM to PDM (Power Delivery Module). • On: When there is a DC/DC converter operation request • Off: No operation request
DC/DC CONV STATUS	0/1/2/3			Displays the status of the DC/DC status signal being used for communication between VCM and the PDM (Power Delivery Module). • 0: DC/DC converter does not operate. • 1: When normal operation • 2: VCM is detecting a DC/DC converter error. • 3: VCM is prohibiting DC/DC converter operation.

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
VARIABLE V/CONT PERMIT	On/Off			Displays the power voltage variable control authorization status of VCM. • On: Authorized • Off: Prohibited
DC/DC CONV REQ VOLT	V			Displays the power generation request voltage being requested to the DC/DC converter.
POWER SW	On/Off	X		Displays the POWER switch operation status. • On: When the POWER switch is operated • Off: On: When the POWER switch is not operated
START SIGNAL	On/Off	X	X	Displays the status of READY permit signal received from BCM via CAN communication. • On: Start signal input. • Off: Start signal does not input.
IMMEDIATE CHG SW	On/Off	X		Displays the operation status of the immediate charging switch. • On: When the switch is operated • Off: When the switch is not operated
A/C SW	On/Off	X	X	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
FRONT WIPER	LOW/HIGH/ Off/INVALID			Displays the front wiper operation status received from the IPDM E/R • LOW: Front wiper is operating at low speed • HIGH: Front wiper is operating at high speed • Off: Front wiper is not operating • INVALID: IPDM E/R cannot detect front wiper status.
HEAD LAMP LOW SIG	On/Off			Displays the operation status of the headlamp received from the IPDM E/R. • On: When the low beam is operating • Off: When the low beam is not operating
HEAD LAMP HI SIG	On/Off			Displays the operation status of the headlamp received from the IPDM E/R. • On: When the high beam is operating • Off: When the high beam is not operating
BLOWER FAN ACTIV	On/Off			Displays the operation status of the blower fan received from the A/C auto amp. • On: When the blower fan is operating • Off: When the blower fan is not operating
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
HV INTERLOCK (DC/DC)	On/Off			Displays the connection status of connection detecting circuit built in PDF (Power Delivery Module). • On: Interlock detection circuit is energized. • Off: Except above.
HV CNCTR INTRLCK (HV BAT)	On/Off	X		Displays the connection status of the high voltage connector connected to the Li-ion battery pack. • On: The high voltage connector is connected correctly. • Off: Except above.

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
READY LAMP SIGNAL	On/BLINK/ Off		X	Displays the READY to drive indicator lamp operation request status. • On: This causes the READY to drive indicator lamp to light up. • BLINK: This causes the READY to drive indicator lamp to flash. • Off: No operation request
PWR LIMIT INDICAT LAMP	On/Off		X	Displays the power limit indicator lamp operation request status. • On: The power limit indicator lamp is lit. • Off: No operation request
EV SYSTEM W/L SIGNAL	On/BLINK/ Off		X	This displays the EV system warning lamp operation request status. • On: This causes the EV system warning lamp to light up • BLINK: This causes the EV system warning lamp to flash. • Off: No operation request
PLUG IN INDI LAMP	On/Off		X	Displays the plug in indicator lamp operation request status. • On: The plug in indicator lamp is lit. • Off: No operation request
CHARGE STAT INDI 1	On/Off		X	Displays the charging status indicator 1 operation request status. • On: The charging status indicator 1 is lit. • Off: No operation request
CHARGE STAT INDI 2	On/Off		X	Displays the charging status indicator 2 operation request status. • On: The charging status indicator 2 is lit. • Off: No operation request
CHARGE STAT INDI 3	On/Off		X	Displays the charging status indicator 3 operation request status. • On: The charging status indicator 3 is lit. • Off: No operation request
CHARGE LAMP SIGNAL	On/BLINK/ Off		X	Displays the 12V battery charge warning lamp operation request status. • On: The causes the 12V battery charge warning lamp to light up. • BLINK: The causes the 12V battery charge warning lamp to flash. • Off: No operation request
AVAILABLE MOT OUTPUT MAX	%			Displays the maximum value that can currently be output by the traction motor.
MOTOR REGE PWR MAX	%			Displays the maximum value that is currently regenerable by the traction motor.
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 CONSUM (MOTOR)	kW			Displays the traction motor estimated power consumption calculated by VCM from the traction motor torque and vehicle speed.
POWER CONSUM (AUXS)	kW			Displays the power consumption of the auxiliaries.
POWER CONSUMPTION (A/C)	kW			Displays the power consumption of the air conditioner system.

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
ESTMT PWR CNSM (A/C CMP)	kW	X		Displays the A/C compressor estimated power consumption.
ESTMT PWR CNSM (PTC HTR)	kW	X		Displays the PTC heater estimated power consumption.
POWER LIMIT CAUSE	• B/T-LOW • B/T-HI • B LEV • B CAP • MOT-V • MOT-T • ##			When the motor power is limited, this shows the reason the power is being limited. • B/T-LOW: Li-ion battery temperature is too low. • B/T-HI: Li-ion battery temperature is too high. • B LEV: The Li-ion battery remaining energy is low. • B CAP: The Li-ion battery capacity is low. • MOT-V: The input voltage to the traction motor or traction motor inverter is low. • MOT-T: Traction motor temperature or traction motor inverter temperature is too high. • ##: No torque limitation.
CHARGE MODE	100V/200V/QUICK/NG/Off			Displays the charging status. • 100V: Charging using AC 100-120 V • 200V: Charging using AC 200-240 V • QUICK: During quick charge • NG: When in a state where charging is not possible • Off: Except above
N/CHG PORT CONNECTION	On/HALF/Off	X	X	Displays the normal charge connector engagement state. • On: The normal charge connector is connected correctly. • HALF: The normal charge connector is semi-engaged. • Off: The normal charge connector is not connected.
Q/CHG INTERLOCK	On/Off	X	X	Displays the quick charger connector engagement status. • On: The quick charger connector is connected correctly. • Off: The quick charger connector is not connected.
AC POWER TYPE	100V/200V/NONE			Displays the type of AC power supply that is connected to the normal charge port. • 100V: A 100-120 V power supply is connected. • 200V: A 200-240 V power supply is connected. • NONE: An AC power supply is not connected.
ENABLE OBC OUT PWR	kW			Displays the power that can be output by the PDM (Power Delivery Module).
HV BATT EMPTY	OK/EMPTY			Displays that the Li-ion battery remaining energy is low. • OK: Normal • EMPTY: When low
OBC OUT PWR	kW	X	X	Displays the power being output by the PDM (Power Delivery Module).
TRG HV BATT CHG LEVEL	100%/80%			Displays the selected Li-ion battery charging level.
HV BATT LEVEL (%)	%	X	X	The Li-ion battery remained energy rate is displayed. **NOTE:** Battery power indication method of VCM differs from that of quick charger. A value displayed for this item may not agree with a value displayed by quick charger.
HV BATT LEVEL	kWh	X	X	The Li-ion battery remained energy is displayed.
HV BATT VOLT	V		X	Displays the Li-ion battery voltage received from the Li-ion battery controller.

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
HV BATT CURRENT	A			Displays the Li-ion battery current received from the Li-ion battery controller.
HV BATTERY TEMP	°C or °F		X	Displays the Li-ion battery temperature received from the Li-ion battery controller.
IR SENSOR SIGNAL P-P	mV			Displays the peak to peak of the signal sent from the on-board isolation resistance monitoring system.
CHG CNECTR LOCK RLY V	mV			Displays the current of charge connector lock relay on the contact side.
C/CNECTR LCK ACTR DUTY	%			Displays the DUTY rate of PWM signal transmitted from VCM to charge connector lock actuator.
F/S RELAY	On/Off		X	Displays the F/S relay operation status. • On: F/S relay is ON • Off: F/S relay is OFF
F/S CHG RELAY	On/Off		X	Displays the F/S CHG relay operation status. • On: F/S CHG relay is ON • Off: F/S CHG relay is OFF
M/C RELAY	On/Off		X	Displays the M/C relay operation status. • On: M/C relay is ON • Off: M/C relay is OFF
A/C RELAY	On/Off		X	Displays the A/C relay operation status. • On: A/C relay is ON • Off: A/C relay is OFF
REVERSE LAMP RELAY	On/Off	X		Displays the reverse lamp relay operation status. • On: Reverse lamp relay is ON • Off: Reverse lamp relay is OFF
REVERSE LAMP RELAY MONI	On/Off			Displays the status that VCM is operating the reverse lamp relay. • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
HV P MAIN RLY ACTIV	On/Off		X	Displays the system main relay 1 operation status. • On: System main relay 1 is ON • Off: System main relay 1 is OFF
HV P MAIN RLY ACTIV MONI	On/Off	X		Displays the status that VCM is operating the system main relay 1. • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
HV N MAIN RLY ACTIV	On/Off		X	Displays the system main relay 2 operation status. • On: System main relay 2 is ON • Off: System main relay 2 is OFF
HV N MAIN RLY ACTIV MONI	On/Off	X		Displays the status that VCM is operating the system main relay 2. • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
HV PRE CHG RLY ACTIV	On/Off		X	Displays the pre-charge relay operation status. • On: pre-charge relay is ON • Off: pre-charge relay is OFF
HV PRE CHG RLY ACTIV MONI	On/Off	X		Displays the status that VCM is operating the pre-charge relay. • On: Operation voltage is being output by VCM. • Off: Operation voltage is not being output by VCM.
Q/CHG RELAY	On/Off			Displays the quick charge relay operation status. • On: Quick charge relay is ON • Off: Quick charge relay is OFF
ASCD SET VEHICLE SPEED	km/h or mph			The preset ASCD vehicle speed is displayed

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
ASCD MAIN SW	On/Off	X		Displays the ASCD MAIN switch operation status. • On: When the ASCD MAIN switch is operated • Off: When the ASCD MAIN switch is not operated
ASCD CANCEL SW	On/Off	X		Displays the CANCEL switch operation status. • On: When the CANCEL switch is operated • Off: When the CANCEL switch is not operated
RESUME/ACC SW	On/Off	X		Displays the RESUME/ACCELERATE switch operation status. • On: When the RESUME/ACCELERATE switch is operated • Off: When the RESUME/ACCELERATE switch is not operated
ASCD SET SW	On/Off	X		Displays the SET/COAST switch operation status. • On: When the SET/COAST switch is operated • Off: When the SET/COAST switch is not operated
ASCD BRAKE SW	On/Off	X		Displays the brake pedal position switch operation status. • On: The brake pedal is not depressed. • Off: The brake pedal is depressed.
STOP LAMP SW	On/Off	X		Displays the operation status of the stop lamp switch. • On: The brake pedal is depressed. • Off: The brake pedal is not depressed.
ASCD CANCEL (LOW SPEED)	NON/CUT			Indicates the vehicle cruise condition. • NON: Vehicle speed is maintained at the ASCD set speed. • CUT: Vehicle speed decreased to excessively low, and ASCD operation is cut off.
ASCD CANCEL (SPEED DIFF)	NON/CUT			Indicates the vehicle cruise condition. • NON: Vehicle speed is maintained at the ASCD set speed. • CUT: Vehicle speed decreased to excessively low compared with the ASCD set speed, and ASCD operation is cut off.
ASCD CRUISE LAMP	On/Off			Indicates [ON/OFF] condition of CRUISE lamp determined by the VCM according to the input signals.
ASCD SET LAMP	On/Off			Displays the SET indicator operation request status. • On: The SET indicator is lit. • Off: No operation request
SL TARGET VEHICLE SPEED	The item is indicated, but not used.			
READY COUNT	count			Displays the cumulative READY count from the time the vehicle is new.
INTEG READY TIME	sec			Displays the cumulative READY time from the time the vehicle is new.
QUICK CHG COUNT	count			Displays the cumulative quick charge count from the time the vehicle is new.
INTEG Q/CHG TIME	sec			Displays the cumulative quick charge time from the time the vehicle is new.
NORMAL CHG COUNT	count			Displays the cumulative normal charge count from the time the vehicle is new.
INTEG N/CHG TIME	sec			Displays the cumulative normal charge time from the time the vehicle is new.
EV SYS ACT REQ (VCM TIMER)	The item is indicated, but not used.			

MONITOR ITEM	Unit	Monitor Item Selection		Description
		ECU INPUT SIGNALS	MAIN SIGNALS	
ASCD VHCL SPD BLINK REQ	BLINK/FIX			Displays the status of vehicle speed indicator blink request of ASCD. • BLINK: Blink request • FIX: No blink request
DIFF WHEEL SPD LRN VAL	—			Displays a leaning value of slip rate calculated from the rotation difference between front wheel and rear wheel.
REFRIGERANT PRESS	MPa	X		The refrigerant pressure (determined by the signal voltage of the refrigerant pressure sensor) is displayed.
REGE TORQ LIMIT VAL (INV)	%			Displays a regeneration side motor torque limit value received from traction motor inverter.
LIGHT CRASH JUDGMENT	—			Displays minor collision detection information received from the air bag diagnosis sensor unit.
CHARGE PORT LID OPENER	On/Off			Displays the control status of the charge port lid opener controlled by VCM. • On: Controlled, open • Off: Inactive
ECO MODE	On/Off			Displays the control status of ECO mode controlled by VCM. • On: ECO mode • Off: Except above
KICK DOWN	The item is indicated, but not used.			

*: During 12 V battery automatic charge, remote climate control operation, and deice system operation.

ACTIVE TEST MODE

Test Item

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

TEST ITEM	CONDITION	JUDGMENT	CHECK ITEM (REMEDY)
VOLTAGE CONTROL	• POWER ON • This changes the voltage used by the ACTIVE TEST.	Check that the 12V battery power supply voltage changes.	• DC/DC converter • VCM • CAN communication
READY INDICATOR	• POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	• VCM • Combination meter • CAN communication
POWER LIMITATION INDICATOR	• POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	• VCM • Combination meter • CAN communication
EV SYSTEM W/L	• POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	• VCM • Combination meter • CAN communication
12V BATTERY CHARGE W/L	• POWER ON • This turns ON and OFF the indicator used by the ACTIVE TEST.	This confirms the indicator is ON/OFF.	• VCM • Combination meter • CAN communication
ECO INDICATOR	• POWER ON • This changes the display value used by the ACTIVE TEST.	Confirm that the ECO indicator display in the upper meter changes.	• VCM • Combination meter • Upper meter • CAN communication
ECO TREE	• POWER ON • This changes the display value used by the ACTIVE TEST.	Confirm that the ECO tree display in the upper meter changes.	• VCM • Combination meter • Upper meter • CAN communication
WATER PUMP 1	• POWER ON • This turns changes the duty ratio used by the ACTIVE TEST.	Check that the water pump operation speed changes.	• Harness and connectors • Water pump • VCM
COOLING FAN	• POWER ON • This turns changes the duty ratio used by the ACTIVE TEST.	Check that the cooling fan operation speed changes.	• Harness and connectors • Cooling fan system • VCM

WORK SUPPORT MODE

Work Item

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

*: When this is performed, all self-diagnosis results in VCM and Freeze Frame Data are cleared.

ECU DIAGNOSIS INFORMATION

VCM

Reference Value

INFOID:0000000008747000

VALUES ON THE DIAGNOSIS TOOL

NOTE:

- Specification data are reference values.
- The displayed data may differ from an actual signal/value/operation, as some of them are calculated by VCM, based on signals transmitted from VCM-related sensors to VCM.
- Li-ion battery charge does not start when the power switch is ON. When it is required to charge with the power switch ON, start charging before turning ON the power switch.
- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

For outlines of following items, refer to EVC-73, "CONSULT Function".

MONITOR ITEM	CONDITION		Values/Status
VCM MODE	Power ON	Charge connector is not connected	10
	READY		30
	During normal charge		60
	During quick charge		90
VCM ACTIVATION	READY		READY
	Except READY		On
MOTOR SPEED	When vehicle speed is 0 km/h		0 rpm
	When vehicle speed is 60 km/h		4200 rpm (Approx.)
INVERTER DC INPUT VOLT	Power ON		200 – 403 V
VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication.
HI SPEC VEHICLE SPEED	Turn drive wheels and compare CONSULT value with the speedometer indication.		Almost the same speed as the speedometer indication.
AMBIENT TEMP	Power: ON		Indicates depending on ambient temperature.
CLASH DETECT INFO	When a non-serious collision is detected		MID
	When a serious collision is detected		HEAVY
	No collision is detected		##
12V BATTERY VOLTAGE	Power ON (not READY)		11 – 15 V
	READY		13 – 15 V
VCM POWER SUPPLY (ACT)	Power ON		11 – 15 V
F/S RELAY VOLT	Power ON		11 – 15 V
	READY		12 – 15 V
12V BATTERY TEMP	Power ON		Indicates depending on motor room air temperature.
12V BATTERY CURRENT AVG	• READY (at idle*) • Li-ion battery remained energy: Full • Selector lever: P or N • A/C switch: OFF • Electrical load: No load		0 – 50 A

MONITOR ITEM	CONDITION		Values/Status
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
ACCEL OPEN ANGLE	Power ON	Accelerator pedal: Fully depressed	90 – 100%
		Accelerator pedal: Fully released	0 – 5%
CURRENT MOTOR TORQ	READY		0 – 280 N·m (Depending on accelerator pedal opening angle)
TRG MOTOR TORQ 1	READY		0 – 280 N·m (Depending on accelerator pedal opening angle)
MOTOR PWR LIMIT REQ (INV)	Normal		100%
	When output is limited		0 – 98%
PRTCTN CNT OPERAT HIST 1	The operation history of the Charge Insulation Resistance Loss Protection Control exists.		1 – 3
	Except above		0
GEAR POSITION DISPLAY	READY	Selector lever: P Range	P
		Selector lever: R range	R
		Selector lever: N Range	N
		Selector lever: D range	D
		Selector lever: B range	B
PRTCTN CNT OPERAT HIST 2	The operation history of the Charging Connector-connecting Protection Control exists.		On
	Except above		Off
NEXT GEAR POSITION	Power ON	Selector lever: R	R
		Selector lever: N or P	N/P
		Selector lever: D, B, or ECO	D
GEAR POSITION	Power ON	Selector lever: R	R
		Selector lever: N or P	N/P
		Selector lever: D, B, or ECO	D
COOLANT TEMP	After 2 minutes have expired since READY		Above the outside temperature and below 80°C (176°F) (Value in accordance with the cooling water temperature)
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%
COOLING FAN REQ DUTY	READY		15 – 85%
DC/DC CONV STAT	READY		On
	Power ON		STOP

MONITOR ITEM	CONDITION		Values/Status
DC/DC CONV STATUS	Power ON	DC/DC converter does not operate	0
		When normal operation	1
		When VCM detects a DC/DC converter error	2
		When VCM prohibits the DC/DC converter operation	3
VARIABLE V/CONT PERMIT	• READY • The 12V battery is sufficiently charged • Wiper not operating		On
	Except above.		Off
DC/DC CONV REQ VOLT	Power ON		14,000 mV
	READY		13,000 – 15,000 mV
POWER SW	Power switch operation: ON⇒OFF⇒ON		On⇒Off⇒On
START SIGNAL	Power switch operation: ON⇒START⇒ON		Off⇒On⇒On
IMMEDIATE CHG SW	Power ON	Immediate charging switch: Pressed	On
		Immediate charging switch: Released	Off
A/C SW	Power ON	A/C switch: ON	On
		A/C switch: OFF	Off
FRONT WIPER	Power ON	Front wiper operation status Low	LOW
		Front wiper operation status High	HIGH
		Front wiper operation status Not operation	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
BLOWER FAN ACTIV	Blower fan: Operates		On
	Blower fan: Not operates		Off
REAR DEFOGGER	Rear defogger: Operates		On
	Rear defogger: Not operates		Off
HV INTERLOCK (DC/DC)	When the PDM (Power Delivery Module) cover and bus bar cover are installed normally.		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
READY LAMP SIGNAL	READY		On
	When READY is started		Blinks
	Except above		Off
PWR LIMIT INDICAT LAMP	Power limitation indicator lamp: ON		On
	Power limitation indicator lamp: OFF		Off

MONITOR ITEM	CONDITION		Values/Status
EV SYSTEM W/L SIGNAL	Power ON	When VCM has detected an error.	On
		Except above	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
CHARGE LAMP SIGNAL	Power ON		On
	READY		Off
AVAILABLE MOT OUTPUT MAX	READY		0 – 100%
MOTOR REGE PWR MAX	READY		0 – 100%
ECO INDICATOR	Displays the same value as in the instant ECO indicator.		
ECO TREE	Displays the same value as in the ECO tree.		
POWER CONSUM (MOTOR)	READY		(-100) – (+100)%
POWER CONSUM (AUXS)	Power ON		0 – 0.6 kW
	READY		0.2 – 0.8 kW
	Charging		0.1 – 0.7 kW
POWER CONSUMPTION (A/C)	• READY • When the air conditioner is used		0 – 5 kW
ESTMT PWR CNSM (A/C CMP)	• READY • A/C switch: ON		0 – 5 kW
ESTMT PWR CNSM (PTC HTR)	• When the air conditioner is operating • Set temperature: HOT side maximum		0 – 10 kW
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		##
CHARGE MODE	Charging using AC 100-120 V		100V
	Charging using AC 200-240 V		200V
	During quick charge		QUICK
	When in a state where charging is not possible		NG
	Except above		Off

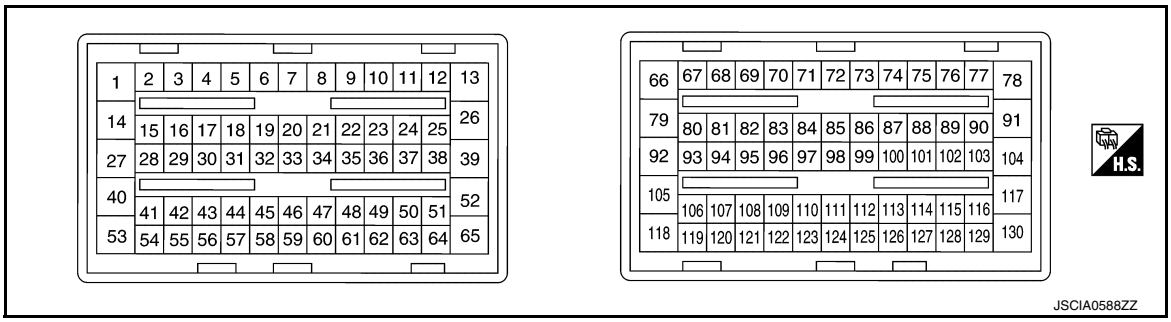
MONITOR ITEM	CONDITION		Values/Status
N/CHG PORT CONNECTION	Normal charge connector is connected.		On
	Normal charge connector is half-engaged		HALF
	Except above		Off
Q/CHG INTERLOCK	Quick charger connector is connected.		On
	Except above		Off
AC POWER TYPE	When an AC power supply is not connected		OFF
	When an AC 100-120 V power supply is connected		100V
	When an AC 200-240 V power supply is connected		200V
ENABLE OBC OUT PWR	Charging	When EVSE for 3.3 kW is used	3.3 kW
		When EVSE for 6.0 kW is used	6.0 kW
HV BATT EMPTY	Power ON	The Li-ion battery remaining energy is sufficient.	OK
		The Li-ion battery remaining energy is low.	EMPTY
OBC OUT PWR	In Normal Charging	When EVSE for 3.3 kW is used	0 – 3.3 kW
		When EVSE for 6.0 kW is used	0 – 6.0 kW
	In Quick Charging		0 – 50 kW
TRG HV BATT CHG LEVEL	Selected 100% charge		100%
	Selected 80% charge		80%
HV BATT LEVEL (%)	Depending on Li-ion battery remained energy.		0 – 100%
HV BATT LEVEL	Power ON		0 – 24 kWh
HV BATT VOLT	Power ON		200 – 403 V
HV BATT CURRENT	• READY (at idle*) • Electrical load: No load		0 – 10 A
HV BATTERY TEMP	Power ON		Between the outside air temperature and 50°C (122°F)
IR SENSOR SIGNAL P-P	Power ON		3150 mV or more
CHG CNECTR LOCK RLY V	Set vehicle as stated below and operate the charge connector lock switch to LOCK. • Power switch: OFF • Charge connector lock switch: OFF • Connect EVSE to normal charge port.		0 V⇒12V battery voltage⇒0 V
	Except above		0 V
C/CNECTR LCK ACTR DUTY	Set vehicle as stated below and operate the charge connector lock switch to LOCK. • Power switch: OFF • Charge connector lock switch: OFF • Connect EVSE to normal charge port.		0%⇒100%⇒0%
	Except above		0 V
F/S RELAY	Power ON		On
F/S CHG RELAY	During quick charge		On
	Except above		Off
M/C RELAY	Power ON		On
A/C RELAY	Power ON		On
	Power OFF		Off
REVERSE LAMP RELAY	Power ON	Selector lever: R range	On
		Selector lever: Except R range	Off

MONITOR ITEM	CONDITION		Values/Status
REVERSE LAMP RELAY MONI	Power ON	Selector lever: R range	On
		Selector lever: Except R range	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
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
Q/CHG RELAY	Quick charging		On
	Except above		Off
ASCD SET VEHICLE SPEED	ASCD: Operating		The preset vehicle speed is displayed
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 CANCEL (LOW SPEED)	Power ON		NON
ASCD CANCEL (SPEED DIFF)	Power ON		NON
ASCD CRUISE LAMP	Power ON	ASCD MAIN switch: Pressed at the 1st time → at the 2nd time	On⇒Off
ASCD SET LAMP	After the ASCD MAIN switch has been pressed once, press it again.		On⇒Off
SL TARGET VEHICLE SPEED	The item is indicated, but not used.		
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

MONITOR ITEM	CONDITION		Values/Status
INTEG N/CHG TIME	Power ON		This shows the normal charge cumulative operation time
EV SYS ACT REQ (VCM TIMER)	The item is indicated, but not used.		
ASCD VHCL SPD BLINK REQ	• Driving • ASCD: ON	When vehicle speed exceeds the set speed of ASCD	Blink
		Except above	Off
DIFF WHEEL SPD LRN VAL	Power ON		± 0.02
REFRIGERANT PRESS	• READY • Both the A/C switch and blower fan switch are ON (A/C compressor is operating)		0.6 – 2.6 MPa
REGE TORQ LIMIT VAL (INV)	Normal		100%
	When output is limited		0 – 98%
LIGHT CRASH JUDGMENT	When a light crash judgment signal is received from air bag diagnosis sensor unit.		15
	Except above		0
CHARGE PORT LID OPENER	Charge port lid opener switch: OFF⇒ON		Off⇒On⇒Off
ECO MODE	ECO mode indicator: ON		On
	ECO mode indicator: OFF		Off
KICK DOWN	Power ON	Accelerator pedal: Depressed	On

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

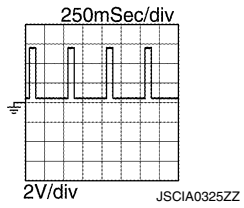
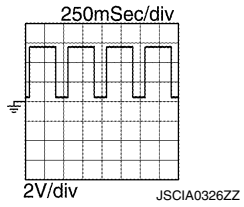
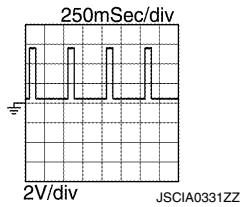
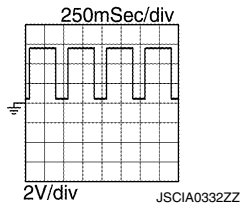
TERMINAL LAYOUT

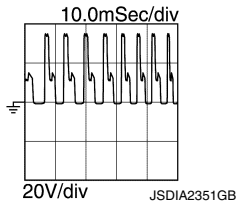
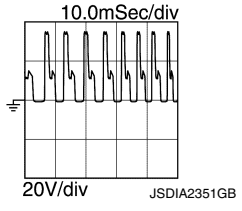


PHYSICAL VALUES

NOTE:
Specification data are reference values.

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
1 (B)	Ground	Motor coil A U-phase	Output	Power switch: ON		9 V – 16 V
				Power switch: OFF		0 V
3 (W)	Ground	Electric shift sensor No. 5	Input	READY	Selector lever is held in D position	0 V
					Other than the above	5 V
5 (LG)	Ground	F/S relay power supply	Input	Power switch: OFF		0 V
				Power switch: ON		12V BATTERY VOLTAGE (11 – 15 V)
7 (O/L)	Ground	Electric shift sensor power supply 1	Input	Power switch: ON		5 V

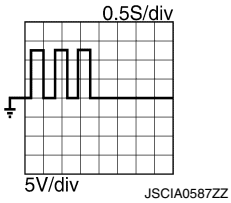
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
8 (W)	Ground	F/S CHG relay	Output	During quick charge		0 V (Approx.)
				Except above		12V BATTERY VOLTAGE (11 – 15 V)
9 (SB)	Ground	Parking actuator relay A	Output	Power switch: ON		0 V
				Power switch: OFF		9 V – 16 V
11 (BR)	Ground	12V Battery power supply	Input	Always		12V BATTERY VOLTAGE (11 – 15 V)
13 (SB)	Ground	Motor coil A V-phase	Output	Power switch: ON		9 V – 16 V
				Power switch: OFF		0 V
16 (R)	Ground	Electric shift sensor No. 3	Input	READY	Selector lever is held in H (Home) and N positions	0 V
					Other than the above	5 V
17 (B)	Ground	Electric shift sensor No. 1	Input	READY	Selector lever is held in R position	0 V
					Other than the above	5 V
18 (Y)	Ground	R position output (selector indicator)	Output	READY	Selector lever is held in R position	1 V or less
					Other than the above	9 V – 16 V
19 (W)	58 (B/R)	Water pump signal	Input	• Power switch ON • Pump operation duty: 0%		
				• Power switch ON • Pump operation duty: Approx. 70%		
20 (G)	58 (B/R)	Water pump signal	Input	Pump operation duty: 0%		
				Pump operation duty: Approx. 70%		

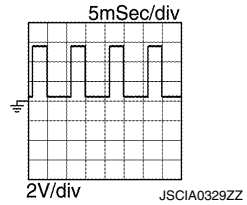
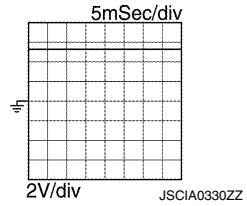
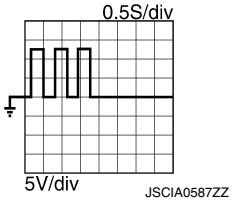
Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
21 (GR)	Ground	F/S relay	Output	Power switch: OFF		12V BATTERY VOLTAGE (11 – 15 V)
				Power switch: ON		0 V (Approx.)
23 (R)	Ground	Charge port lid opener actuator relay	Output	When the charge port lid opener actuator is operating		12V BATTERY VOLTAGE (11 – 15 V)
				Except above		0 V
24 (L)	—	EV system CAN-H	Input/ Output	—		—
25 (G)	—	EV system CAN-L	Input/ Output	—		—
28 (R)	58 (B/R)	System main relay 2	Output	During READY or during charging		12V BATTERY VOLTAGE (11 – 15 V)
30 (W)	Ground	READY signal	Input	For Approx. 2 seconds after power switch ON under following condition: • Selector lever: P or N • Brake pedal: Depressed		0 V (Approx.)
				Except above		12V BATTERY VOLTAGE (11 – 15 V)
32 (B)	Ground	Encoder power supply	Output	Power switch: ON		5 V
33 (L)	Ground	N position output (selector indicator)	Output	READY	Selector lever is held in N position	1 V or less
					Other than the above	9 V – 16 V
34 (R)	Ground	D position output (selector indicator)	Output	READY	Selector lever is held in D position	1 V or less
					Other than the above	9 V – 16 V
36 (W)	62 (B)	Sensor power supply (Accelerator pedal position sensor 1)	Output	Power switch: ON		5 V (Approx.)
39 (R)	Ground	Motor coil A W-phase	Output	Power switch: ON		9 V – 16 V
				Power switch: OFF		0 V
40 (B)	Ground	Pre-charge relay	Output	Immediately after the power OFF⇒READY operation		12V BATTERY VOLTAGE* (11 – 15 V)
				Except above		0 V
44 (P)	Ground	Encoder signal B	Input	Parking actuator is operated		
45 (V)	Ground	Encoder signal A	Input	Parking actuator is operated		

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
46 (B)	Ground	P position output (selector indicator)	Output	READY	Selector lever is held in P position	1 V or less
					Other than the above	9 V – 16 V
47 (LG)	Ground	P/N position signal	Output	READY	Selector lever is held in P and N positions	9 V – 16 V
					Other than the above	0 V
48 (W)	Ground	P position signal	Output	READY	Selector lever is held in P position	0 V
					Other than the above	9 V – 16 V
49 (R)	62 (B)	Accelerator pedal position sensor 1	Input	• Power switch: ON • Accelerator pedal: Fully released		0.6 – 0.9 V
				• Power switch: ON • Accelerator pedal: Fully depressed		3.9 – 4.8 V
51 (R)	Ground	Power ON power supply	Input	Power switch: ON		12V BATTERY VOLTAGE (11 – 15 V)
54 (W)	58 (B/R)	System main relay 1	Output	During READY or during charging		12V BATTERY VOLTAGE (11 – 15 V)
				Except above		0 V
56 (G)	Ground	Encoder ground	—	Always		0 V
57 (O)	Ground	Electric shift sensor ground 1	—	Always		0 V
58 (B/R)	—	VCM ground	—	—		—
62 (B)	—	Sensor ground (Accelerator pedal position sensor 1)	—	—		—
65 (B)	—	VCM ground	—	—		—
70 (SB)	Ground	Reverse lamp relay	Output	• Power ON • Selector lever: R range		0 V (Approx.)
				• Power ON • Selector lever: Except R range		12V BATTERY VOLTAGE (11 – 15 V)
72 (P)	Ground	Connection detecting circuit signal	Input	When the connection detecting circuit of PDM (Power Delivery Module) is energized.		3 – 7 V
				When the connection detecting circuit of PDM (Power Delivery Module) is not energized.		0 V
73 (O)	Ground	Connection detecting circuit power supply	Output	Power switch: ON		3 – 7 V
74 (G)	Ground	Power ON power supply	Input	Power switch: ON		12V BATTERY VOLTAGE (11 - 15 V)
75 (L)	—	CAN-H	Input/ Output	—		—
76 (P)	—	CAN-L	Input/ Output	—		—
78 (SB)	58 (B/R)	Charge connector lock relay	Output	When the charge connector lock actuator is operating		12V BATTERY VOLTAGE (11 – 15 V)

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
79 (R)	Ground	12V Battery power supply	Input	Always		12V BATTERY VOLTAGE (11 – 15 V)
81 (L)	Ground	Charge connector lock switch (AUTO)	Input	Charge connector lock switch: AUTO		0 V
				Except above		12V BATTERY VOLTAGE (11 – 15 V)
82 (GR)	Ground	Charge port light	Output	Charge port light: ON		0 V
				Charge port light: OFF		12V BATTERY VOLTAGE (11 – 15 V)
83 (W)	Ground	Electric shift sensor power supply 2	Input	Power switch: ON		5 V
84 (W)	Ground	Electric shift sensor No. 2	Input	READY	Selector lever is held in R and N positions	0 V
					Other than the above	5 V
85 (G)	Ground	Electric shift sensor No. 4	Input	READY	Selector lever is held in N and D positions	0 V
					Other than the above	5 V
86 (G)	Ground	Electric shift sensor No. 6	Input	READY	Selector lever is held in H (Home) position	0 V
					Other than the above	5 V
87 (V)	Ground	Charge connector lock switch indicator (LOCK)	Input	“LOCK” indicator: ON		0 V
				“LOCK”indicator: OFF		12V BATTERY VOLTAGE (11 – 15 V)
88 (SB)	58 (B/R)	M/C relay	Output	Power switch: OFF		12V BATTERY VOLTAGE (11 – 15 V)
				Power switch: ON		0 V (Approx.)
89 (BR)	Ground	Charging status indicator 2	Output	Charging status indicator 2: ON		0 V (Approx.)
				Charging status indicator 2: OFF		12V BATTERY VOLTAGE (11 – 15 V)
90 (G)	Ground	Charging status indicator 3	Output	Charging status indicator 3: ON		0 V (Approx.)
				Charging status indicator 3: OFF		12V BATTERY VOLTAGE (11 – 15 V)
91 (O)	Ground	Charge connector lock switch indicator (AUTO)	Input	“AUTO” indicator: ON		0 V
				“AUTO”indicator: OFF		12V BATTERY VOLTAGE (11 – 15 V)
93 (BR)	Ground	Charge port lid opener switch	Input	Charge port lit opener switch: Pressed.		0 V
				Charge port lit opener switch: Not operated.		12V BATTERY VOLTAGE (11 – 15 V)
94 (O)	Ground	Charge connector lock switch (LOCK)	Input	Charge connector lock switch: LOCK		0 V
				Except above		12V BATTERY VOLTAGE (11 – 15 V)
95 (Y)	120 (L)	Battery current sensor	Input	• READY • 12V battery is fully charged		2.6 – 3.5 V
96 (R)	120 (L)	Sensor power supply (Battery current sensor)	Output	Power switch: ON		5 V (Approx.)

Terminal No. (Wire color)		Description		Condition		Value (Approx.)
+	–	Signal name	Input/ Output			
97 (W)	122 (B)	Sensor power supply (Accelerator pedal position sensor 2)	Output	Power switch: ON		5 V (Approx.)
98 (L)	123 (BR)	Sensor power supply (Refrigerant pressure sensor)	Output	Power switch: ON		5 V
99 (R)	Ground	P position switch No. 1	Input	READY	P position switch is pushed	5 V
					Other than the above	0 V
101 (P)	Ground	Stop lamp switch	Input	• Power switch: ON • Brake pedal: depress		12V BATTERY VOLTAGE (11 – 15 V)
				• Power switch: ON • Brake pedal: Fully released		0 V
103 (L)	Ground	Plug in indicator lamp	Output	Plug in indicator lamp: ON		0 V (Approx.)
				Plug in indicator lamp: OFF		12V BATTERY VOLTAGE (11 – 15 V)
104 (R)	Ground	Charge connector lock relay power supply	Input	When the charge connector lock actuator is operating		12V BATTERY VOLTAGE (11 – 15V)
				Except above		0 V
107 (L)	120 (L)	Battery temperature sensor	Input	• Power switch: ON • Motor room temperature: 25°C (77°F)		3.3 V
108 (R)	122 (B)	Accelerator pedal position sensor 2	Input	• Power switch: ON • Accelerator pedal: Fully released		0.3 – 0.45 V
				• Power switch: ON • Accelerator pedal: Fully depressed		1.95 – 2.4 V
109 (B)	123 (BR)	Refrigerant pressure sensor	Input	A/C compressor operating.		1.0 – 4.0 V
110 (Y)	121 (W)	Coolant temperature sensor	Input	Coolant temperature: 20°C (68°F)		3.3 – 3.7 V
				Coolant temperature: 60°C (140°F)		1.6 – 2.1 V
111 (SB)	58 (B/R)	ASCD steering switch	Input	• Power ON • ASCD steering switch: All OFF		4.1 – 4.3 V
				• Power ON • ECO mode switch: Pressed		3.5 – 3.7 V
				• Power ON • RESUME/ACCELERATE switch: Pressed		2.8 – 3.1 V
				• Power ON • SET/COAST switch: Pressed		2.0 – 2.4 V
				• Power ON • CANCEL switch: Pressed		1.1 – 1.6 V
				• Power ON • ASCD main switch: Pressed		0 – 0.6 V
112 (B)	Ground	P position switch No. 2	Input	READY	P position switch is pushed	0 V
					Other than the above	5 V
113 (O)	Ground	Brake pedal position switch	Input	• Power switch: ON • Brake pedal: depress		0 V
				• Power switch: ON • Brake pedal: Fully released		12V BATTERY VOLTAGE (11 – 15 V)

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
115 (V)	Ground	Charging status indicator 1	Output	Charging status indicator 1: ON	0 V (Approx.)
				Charging status indicator 1: OFF	12V BATTERY VOLTAGE (11 – 15 V)
116 (SB)	Ground	A/C relay	Output	Power switch: ON	0 V (Approx.)
				A few seconds after turning power switch OFF	12V BATTERY VOLTAGE (11 – 15 V)
117 (LG)	58 (B/R)	Charge connector lock actuator (+)	Output	Charge connector lock actuator: unlock⇒lock	★6 – 7 V  **NOTE:** Repeat up to 3 times until normally locked.
				Except above	0 V
118 (B)	—	VCM ground	—	—	—
120 (L)	—	Sensor ground (Battery current sensor)	—	—	—
121 (W)	—	Sensor ground (Coolant temperature sensor)	—	—	—
122 (B)	—	Sensor ground (Accelerator pedal position sensor 2)	—	—	—
123 (BR)	—	Sensor ground (Refrigerant pressure sensor)	—	—	—
124 (W/L)	Ground	Electric shift sensor ground 2	—	Always	0 V
125 (BR)	—	ASCD steering switch ground	—	—	—
126 (B/R)	—	VCM ground	—	—	—

Terminal No. (Wire color)		Description		Condition	Value (Approx.)
+	–	Signal name	Input/ Output		
128 (V)	58 (B/R)	Cooling fan control signal	Output	Fan duty: 40%	
				Fan duty: 100%	
129 (Y)	Ground	Immediate charging switch	Input	Immediate charging switch: Pressed	12V BATTERY VOLTAGE (11 – 15 V)
				Immediate charging switch: Released	0 V
130 (W)	58 (B/R)	Charge connector lock actuator (-)	Output	Charge connector lock actuator: lock⇒unlock	★6 – 7 V  **NOTE:** Repeat up to 3 times until normally unlocked.
				Except above	0 V

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

Fail-Safe

INFOID:0000000008747001

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

×:Applicable

DTC		Pattern				Others
		A	B	C	D	
U1010	TYPE 1			×		
	TYPE 2	×	×	×	×	
P0A8D		×	×	×	×	
P0A8E		×	×	×	×	
P0AA0		×	×	×	×	Start not possible
P0AA1		×	×	×	×	Start not possible

DTC		Pattern				Others
		A	B	C	D	
P0AA2		×	×	×	×	
P0AA4		×	×	×	×	Start not possible
P0AA5		×	×	×	×	
P0AA6		×	×			Doing READY again is prohibited.
P1564						ASCD operation prohibited
P1572						ASCD operation prohibited
P1574						ASCD operation prohibited
P1610		×	×	×	×	Start not possible
P1611		×	×	×	×	Start not possible
P1612		×	×	×	×	Start not possible
P2122 P2123 P2127 P2128						• Traction motor output is limited. • Reduced responsiveness during accelerator operation
P2138	TYPE 1			×		
	TYPE 2					• Traction motor output is limited. • Reduced responsiveness during accelerator operation
P3100		×	×	×	×	
P3101	TYPE 1			×		
	TYPE 2	×	×	×	×	Start not possible
	TYPE 3					No fail-safe.
P3102						Traction motor output is limited.
P3117						• VCM inhibits the operation of the electric compressor. • VCM inhibits the operation of the PTC heater.
P312B		×	×	×	×	
P312C		×	×	×	×	
P312D		×	×	×	×	
P312E		×	×	×	×	
P312F		×	×	×	×	
P3130		×	×	×	×	
P3131	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P3137		×	×	×	×	Start not possible
P3141			×			
P315C		×	×	×	×	
P316A				×		
P316C		×				
P316D				×		
P316F	TYPE 1	×	×	×	×	
	TYPE 2	×	×			
P3170			×			
P3173		×	×			Traction motor output is limited.
P3175				×		
P3176		×	×	×	×	
P3177		×	×	×	×	

DTC		Pattern				Others
		A	B	C	D	
P3178		×	×	×	×	
P317A				×		
P317B		×	×	×	×	
P317D				×		
P317E		×	×			
P3182		×	×	×	×	
P3183		×	×			
P3187				×		
P3188	TYPE 1	×	×			Traction motor output is limited.
	TYPE 2					No fail-safe.
P318B	TYPE 1			×		Put the gear position in neutral.
	TYPE 2	×	×	×	×	
P3191	TYPE 1			×		
	TYPE 2					No fail-safe.
P3193	TYPE 1	×	×			Only driving in creep is possible.
	TYPE 2					No fail-safe.
P3196	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P3197				×		
P319C				×		
P319E		×	×			Only driving in creep is possible.
P31A1	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P31A2				×		
P31A7				×		
P31A9		×	×			Only driving in creep is possible.
P31AD				×		
P31AE	TYPE 1	×				
	TYPE 2	×	×			Traction motor output is limited.
P31B0	TYPE 1					VCM inhibits the timer charge.
	TYPE 2					VCM inhibits the timer charge and the remote climate control.
	TYPE 3					No fail-safe.
P31B3	TYPE 1					When the power is turned on and the vehicle is charging, the cooling fan is operated at a constant speed.
	TYPE 2					No fail-safe.
P31B4	TYPE 1					VCM inhibits the timer charge.
	TYPE 2					VCM inhibits the remote climate control.
	TYPE 3					No fail-safe.
P31B5	TYPE 1					ASCD operation prohibited **NOTE:** The ECO indicator value also becomes extremely poor.
	TYPE 2					No fail-safe.
P31B6						VCM sets the DC/DC converter output power to a constant 14 V.
P31C5						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.

DTC		Pattern				Others
		A	B	C	D	
P31C6						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.
P31C7						• VCM inhibits the timer charge and the remote climate control. • VCM inhibits the automatic 12V battery charge control.
P31CA		×				Traction motor output is limited.
P31CB		×				Traction motor output is limited.
P31D5						• Traction motor output is limited. • Vehicle speed is limited. [Approx. 40 km/h (25 MPH)]
P31DB		×	×	×	×	
P31DC		×	×	×	×	
P31DE	TYPE 1					Traction motor output is limited.
	TYPE 2	×	×	×	×	Start not possible
P31E0	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E1	TYPE 1	×	×	×	×	
	TYPE 2					No fail-safe.
P31E7						Doing READY again is prohibited.
P31F2						VCM inhibits the timer charge and the remote climate control.

DTC Inspection Priority Chart

INFOID:0000000008747002

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 communication line
	U1010	Control unit (CAN)
	P0A00	Coolant temperature sensor
	P1551, P1552	Battery current sensor
	P1556, P1557	Battery temperature sensor
	P2122, P2123	Accelerator pedal position sensor 1
	P2127, P2128	Accelerator pedal position sensor 2
	P3101	VCM
	P3135	Slight collision detection
	P3137	Car crash
	P3175	VCM
	P318B, P318D, P3191, P3193, P3194, P3195, P3196, P3197, P319C, P319E, P319F, P31A0, P31A1, P31A2, P31A3, P31A7, P31A9, P31AA, P31AB, P31AD, P31AE, P31AF, P31B0, P31B2, P31B3, P31B4, P31B5, P31B6, P31B7, P31B8, P31BA, P31BB	Communication error
	P31C5, P31C6, P31C7	VCM

Priority	DTC	Detection items
2	P0A0B	High Voltage system interlock error
	P0A8D, P0A8E	14V power supply
	P0A94	DC/DC converter
	P0AA0, P0AA1, P0AA2	System main relay 1
	P0AA4, P0AA5	System main relay 2
	P1550, P1554	Battery current sensor
	P155A	Battery temperature sensor
	P1564	ASCD switch
	P1572	Brake pedal position switch
	P1574	ASCD vehicle speed sensor
	P1805	Brake switch
	P2138	Accelerator pedal position sensor
	P3102	Invalid battery
	P315C	Charge relay
	P315E	VDC system
	P316A	Motor speed
	P3172, P3173	PDM (Power Delivery Module) system
	P317D	Motor system
	P3183	High Voltage battery system
	P318A, P318B, P318C	Electric shift system
	P31CA, P31CB	PDM (Power Delivery Module) system
	P31D3	M/C relay
	P31D4, P31D5	Pre charge relay
	P31D6, P31D7	F/S relay
	P31D8	Charge connector lock relay
	P31DB	System main relay 1
	P31DC	System main relay 2
	P31DD	Pre charge relay
	P31E5	VCM power supply
	P31E8, P31E9, P31EC	Electric water pump
	P31EE	Refrigerant pressure sensor
	P31F2	AV set information

Priority	DTC	Detection items
3	P0A8F	14V power supply
	P0AA6	Li-ion battery voltage system isolation error
	P3100, P312A	Communication error
	P3117	A/C system
	P311C	High voltage system
	P312B	Restart error
	P312C	Traction motor inverter discharge error
	P312D	Quick charge relay
	P312E	READY OFF error
	P312F	Charge OFF error
	P3130	Traction motor inverter discharge error
	P3131	System shutoff timeout
	P3141	PDM (Power Delivery Module)
	P316F	PDM (Power Delivery Module) system
	P3176	Inverter condenser
	P3177, P3178	ECU activation error
	P31DE	Li-ion battery main relay
	P31E0, P31E1	High voltage system interlock error
	P31E7	Restart inhibition
4	P316C, P316D, P316E, P3170, P3171	PDM (Power Delivery Module) system
	P3179, P317A, P317B	Traction motor system
	P317E, P3180, P3182	Li-ion battery system
	P3187, P3188, P3189	Electric shift system

DTC Index

INFOID:0000000008747003

×:Applicable —: Not applicable

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
U1000	CAN COMM CIRCUIT	—	1	EVC-154
U1010	CONTROL UNIT (CAN)	×	1	EVC-155
P0A00	COOLANT TEMPERATURE SENSOR	—	1	EVC-156
P0A0B	HV SYSTEM INTERLOCK ERROR	×	1	EVC-159
P0A8D	14V POWER SUPPLY	×	1	EVC-162
P0A8E	14V POWER SUPPLY	×	1	EVC-164
P0A8F	14V POWER SUPPLY	×	1	EVC-166
P0A94	DC/DC CONVERTER	—	1	EVC-168
P0AA0	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-169
P0AA1	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-174
P0AA2	HYBRID BATT POSITIVE CONTACTOR	×	1	EVC-179
P0AA4	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-181
P0AA5	HYBRID BATT NEGATIVE CONTACTOR	×	1	EVC-186
P0AA6	HYBRID BATT VOLT SYS ISOLATION	×	1	EVC-188
P1550	BATTERY CURRENT SENSOR	—	1	EVC-196
P1551	BATTERY CURRENT SENSOR	—	1	EVC-196
P1552	BATTERY CURRENT SENSOR	—	1	EVC-196

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P1554	BATTERY CURRENT SENSOR	—	1	EVC-200
P1556	BATTERY TEMPERATURE SENSOR	—	1	EVC-204
P1557	BATTERY TEMPERATURE SENSOR	—	1	EVC-204
P155A	BATTERY TEMPERATURE SENSOR	—	1	EVC-206
P1564	ASCD SWITCH	—	1	EVC-208
P1572	ASCD BRAKE SWITCH	—	1	EVC-211
P1574	ASCD VEHICLE SPEED SENSOR	—	1	EVC-217
P1610	LOCK MODE	—	1	SEC-72
P1611	ID DISCORD, IMMU-VCM	—	1	SEC-73
P1612	CHAIN OF VCM-IMMU	—	1	SEC-74
P1805	BRAKE SWITCH	×	1	EVC-219
P2122	APP SENSOR D	×	1	EVC-222
P2123	APP SENSOR D	×	1	EVC-222
P2127	APP SENSOR E	×	1	EVC-225
P2128	APP SENSOR E	×	1	EVC-225
P2138	APP SENSOR	×	1	EVC-228
P3100	COMMUNICATION ERROR	×	1	EVC-230
P3101	VCM	× or —	1	EVC-232
P3102	INVALID BATTERY	×	1	EVC-233
P3117	A/C SYSTEM	—	1	EVC-234
P311C	HIGH VOLTAGE SYSTEM	—	1	EVC-236
P312A	COMMUNICATION ERROR	×	1	EVC-241
P312B	RESTART ERROR	×	1	EVC-245
P312C	INVERTER DISCHARGE ERROR	×	1	EVC-247
P312D	QUICK CHARGE RELAY	×	1	EVC-248
P312E	READY OFF ERROR	×	1	EVC-249
P312F	CHARGE OFF ERROR	×	1	EVC-251
P3130	INVERTER DISCHARGE ERROR	×	1	EVC-247
P3131	SYSTEM SHUTOFF TIMEOUT	×	1	EVC-253
P3135	SLIGHT COLLISION DETECTION	×	1	EVC-257
P3137	CAR CRASH	×	1	EVC-258
P3141	PDM (POWER DELIVERY MODULE)	×	1	EVC-259
P315C	CHARGE RELAY	×	1	EVC-261
P315E	VDC SYSTEM	—	1	EVC-262
P316A	MOTOR SPEED	×	1	EVC-263
P316C	PD MODULE SYSTEM	—	1	EVC-264
P316D	PD MODULE SYSTEM	—	1	EVC-264
P316E	PD MODULE SYSTEM	—	1	EVC-264
P316F	PD MODULE SYSTEM	×	1	EVC-265
P3170	PD MODULE SYSTEM	—	1	EVC-267
P3171	PD MODULE SYSTEM	×	1	EVC-267
P3172	PD MODULE SYSTEM	×	1	EVC-268
P3173	PD MODULE SYSTEM	× or —	1	EVC-268
P3175	VCM	×	1	EVC-269

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P3176	INVERTER CONDENSER	×	1	EVC-270
P3177	ECU ACTIVATION ERROR	—	1	EVC-275
P3178	ECU ACTIVATION ERROR	×	1	EVC-278
P3179	MOTOR SYSTEM	×	1	EVC-279
P317A	MOTOR SYSTEM	×	1	EVC-279
P317B	MOTOR SYSTEM	×	1	EVC-279
P317D	MOTOR SYSTEM	×	1	EVC-280
P317E	HV BATTERY SYSTEM	—	1	EVC-282
P3180	HV BATTERY SYSTEM	×	1	EVC-282
P3182	HV BATTERY SYSTEM	—	1	EVC-282
P3183	HV BATTERY SYSTEM	×	1	EVC-283
P3187	ELECTRIC SHIFT SYSTEM	×	1	EVC-284
P3188	ELECTRIC SHIFT SYSTEM	×	1	EVC-285
P3189	ELECTRIC SHIFT SYSTEM	—	1	EVC-286
P318A	ELECTRIC SHIFT SYSTEM	×	1	EVC-287
P318B	ELECTRIC SHIFT SYSTEM	×	1	EVC-289
P318C	ELECTRIC SHIFT SYSTEM	×	1	EVC-290
P318D	COMMUNICATION ERROR	×	1	EVC-292
P3191	COMMUNICATION ERROR	× or —	1	EVC-293
P3193	COMMUNICATION ERROR	× or —	1	EVC-295
P3194	COMMUNICATION ERROR	—	1	EVC-297
P3195	COMMUNICATION ERROR	—	1	EVC-299
P3196	COMMUNICATION ERROR	×	1	EVC-301
P3197	COMMUNICATION ERROR	×	1	EVC-303
P319C	COMMUNICATION ERROR	×	1	EVC-293
P319E	COMMUNICATION ERROR	×	1	EVC-295
P319F	COMMUNICATION ERROR	—	1	EVC-297
P31A0	COMMUNICATION ERROR	—	1	EVC-299
P31A1	COMMUNICATION ERROR	×	1	EVC-301
P31A2	COMMUNICATION ERROR	×	1	EVC-303
P31A7	COMMUNICATION ERROR	×	1	EVC-293
P31A9	COMMUNICATION ERROR	×	1	EVC-295
P31AA	COMMUNICATION ERROR	—	1	EVC-297
P31AB	COMMUNICATION ERROR	—	1	EVC-299
P31AD	COMMUNICATION ERROR	×	1	EVC-303
P31AE	COMMUNICATION ERROR	×	1	EVC-301
P31AF	COMMUNICATION ERROR	×	1	EVC-304
P31B0	COMMUNICATION ERROR	—	1	EVC-306
P31B2	COMMUNICATION ERROR	×	1	EVC-308
P31B3	COMMUNICATION ERROR	× or —	1	EVC-304
P31B4	COMMUNICATION ERROR	—	1	EVC-306
P31B5	COMMUNICATION ERROR	—	1	EVC-308
P31B6	COMMUNICATION ERROR	—	1	EVC-310
P31B7	COMMUNICATION ERROR	×	1	EVC-312

DTC	Items (CONSULT screen terms)	EV system warning lamp	Trip	Reference page
P31B8	COMMUNICATION ERROR	—	1	EVC-314
P31BA	COMMUNICATION ERROR	—	1	EVC-316
P31C5	VCM	—	1	EVC-318
P31C6	VCM	—	1	EVC-318
P31C7	VCM	×	1	EVC-320
P31CA	PD MODULE SYSTEM	×	1	EVC-322
P31CB	PD MODULE SYSTEM	×	1	EVC-322
P31D3	M/C RELAY	×	1	EVC-325
P31D4	PRE CHARGE RELAY	×	1	EVC-328
P31D5	PRE CHARGE RELAY	×	1	EVC-330
P31D6	F/S RELAY	×	1	EVC-335
P31D7	F/S RELAY	×	1	EVC-337
P31D8	CHARGING CONNECTOR LOCK RLY	×	1	EVC-340
P31DB	HV BATT MAIN RELAY +	×	1	EVC-343
P31DC	HV BATT MAIN RELAY -	×	1	EVC-344
P31DD	PRE CHARGE RELAY	×	1	EVC-345
P31DE	HV BATT MAIN RELAY	×	1	EVC-346
P31E0	HV SYSTEM INTERLOCK ERROR	×	1	EVC-347
P31E1	HV SYSTEM INTERLOCK ERROR	×	1	EVC-351
P31E5	VCM POWER SUPPLY	—	1	EVC-354
P31E7	RESTART INHIBITION	×	1	EVC-357
P31E8	WATER PUMP 1	×	1	EVC-358
P31E9	WATER PUMP 1	×	1	EVC-361
P31EC	WATER PUMP 1	—	1	EVC-363
P31EE	REFRIGERANT PRESSURE SENSOR	—	1	EVC-365
P31F2	AV SET INFORMATION	—	1	EVC-368

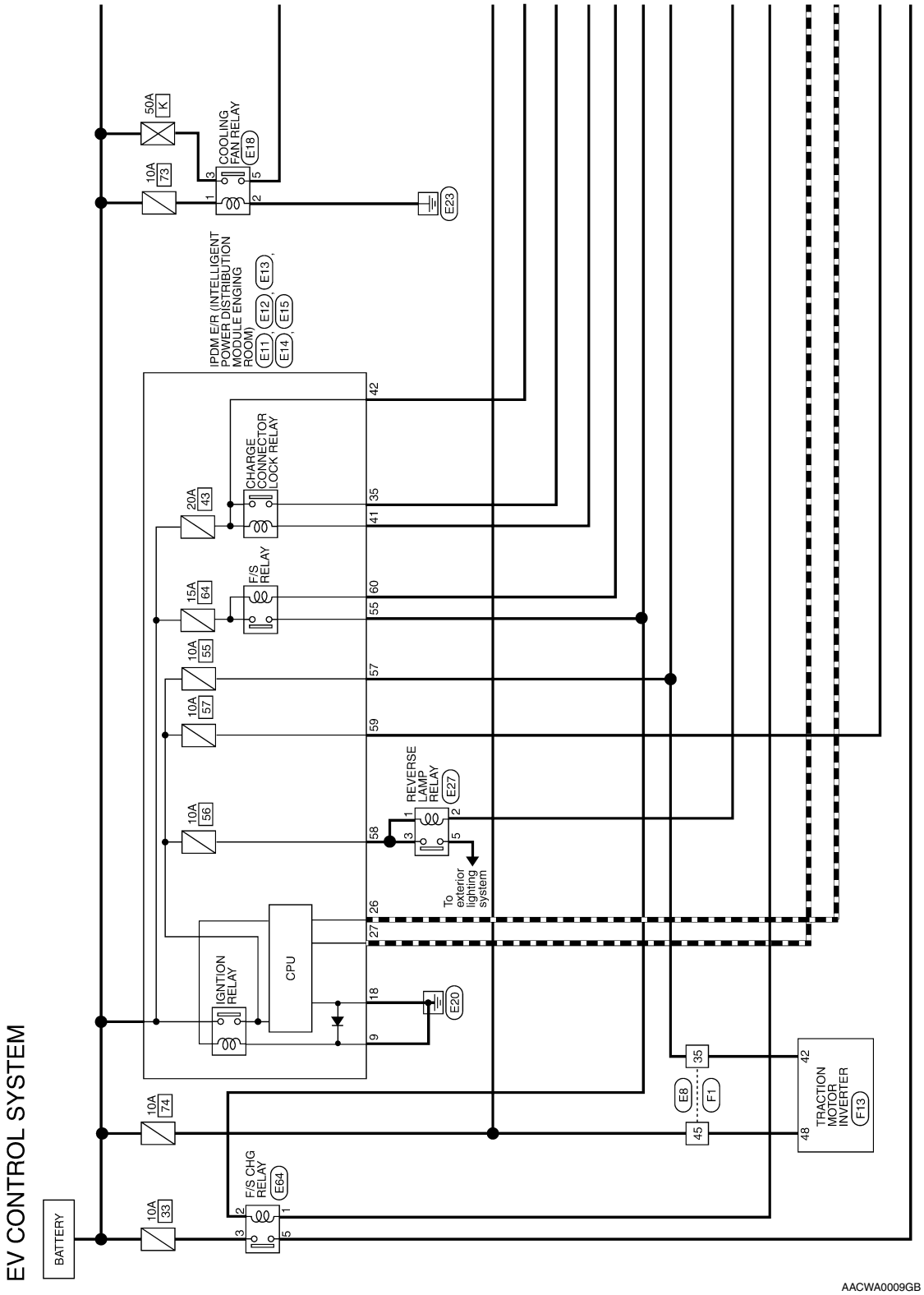
*: To clear DTC P0AA1, perform “SPECIFIC DTC CLEAR” in “WORK SUPPORT” of CONSULT.

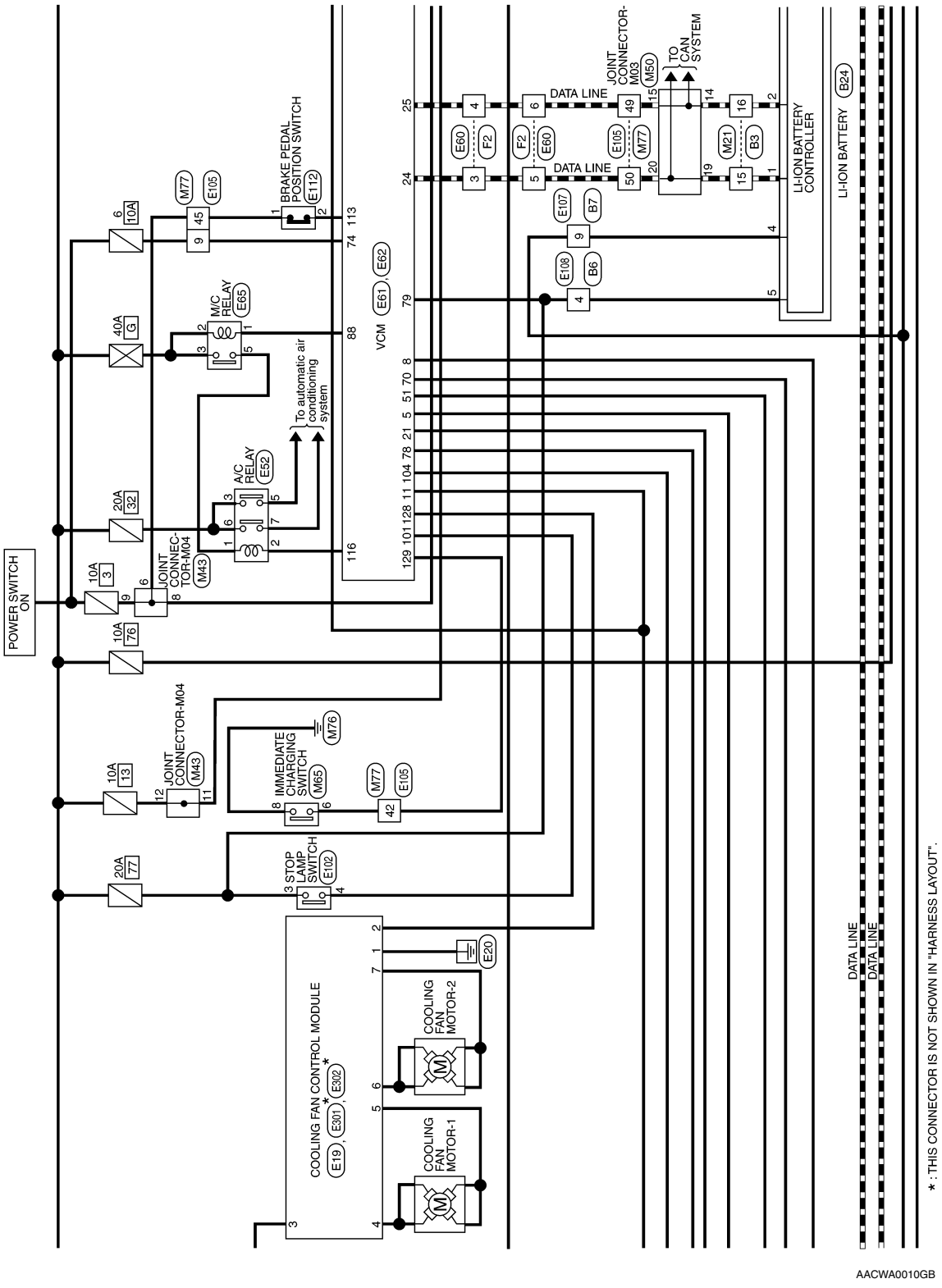
WIRING DIAGRAM

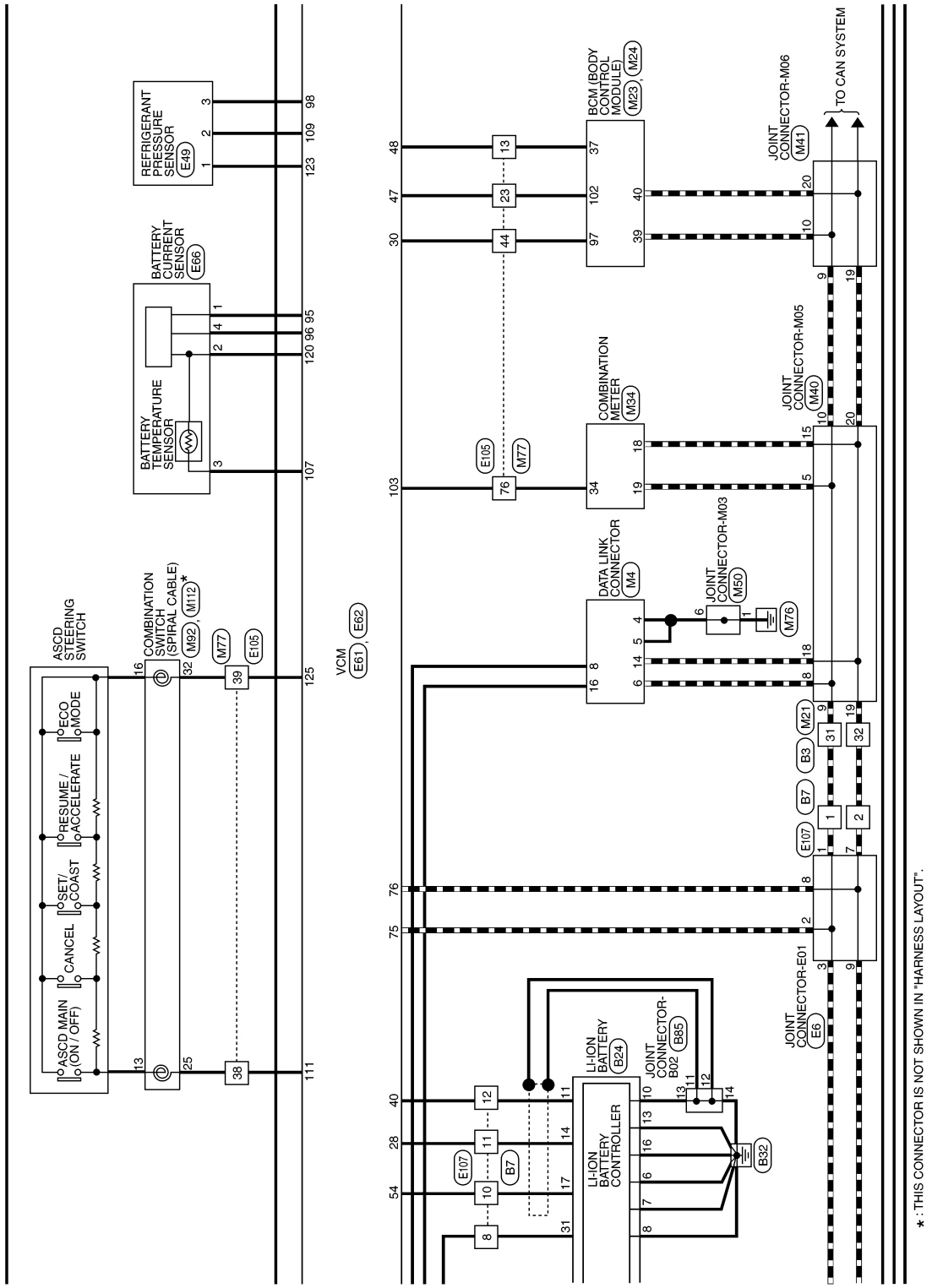
VCM

Wiring Diagram

INFOID:0000000008747004




POWER SWITCH ON
10A 3
10A 76
JOINT CONNEC-TOR-M04 M43
6 10A
40A G
20A 32
20A 77
10A 13
JOINT CONNECTOR-M04
M/C RELAY E65
A/C RELAY E52
To automatic air conditioning system
BRAKE PEDAL POSITION SWITCH E112
M77 E105
IMMEDIATE CHARGING SWITCH M65
M76
STOP LAMP SWITCH E102
VCM E61, E62
COOLING FAN CONTROL MODULE E19, E301*, E802*
COOLING FAN MOTOR-2
COOLING FAN MOTOR-1
E20
DATA LINE
JOINT CONNECTOR-M03 M50
TO CAN SYSTEM
LI-ION BATTERY CONTROLLER B24
LI-ION BATTERY
E60 F2
E105 M77
M21 B3
E107 B7
E108 B6
* : THIS CONNECTOR IS NOT SHOWN IN "HARNESS LAYOUT".
AACWA0010GB



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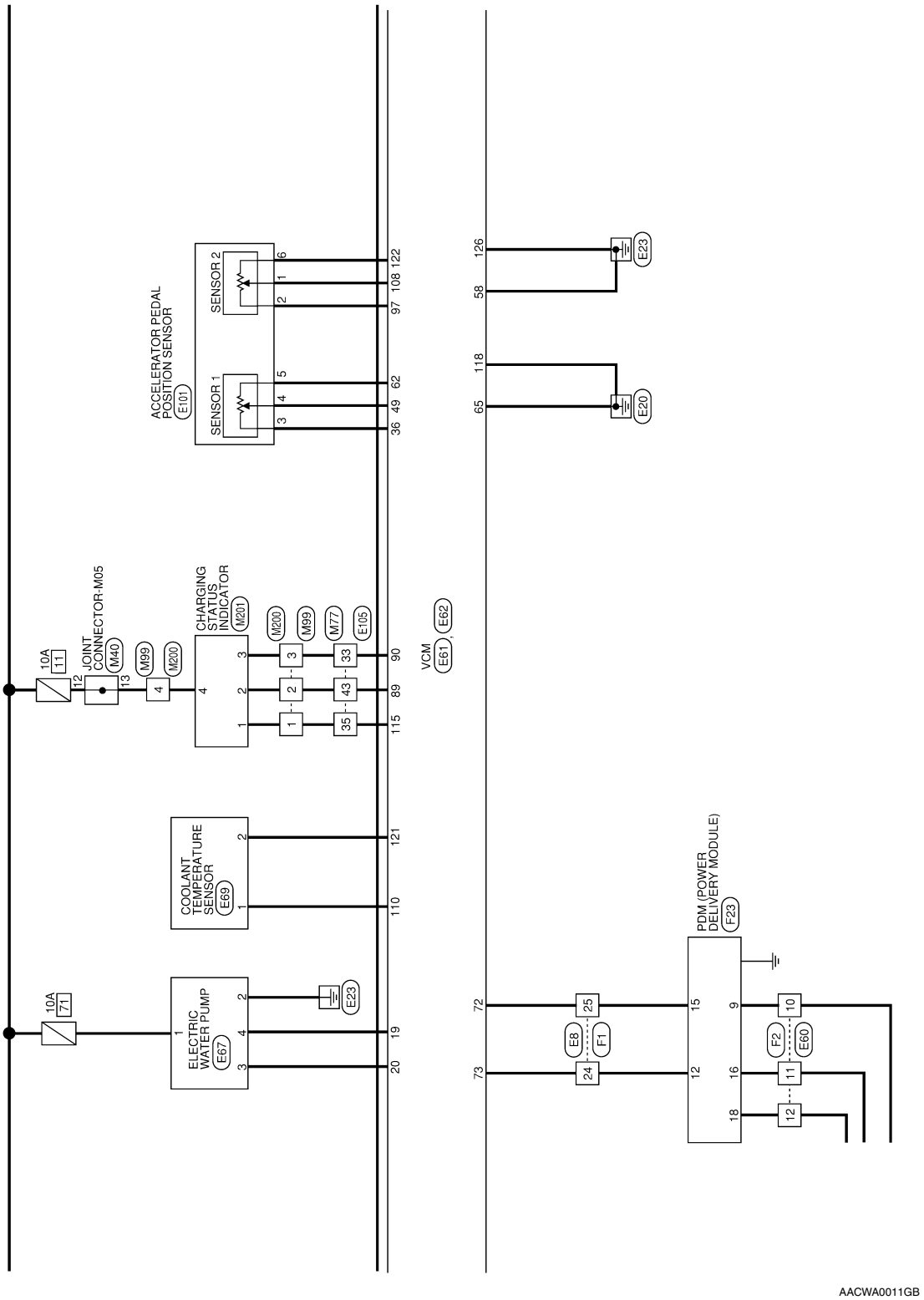
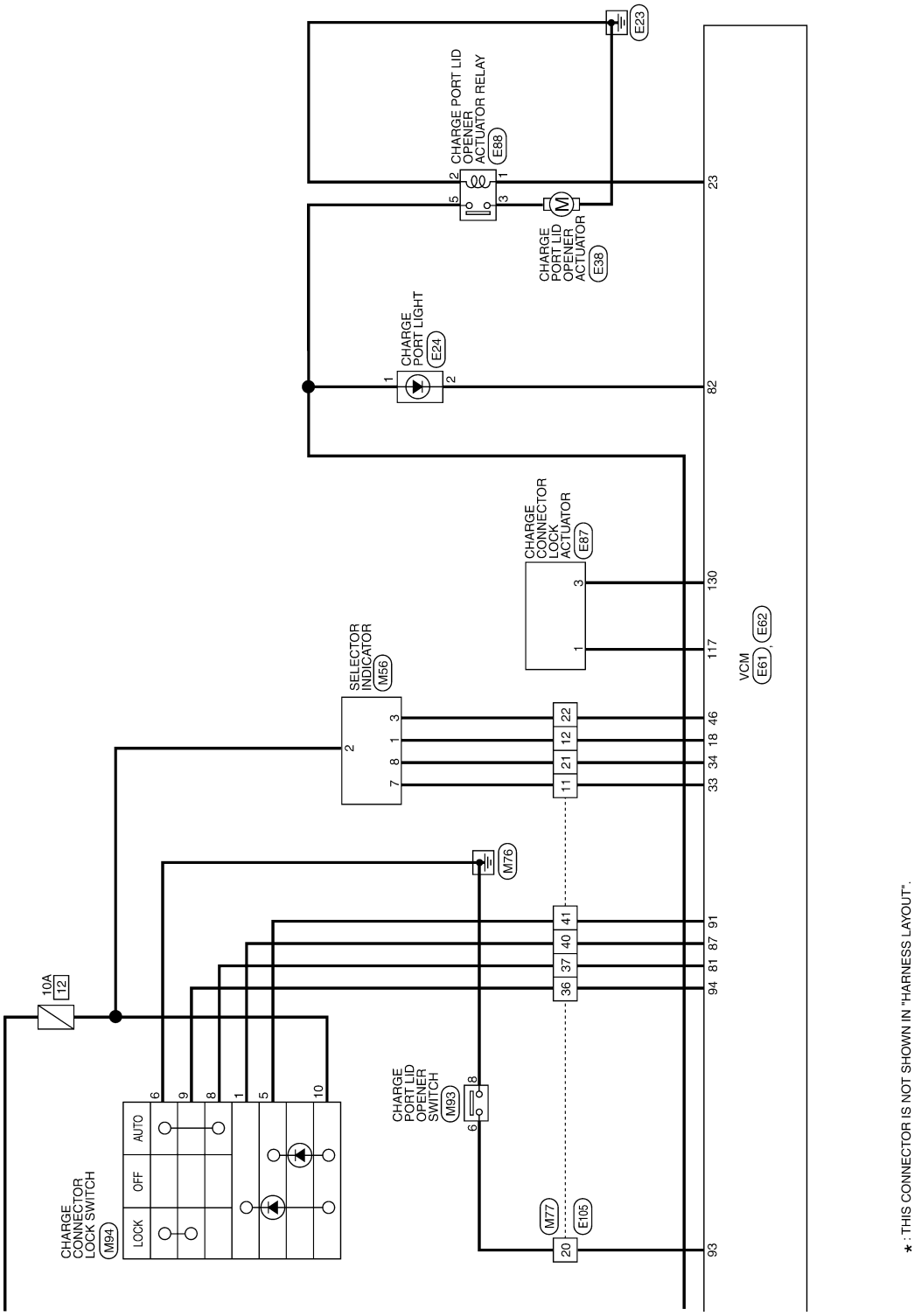

ACCELERATOR PEDAL POSITION SENSOR
E101
SENSOR 1
SENSOR 2
JOINT CONNECTOR-M05
M40
10A
11
71
CHARGING STATUS INDICATOR
M201
COOLANT TEMPERATURE SENSOR
E69
ELECTRIC WATER PUMP
E67
VCM
E61
E62
PDM (POWER DELIVERY MODULE)
F23
E23
E20
E8
F1
F2
E60
M200
M99
M77
E105
AACWA0011GB



AACWA0013GB

EV CONTROL SYSTEM - CONNECTORS

Connector No.	M4
Connector Name	DATA LINK CONNECTOR
Connector Color	WHITE

H.S.

9	10	11	12	13	14	15	16
1	2	3	4	5	6	7	8

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	LG	–
4	B	–
5	B	–
6	L	–
7	GR	–
8	G	–
9	–	–
10	–	–
11	SB	–
12	G	–
13	L	–
14	P	–
15	–	–
16	Y	–

Connector No.	M21
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
32	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	B	–
8	SHIELD	–
9	R	–
10	SB	–
11	P	–
12	V	–
13	GR	–
14	P	–
15	L	–
16	G	–
17	–	–
18	–	–
19	–	–
20	–	–
21	–	–
22	–	–

Terminal No.	Color of Wire	Signal Name
23	–	–
24	W	–
25	B	–
26	W	–
27	Y	–
28	–	–
29	W	–
30	L	–
31	L	–
32	P	–

AACIA0085GB

Connector No.	M23
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	WHITE

H.S.

71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100	101	102	103	104	105	106	107	108	109	110

Terminal No.	Color of Wire	Signal Name
71	–	–
72	–	–
73	V	PUSH SW SIGNAL OUTPUT
74	–	–
75	LG	REQUEST SW (DR)
76	SB	ENGINE START SW
77	–	–
78	P	DOOR ANTENNA (DR) +
79	V	DOOR ANTENNA (DR) –
80	LG	DOOR ANTENNA (AS) +
81	Y	DOOR ANTENNA (AS) –
82	W	BACK DOOR ANTENNA +
83	B	BACK DOOR ANTENNA –
84	BR	ROOM ANTENNA 1 +
85	Y	ROOM ANTENNA 1 –
86	G	ROOM ANTENNA 2 +
87	R	ROOM ANTENNA 2 –
88	G	ROOM ANTENNA 3 +
89	R	ROOM ANTENNA 3 –

Terminal No.	Color of Wire	Signal Name
90	W	HIGHSIDE ENGINE START SW ILLUMINATION LED
91	V	POWER POSITION LED (LOCK POSITION LED)
92	B	LOW SIDE ENGINE START SW ILLUMINATION LED OUTPUT
93	GR	SMART KEYLESS BUZZER OUTPUT
94	–	SMART KEYLESS BUZZER OUTPUT
95	–	–
96	BR	ACC RELAY OUTPUT
97	LG	STARTER RELAY OUTPUT
98	L	IGN RELAY OUTPUT1 (USM)
99	GR	IGN RELAY OUTPUT2 (ELEC)
100	P	REQUEST SW (AS)
101	–	–
102	BG	SHIFT N, P
103	–	–
104	–	–
105	W	BRAKE SW2
106	–	–
107	–	–
108	–	–
109	–	–
110	–	–

AACIA0086GB

Connector No.	M24
Connector Name	BCM (BODY CONTROL MODULE)
Connector Color	BLACK

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40

Terminal No.	Color of Wire	Signal Name
1	–	–
2	L	COMBINATION SW INPUT 5
3	GR	COMBINATION SW INPUT 4
4	BR	COMBINATION SW INPUT 3
5	G	COMBINATION SW INPUT 2
6	V	COMBINATION SW INPUT 1
7	GR	KEY CYLINDER UNLOCK SW
8	R	KEY CYLINDER LOCK SW
9	BR	BRAKE SW1
10	–	–
11	–	–
12	Y	CENTRAL DOOR LOCK SW
13	BR	CENTRAL DOOR UNLOCK SW
14	G	AUTO LIGHT SENSOR INPUT
15	W	REAR DEFOGGER SW
16	R	MR OUTPUT
17	Y	AUTO LIGHT SENSOR POWER SUPPLY OUTPUT
18	L	KEYLESS TUNER, AUTO LIGHT SENSOR GND
19	–	–
20	–	–
21	P	IMMOBILIZER ONE WAY COMMUNICATION (CLOCK)
22	–	–
23	R	SECURITY INDICATOR OUTPUT
24	SB	DONGLE LINK
25	LG	IMMOBILIZER TWO WAY COMMUNICATION
26	–	–
27	–	–
28	–	–
29	G	HAZARD SW
30	V	TRUNK/BACK DOOR OPENER SW
31	W	DOOR LOCK STATUS SW (DR)
32	GR	COMBINATION SW OUTPUT 5
33	Y	COMBINATION SW OUTPUT 4
34	W	COMBINATION SW OUTPUT 3
35	BG	COMBINATION SW OUTPUT 2
36	P	COMBINATION SW OUTPUT 1
37	V	SHIFT P POSITION, PARKING POSITION SW
38	SB	INTELLIGENT TUNER
39	L	CAN–H
40	P	CAN–L

AACIA0087GB

Connector No.	M34
Connector Name	COMBINATION METER
Connector Color	WHITE

H.S.

20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1
40	39	38	37	36	35	34	33	32	31	30	29	28	27	26	25	24	23	22	21

Terminal No.	Color of Wire	Signal Name
1	LG	BAT
2	Y	BAT (FOR UPPER)
3	GR	IGN
4	BG	IGN (FOR UPPER)
5	B	GND1 (ILL)
6	B	GND2 (POWER)
7	–	–
8	Y	WASHER SW
9	BR	CHARGE CONNECT
10	–	–
11	–	–
12	V	SW GND
13	G	MODE B SW
14	Y	MODE A SW
15	BR	TRIP RESET SW
16	P	ILL CONT UP
17	G	UPPER ILL CONT
18	P	CAN–H
19	L	CAN–L
20	LG	AS SEATBELT W/L
21	–	–
22	GR	GND (FOR UPPER)
23	–	–
24	BG	PKB SW
25	SB	BRAKE OIL
26	B	ILL CONT OUT
27	R	A/BAG WARN
28	R	SECURITY
29	–	–
30	GR	8 P/R O/P
31	–	–
32	W	SDA (12C)
33	G	SCL (12C)
34	L	CHARGE LAMP
35	–	–
36	–	–
37	–	–
38	V	LED H LAMP R
39	LG	LED H LAMP L
40	W	BUCKLE SW FR DR

AACIA0088GB

Connector No.	M40
Connector Name	JOINT CONNECTOR-M05
Connector Color	BLUE

Terminal No.	Color of Wire	Signal Name
1	L	–
2	L	–
3	BR	–
4	GR	–
5	L	–
6	L	–
7	L	–
8	L	–
9	L	–
10	L	–
11	LG	–
12	LG	–
13	L	–
14	R	–
15	P	–
16	P	–
17	P	–
18	P	–
19	P	–
20	P	–

Connector No.	M41
Connector Name	JOINT CONNECTOR-M06
Connector Color	BLUE

Terminal No.	Color of Wire	Signal Name
1	SB	–
2	SB	–
3	SB	–
4	SB	–
5	L	–
6	L	–
7	L	–
8	L	–
9	L	–
10	L	–
11	LG	–
12	LG	–
13	LG	–
14	LG	–
15	P	–
16	P	–
17	P	–
18	P	–
19	P	–
20	P	–

Connector No.	M43
Connector Name	JOINT CONNECTOR-M04
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
1	G	–
2	Y	–
3	W	–
4	W	–
5	W	–
6	Y	–
7	Y	–
8	G	–
9	W	–
10	W	–
11	Y	–
12	Y	–
13	–	–
14	–	–
15	–	–
16	–	–
17	–	–
18	B	–
19	B	–
20	B	–

AACIA0089GB

Connector No.	M65
Connector Name	IMMEDIATE CHARGING SWITCH
Connector Color	GRAY

Terminal No.	Color of Wire	Signal Name
1	LG	–
2	–	–
3	–	–
4	B	–
5	–	–
6	SB	–
7	–	–
8	B	–

Connector No.	M56
Connector Name	SELECTOR INDICATOR
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	R	–
3	B	–
4	B	–
5	W	–
6	–	–
7	L	–
8	P	–

Connector No.	M50
Connector Name	JOINT CONNECTOR-CM03
Connector Color	PINK

Terminal No.	Color of Wire	Signal Name
1	B	–
2	B	–
3	B	–
4	B	–
5	B	–
6	B	–
7	B	–
8	B	–
9	B	–
10	B	–
11	G	–
12	G	–
13	G	–
14	G	–
15	G	–
16	L	–
17	L	–
18	L	–
19	L	–
20	L	–

AACIA0090GB

Terminal No.	Color of Wire	Signal Name
60	Y	–
61	GR	–
62	W	–
63	BR	–
64	SHIELD	–
65	W	–
66	LG	–
67	R	–
68	G	–
69	BG	–
70	GR	–
71	R	–
72	R	–
73	B	–
74	W	–
76	L	–
80	W	–
81	LG	–
83	GR	–
84	L	–
85	Y	–
86	SB	–
88	R	–
89	G	–
90	SHIELD	–
91	Y	–
92	BR	–
93	W	–
94	P	–
95	L	–
96	P	–
97	G	–
98	V	–
99	LG	–
100	R	–

Terminal No.	Color of Wire	Signal Name
22	B	–
23	BG	–
24	B	–
26	G	–
27	B	–
28	B	–
25	W	–
29	R	–
31	R	–
32	W	–
33	GR	–
34	BR	–
35	BR	–
36	W	–
37	L	–
38	LG	–
39	SB	–
40	V	–
41	P	–
42	SB	–
43	G	–
44	LG	–
45	Y	–
46	R	–
47	W	–
48	L	–
49	G	–
50	L	–
51	SB	–
52	L	–
54	B	–
55	R	–
56	V	–
57	Y	–
58	L	–

Connector No.	M77
Connector Name	WIRE TO WIRE
Connector Color	WHITE

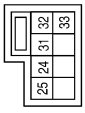
H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–
2	L	–
3	V	–
4	LG	–
6	P	–
7	GR	–
9	G	–
10	L	–
11	L	–
12	Y	–
13	V	–
14	R	–
15	G	–
16	W	–
17	R	–
18	G	–
19	W	–
20	GR	–
21	P	–

AACIA0091GB

Connector No.	M92
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Color	GRAY

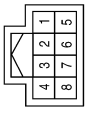
H.S.



Terminal No.	Color of Wire	Signal Name
21	–	–
22	–	–
24	R	–
25	LG	–
27	–	–
31	W	–
32	SB	–
33	B	–

Connector No.	M93
Connector Name	CHARGE PORT LID OPENER SWITCH
Connector Color	GREEN

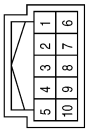
H.S.



Terminal No.	Color of Wire	Signal Name
1	P	–
2	–	–
3	–	–
4	B	–
5	–	–
6	–	–
7	–	–
8	B	–

Connector No.	M94
Connector Name	CHARGE CONNECTOR LOCK SWITCH
Connector Color	GRAY

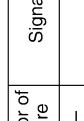
H.S.



Terminal No.	Color of Wire	Signal Name
1	V	–
2	G	–
3	–	–
4	GR	–
5	P	–
6	BR	–
7	–	–
8	L	–
9	W	–
10	Y	–

Connector No.	M99
Connector Name	WIRE TO WIRE
Connector Color	WHITE

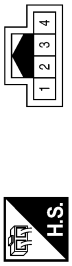
H.S.



Terminal No.	Color of Wire	Signal Name
1	BR	–
2	G	–
3	GR	–
4	LG	–

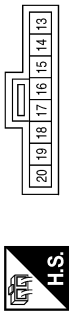
AACIA0092GB

Connector No.	M200
Connector Name	WIRE TO WIRE
Connector Color	WHITE



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

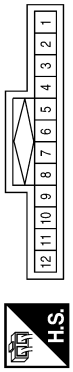
Connector No.	M112
Connector Name	COMBINATION SWITCH (SPIRAL CABLE)
Connector Color	GRAY



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

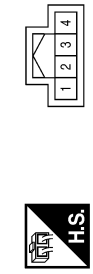
AACIA0093GB

Connector No.	E6
Connector Name	JOINT CONNECTOR-E01
Connector Color	BLUE



Terminal No.	Color of Wire	Signal Name
1	L	–
2	L	–
3	L	–
4	L	–
5	–	–
6	L	–
7	P	–
8	P	–
9	P	–
10	P	–
11	–	–
12	P	–

Connector No.	M201
Connector Name	CHARGING STATUS INDICATOR
Connector Color	WHITE



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

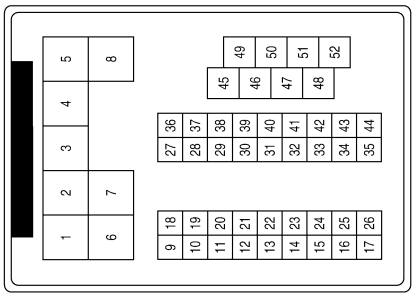
AACIA0094GB

Terminal No.	Color of Wire	Signal Name
49	B/R	–
50	W	–
51	R	–
52	B	–

Terminal No.	Color of Wire	Signal Name
16	W	–
17	L	–
18	–	–
19	LG	–
20	W	–
21		–
22	–	–
23	–	–
24	O	–
25	P	–
26	–	–
27	–	–
28	–	–
29	–	–
30	–	–
31	–	–
32	–	–
33	–	–
34	–	–
35	R	–
36	G	–
37	V	–
38	P	–
39	B	–
40	O	–
41	L	–
42	–	–
43	–	–
44	B/W	–
45	P	–
46	B/R	–
47	G	–
48	SB	–

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	–	–
8	–	–
9	V	–
10	SB	–
11	Y	–
12	G	–
13	BR	–
14	L	–
15	–	–

AACIA0095GB

Connector No.	E11
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BLACK

H.S.

11	10	9
14	13	12

Terminal No.	Color of Wire	Signal Name
9	B	GND (POWER)
10	–	–
11	–	–
12	–	–
13	–	–
14	R	RR DEF

Connector No.	E12
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN

H.S.

17		16	15
22	21	20	19	18

Terminal No.	Color of Wire	Signal Name
15	–	–
16	–	–
17	–	–
18	B/W	GND (SIGNAL)
19	W	FR FOG/L RH

Terminal No.	Color of Wire	Signal Name
20	V	FR FOG/L LH
21	–	–
22	–	–

Connector No.	E13
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

28	27	26	25	24	23
34	33	32	31	30	29

Terminal No.	Color of Wire	Signal Name
23	–	–
24	–	–
25	R	AUTO STOP SW
26	P	CAN-CL
27	L	CAN-CH
28	G	DTRL RLY
29	–	–
30	–	–

Terminal No.	Color of Wire	Signal Name
31	–	–
32	SB	HOOD SW
33	–	–
34	W	HORN RLY CONT

AACIA0096GB

Connector No.	E14
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	BROWN

H.S.

39	38		37	36	35
46	45	44	43	42	41	40

Terminal No.	Color of Wire	Signal Name
35	R	VCM VB
36	–	–
37	–	–
38	LG	TAIL 1 (WITHOUT SOLAR CELL)
38	R	TAIL 1 (WITH SOLAR CELL)
39	L	FR WIPER HI
40	–	–
41	SB	VCM RLY CONT
42	BR	VCM BAT
43	O	CLEARANCE/L LH
44	B	TAIL 2
45	Y	FR WIPER LO
46	–	–

Connector No.	E15
Connector Name	IPDM E/R (INTELLIGENT POWER DISTRIBUTION MODULE ENGINE ROOM)
Connector Color	WHITE

H.S.

53	52	51	50		49	48	47
62	61	60	59	58	57	56	55	54

Terminal No.	Color of Wire	Signal Name
47	–	–
48	–	–
49	Y	H/LAMP HI RH
50	G	H/LAMP HI LH
51	L	H/LAMP LO LH
52	P	H/LAMP LO RH
53	–	–
54	–	–
55	LG	FAST CHARGE
56	–	–
57	R	VCM IGN
58	O	REVERSE LAMP IGN
59	BR	ABS ECU IGN
60	GR	F/S RLY CONT
61	–	–
62	V	E–ACT/HAS IGN

Connector No.	E18
Connector Name	COOLING FAN RELAY
Connector Color	BLACK

H.S.

3		2
1		5

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

AACIA0124GB

Connector No.	E19
Connector Name	COOLING FAN CONTROL MODULE
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	B	GND
2	G	PWM_SIG
3	R	PWM_POWER

Connector No.	E24
Connector Name	CHARGING PORT LID ILLUMINATION
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	GR	–

Connector No.	E27
Connector Name	REVERSE LAMP RELAY
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	O	–
2	SB	–
3	O	–
4	G	–

Connector No.	E38
Connector Name	CHARGE PORT LID OPENER ACTUATOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	B/Y	–
2	–	–
3	P	–
4	–	–

Connector No.	E49
Connector Name	REFRIGERANT PRESSURE SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	B	–
3	SB	–

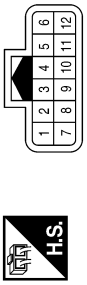
Connector No.	E52
Connector Name	A/C RELAY
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–
2	BR	–
3	R	–
5	W	–
6	R	–
7	O	–

AACIA0125GB

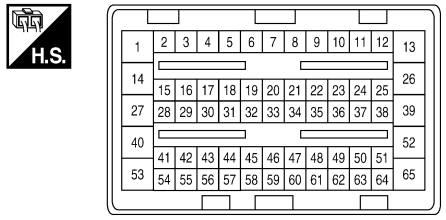
Connector No.	E60
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	L	–
4	G	–
5	L	–
6	G	–
7	–	–
8	–	–
9	–	–
10	GR	–
11	BR	–
12	Y	–

AACIA0126GB

Connector No.	E61
Connector Name	VCM
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	B	MOTOR COIL A U-PHASE
2	–	–
3	W	ELECTRIC SHIFT SENSOR NO.5
4	–	–
5	LG	F/S RELAY POWER SUPPLY
6	–	–
7	O/L	ELECTRIC SHIFT SENSOR POWER SUPPLY 1
8	W	F/S CHG RELAY
9	SB	PARKING ACTUATOR RELAY A
10	–	–
11	BR	12V BATTERY POWER SUPPLY
12	–	–
13	SB	MOTOR COIL A V-PHASE
14	–	–
15	–	–

Terminal No.	Color of Wire	Signal Name
16	R	ELECTRIC SHIFT SENSOR NO.3
17	B	ELECTRIC SHIFT SENSOR NO.1
18	Y	R POSITION OUTPUT (SELECT INDICATOR)
19	W	WATER PUMP SIGNAL
20	G	WATER PUMP SIGNAL
21	GR	F/S RELAY
22	–	–
23	R	CHARGE PORT LID OPENER ACTUATOR RELAY
24	L	EV SYSTEM CAN-H
25	G	EV SYSTEM CAN-L
26	–	–
27	–	–
28	R	SYSTEM MAIN RELAY 2
29	–	–
30	W	READY SIGNAL
31	–	–
32	B	VENC
33	L	N POSITION OUTPUT (SELECT INDICATOR)
34	R	D POSITION OUTPUT (SELECT INDICATOR)
35	–	–
36	W	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 1)
37	–	–
38	–	–
39	R	MOTOR COIL A W-PHASE

Terminal No.	Color of Wire	Signal Name
40	B	PRE-CHARGE RELAY
41	–	–
42	–	–
43	–	–
44	P	ENCODER SIGNAL B
45	V	ENCODER SIGNAL A
46	B	P POSITION OUTPUT (SELECT INDICATOR)
47	LG	P/N POSITION SIGNAL
48	W	P POSITION SIGNAL
49	R	ACCELERATOR PEDAL POSITION SENSOR 1
50	–	–
51	R	POWER ON POWER SUPPLY
52	–	–
53	–	–
54	W	SYSTEM MAIN RELAY 1
55	–	–
56	G	ENCODER GROUND
57	O	ELECTRIC SHIFT SENSOR GND 1
58	B/R	VCM GROUND
59	–	–
60	–	–
61	–	–
62	B	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 1)
63	–	–
64	–	–
65	B	VCM GROUND

AACIA0127GB

Connector No.	E62
Connector Name	VCM
Connector Color	BROWN

H.S.

Terminal No.	Color of Wire	Signal Name
70	SB	REVERSE LAMP RELAY
71	–	–
72	P	CONNECTION DETECTING CIRCUIT SIGNAL
73	O	CONNECTION DETECTING CIRCUIT POWER SUPPLY
74	G	POWER ON POWER SUPPLY
75	L	CAN-H
76	P	CAN-L
78	SB	CHARGE CONNECTOR LOCK RELAY
79	R	12V BATTERY POWER SUPPLY
81	L	CHARGE CONNECTOR LOCK SWITCH (AUTO)
82	GR	CHARGE PORT LIGHT
83	W	ELECTRIC SHIFT SENSOR POWER SUPPLY 2
84	W	ELECTRIC SHIFT SENSOR NO.2
85	G	ELECTRIC SHIFT SENSOR NO.4
86	G	ELECTRIC SHIFT SENSOR NO.6
87	V	CHARGE CONNECTOR LOCK SWITCH INDICATOR (LOCK)
88	SB	M/C RELAY
89	BR	CHARGING STATUS INDICATOR 2
90	G	CHARGING STATUS INDICATOR 3
91	O	CHARGE CONNECTOR LOCK SWITCH INDICATOR (AUTO)
92	–	–
93	BR	CHARGE PORT LID OPENER SWITCH
94	O	CHARGE CONNECTOR LOCK SWITCH (LOCK)
95	Y	BATTERY CURRENT SENSOR
96	R	SENSOR POWER SUPPLY (BATTERY CURRENT SENSOR)
97	W	SENSOR POWER SUPPLY (ACCELERATOR PEDAL POSITION SENSOR 2)
98	L	SENSOR POWER SUPPLY (REFRIGERANT PRESSURE SENSOR)
99	R	P POSITION SW NO.1
101	P	STOP LAMP SWITCH
103	L	PLUG IN INDICATOR LAMP
104	R	CHARGE CONNECTOR LOCK RELAY POWER SUPPLY
107	L	BATTERY TEMPERATURE SENSOR
108	R	ACCELERATOR PEDAL POSITION SENSOR 2
109	B	REFRIGERANT PRESSURE SENSOR
110	Y	COOLANT TEMPERATURE SENSOR
111	SB	ASCD STEERING SWITCH
112	B	P POSITION SW NO.2
113	O	BRAKE PEDAL POSITION SWITCH
115	V	CHARGING STATUS INDICATOR 1
116	SB	A/C RELAY
117	LG	CHARGE CONNECTOR LOCK ACTUATOR (+)
118	B	VCM GROUND
120	L	SENSOR GROUND (BATTERY CURRENT SENSOR)
121	W	SENSOR GROUND (COOLANT TEMPERATURE SENSOR)
122	B	SENSOR GROUND (ACCELERATOR PEDAL POSITION SENSOR 2)
123	BR	SENSOR GROUND (REFRIGERANT PRESSURE SENSOR)
124	W/L	ELECTRIC SHIFT SENSOR GND 2
125	BR	ASCD STEERING SWITCH GROUND
126	B/R	VCM GROUND
128	V	COOLING FAN CONTROL SIGNAL
129	Y	IMMEDIATE CHARGING SWITCH
130	W	CHARGE CONNECTOR LOCK ACTUATOR (-)

AACIA0128GB

Connector No.	E64
Connector Name	F/S CHG RELAY
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	LG	–
3	W	–
5	GR	–

Connector No.	E65
Connector Name	M/C RELAY
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	SB	–
2	R	–
3	R	–
5	W	–

Connector No.	E66
Connector Name	BATTERY CURRENT SENSOR
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	L	–
3	L	–
4	R	–

Connector No.	E67
Connector Name	ELECTRIC WATER PUMP
Connector Color	GREEN

H.S.

Terminal No.	Color of Wire	Signal Name
1	BR	–
2	W	–
3	B/Y	–
4	G	–

Connector No.	E69
Connector Name	COOLANT TEMPERATURE SENSOR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	Y	–
2	W	–

Connector No.	E87
Connector Name	CHARGE PORT LOCK ACTUATOR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	W	–
2	–	–
3	LG	–
4	–	–

AACIA0129GB

Connector No.	E102
Connector Name	STOP LAMP SWITCH
Connector Color	WHITE

Terminal No.	Color of Wire	Signal Name
1	W	–
2	SB	–
3	R	–
5	P	–

Connector No.	E101
Connector Name	ACCELERATOR PEDAL POSITION SENSOR
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
1	R	–
2	W	–
3	W	–
4	R	–
5	B	–
6	B	–

Connector No.	E88
Connector Name	CHARGE PORT LID OPENER ACTUATOR RELAY
Connector Color	BLUE

Terminal No.	Color of Wire	Signal Name
1	R	–
2	B/Y	–
3	P	–
5	BR	–

AACIA0130GB

Connector No.	E105
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1	R	–
2	L	–
3	BW	– (WITHOUT FRONT FOG LAMPS)
3	R	– (WITH LED HEADLAMPS)
4	LG	– (WITH LED HEADLAMPS)
4	B/W	– (WITHOUT FRONT FOG LAMPS)
6	B/R	–
7	W	–
9	G	–
10	R	–
11	L	–
12	Y	–
13	W	–
14	R	–
15	G	–
16	G	–
17	R	–
18	O	–
19	W/L	–
20	BR	–
21	R	–
22	B	–
23	LG	–
24	B	–
25	W	–
26	W	–
27	B	–
28	O/L	–
29	W	–
31	R	–
32	W	–
33	G	–
34	BR	–
35	V	–
36	O	–
37	L	–
38	SB	–
39	P	–
40	V	–
41	O	–
42	Y	–
43	BR	–
44	W	–
45	G	–
46	P	–
47	LG	–
47	R	–
48	B	–
49	L	–
50	G	–
51	W	–
52	O	–
54	B	–
55	R	–
56	Y	–
57	Y	–
58	L	–
60	LG	–
61	GR	–
62	W	–
63	SB	–
64	SHIELD	–
65	W	–
66	G	–
67	V	–
68	R	–
69	B	–
70	BR	–
71	LG	–
72	R	–
73	B	–
74	O	–
76	L	–
77	Y	–
80	P	–
81	SB	–
83	GR	–
84	L	–
85	O	–
86	BR	–
88	B	–
89	W	–
90	SHIELD	–
91	Y	–
92	BR	–
93	O	–
94	R	–
95	V	–
96	P	–
97	G	–
98	W	–
99	O	–
100	SB	–

AACIA0131GB

Connector No.	E107
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12
13	14	15	16	17	18	19	20	21	22	23	24

Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–
3	SB	–
4	–	–
5	–	–
6	GR	–
7	–	–
8	P	–

Terminal No.	Color of Wire	Signal Name
9	BR	–
10	W	–
11	R	–
12	B	–
13	G	–
14	B	–
15	LG	–
16	BR	–
17	G	–
18	B	–
19	Y	–
20	R	–
21	O	–
22	W	–
23	SHIELD	–
24	–	–

Connector No.	E108
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name
1	W	–
2	Y	–
3	SB	–
4	R	–

Connector No.	E301
Connector Name	COOLING FAN CONTROL MODULE (COOLING FAN-1)
Connector Color	BLACK

H.S.

4	5

Terminal No.	Color of Wire	Signal Name
4	L	–
5	B	–

Connector No.	E302
Connector Name	COOLING FAN CONTROL MODULE (COOLING FAN-2)
Connector Color	BLACK

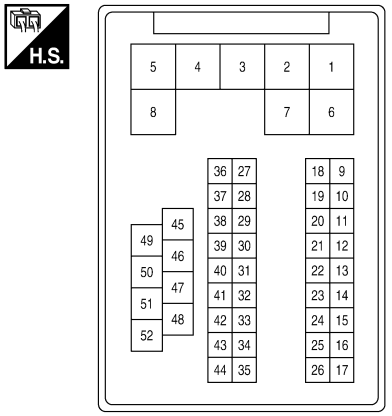
H.S.

6	7

Terminal No.	Color of Wire	Signal Name
6	B	–
7	L	–

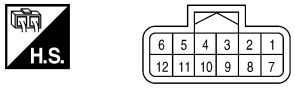
AACIA0132GB

Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Color	BLACK



Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	–	–
8	–	–
9	V	–
10	SB	–
11	Y	–
12	G	–
13	BR	–
14	R	–
15	–	–
16	W	–
17	L	–
18	–	–
19	BR	–
20	W	–
21	LG	–
22	–	–
23	–	–
24	O	–
25	P	–
26	–	–
27	–	–
28	–	–
29	–	–
30	–	–
31	–	–
32	–	–
33	–	–
34	–	–
35	LG	–
36	G	–
37	O	–
38	W	–
39	R	–
40	Y	–
41	L	–
42	–	–
43	–	–
44	SHIELD	–
45	G	–
46	B	–
47	G	–
48	SB	–
49	P	–
49	B	–
50	W	–
51	LG	–
52	B	–

Connector No.	F2
Connector Name	WIRE TO WIRE
Connector Color	BLACK

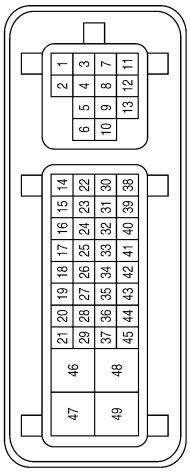


Terminal No.	Color of Wire	Signal Name
1	-	–
2	-	–
3	L	–
4	G	–
5	L	–
6	G	–
7	-	–
8	-	–
9	-	–
10	GR	–
11	V	–
12	R	–

AACIA0133GB

Connector No.	F13
Connector Name	TRACTION MOTOR INVERTER
Connector Color	BLACK

H.S.



Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	–	–
8	–	–
9	–	–
10	–	–
11	–	–
12	–	–
13	–	–
14	L	EV SYSTEM CAN- H
15	G	EV SYSTEM CAN-L
16	–	–
17	P	REZ_S2
18	L	REZ_S4
19	R	REZ_R1
20	B	REZ_S1

Terminal No.	Color of Wire	Signal Name
21	W	REZ_S3
22	–	–
23	–	–
24	–	–
25	–	–
26	–	–
27	G	REZ_R2
28	–	–
29	–	–
30	–	–
31	–	–
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–
37	–	–
38	–	–
39	–	–
40	–	–
41	–	–
42	LG	IGN_SW
43	–	–
44	O	TMGND
45	Y	TM
46	G	VB1
47	B	VBGND1
48	G	VB2
49	B	VBGND2

AACIA0134GB

Terminal No.	Color of Wire	Signal Name
21	G	CHSSI2
22	Y	CHSSI1
23	–	–
24	–	–
25	SB	QCPTMP2
26	V	QCPTMP1
27	L	EV CAN-H
28	–	–
29	W	CONDETI
30	BR	CNTRL
31	–	–
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–

Connector No.	F23
Connector Name	PDM (POWER DELIVERY MODULE)
Connector Color	GREEN

H.S.

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	L	Q-CAN-L
7	W	Q-CAN-H
8	–	–
9	GR	QCRLY
10	LG	CSTATE
11	G	EV CAN-L
12	O	INTERLOCK_IN
13	–	–
14	–	–
15	P	INTERLOCK OUT
16	V	IGN
17	–	–
18	R	BAT
19	R	CHOKO
20	BR	CHILI

AACIA0135GB

Connector No.	B3
Connector Name	WIRE TO WIRE
Connector Color	WHITE

H.S.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	–	–
4	–	–
5	–	–
6	–	–
7	B	–
8	SHIELD	–
9	B	–
10	SB	–
11	P	–
12	BR	–
13	GR	–
14	P	–
15	L	–
16	G	–
17	–	–
18	–	–
19	–	–
20	–	–
21	–	–
22	–	–
23	–	–

Terminal No.	Color of Wire	Signal Name
24	R	–
25	W	–
26	LG	–
27	Y	–
28	–	–
29	R	–
30	GR	–
31	L	–
32	P	–

Connector No.	B6
Connector Name	WIRE TO WIRE
Connector Color	WHITE

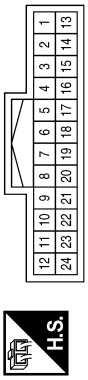
H.S.

1
2

Terminal No.	Color of Wire	Signal Name
1	R	–
2	–	–

AACIA0136GB

Connector No.	B7
Connector Name	WIRE TO WIRE
Connector Color	WHITE



Terminal No.	Color of Wire	Signal Name
1	L	–
2	P	–
3	Y	–
4	-	–
5	-	–
6	SB	–
7	-	–
8	P	–
9	V	–
10	Y	–
11	L	–
12	G	–
13	G	–
14	B	–
15	LG	–
16	BR	–
17	G	–
18	B	–
19	Y	–
20	R	–
21	Y	–
22	W	–
23	SHIELD	–
24	-	–

AACIA0137GB

Connector No.	B85
Connector Name	JOINT CONNECTOR-B02
Connector Color	BLACK

Terminal No.	Color of Wire	Signal Name
1	B	–
2	–	–
3	B	–
4	B	–
5	–	–
6	–	–
7	L	–
8	W	–
9	V	–
10	V	–
11	SHIELD	–
12	SHIELD	–
13	B	–
14	B	–
15	G	–
16	G	–
17	G	–
18	LG	–
19	R	–
20	R	–

Terminal No.	Color of Wire	Signal Name
21	–	–
22	–	–
23	–	–
24	–	–
25	–	–
26	–	–
27	–	–
28	–	–
29	–	–
30	–	–
31	P	CHG IGN
32	–	–
33	–	–
34	–	–
35	–	–
36	–	–

Connector No.	B24
Connector Name	LI-ION BATTERY
Connector Color	GREEN

Terminal No.	Color of Wire	Signal Name
1	L	EV CAN-H
2	G	EV CAN-L
3	–	–
4	V	IGN
5	R	BAT
6	B	GND3
7	B	GND2
8	B	GND1
9	–	–
10	B	PRE CHG GND
11	G	PRE CHG V
12	–	–
13	B	RLY N GND
14	L	RLY N V
15	–	–
16	B	RLY P GND
17	Y	RLY P V
18	–	–
19	–	–
20	–	–

AACIA0147GB

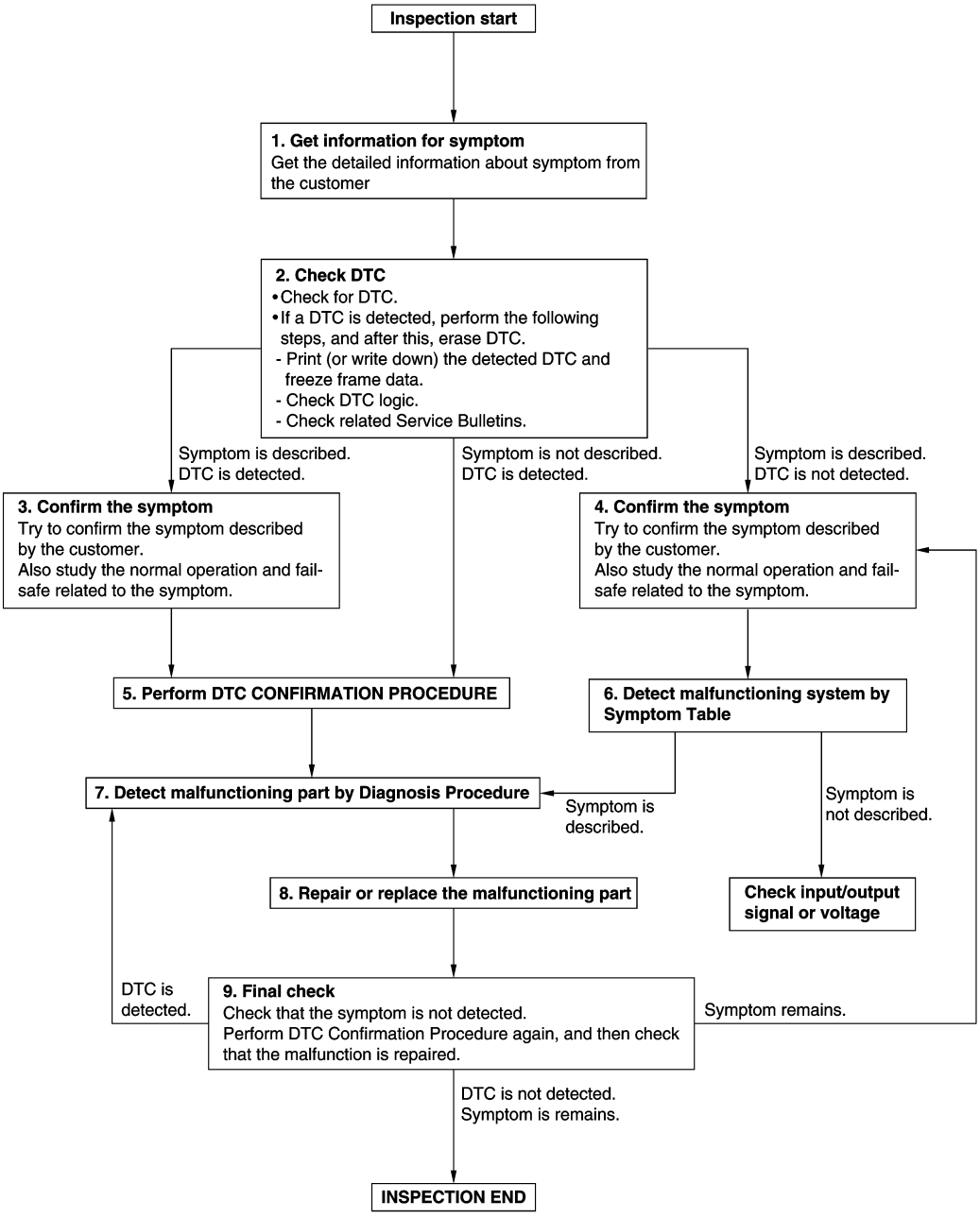
BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000008747005

OVERALL SEQUENCE



JSCIA0443GB

DETAILED FLOW

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-141, "Diagnostic Work Sheet".)

>> GO TO 2.

2.CHECK DTC

1. Check DTC.
2. If a DTC is detected, perform the following steps, and after this, erase DTC.

- Print (or write down) the detected DTC and freeze frame data.
- Check DTC logic. Refer to EVC-102, "DTC Index".
- Check related Service Bulletins.
- Study the relationship between the cause detected by DTC and the symptom described by the customer. (Symptom Diagnosis is useful. Refer to EVC-412, "Symptom Index".)

Are any symptoms described and any DTCs detected?

Symptom is described, DTC is detected>>GO TO 3.
Symptom is described, DTC is not detected>>GO TO 4.
Symptom is not described, DTC is detected>>GO TO 5.

3.CONFIRM THE SYMPTOM

Try to confirm the symptom described by the customer.
Also study the normal operation and fail-safe related to the symptom. Refer to EVC-412, "Symptom Index" and EVC-97, "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-412, "Symptom Index" and EVC-97, "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-100, "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-53, "Intermittent Incident".

6.DETECT MALFUNCTIONING SYSTEM BY SYMPTOM TABLE

Detect malfunctioning system according to EVC-412, "Symptom Index" based on the confirmed symptom in step 4, and determine the trouble diagnosis order based on possible causes and symptoms.

Is the symptom described?

YES >> GO TO 7.
NO >> Monitor input data from related sensors or check voltage of related VCM terminals using CONSULT. Refer to EVC-84, "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 >> Check according to GI-53, "Intermittent Incident".

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. Refer to EVC-73, "CONSULT Function".

>> 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:0000000008747006

DIAGNOSTIC WORKSHEET

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

Question	Group	Information from the customer	
Vehicle condition at malfunction occurrence	R/Q/N/O	☐ READY (R) ☐ Quick charge (Q) ☐ Normal charge (N) ☐ Others (O)	
Symptom	R	☐ “READY” not enabled ☐ Poor drivability ☐ Shock ☐ Vibration ☐ Driving impossible ☐ Noise ☐ Poor shifting ☐ Poor braking ☐ Poor acceleration ☐ Low electricity consumption ☐ Switch malfunction ☐ Warning lamp ON ☐ Others ( )	
		Details of symptom	
		Information display indication	
		Electricity consumption	km (mile)/kW
		Li-ion battery remaining energy	/
	Q, N	☐ Charging unable ☐ Charging discontinued ☐ Slow charging ☐ Poor timer charging ☐ Poor remote charging ☐ Immediate charging unable ☐ Others ( )	
		Details of symptom	
		Quick charger monitor indication	
	O	☐ A/C inoperative ☐ Poor A/C ☐ Dead 12V battery ☐ Others ( )	
		Details of symptom	
Location/status of occurrence	R/O	☐ Not applicable ☐ Ordinary road ☐ Highway ☐ Mountain pass ☐ Rough road ☐ Level road ☐ Uphill ☐ Downhill ☐ Left/right turn ☐ Others ( )	
	Q/N/O	☐ Start of charge ☐ During charging ☐ After the end of charging ☐ During standby of timer charging ☐ During timer charging ☐ At the end of timer charging ☐ During remote charging ☐ Others ( )	

JSCIA0784GB

Question	Group	Information from the customer	
Driving condition	R	☐ At the system startup ☐ During READY (Vehicle stopped) ☐ At start ☐ During acceleration ☐ During driving with a constant speed ☐ During coasting ☐ During braking ☐ Right before stopping ☐ Right after stopping ☐ During POWER OFF operation ☐ A/C ON ☐ During shift change ☐ Others ( )	
		Vehicle speed	km (MPH)
		Accelerator pedal opening angle	/8
Quick charger	Q	Quick charger maker	☐ Not applicable ☐ Applicable ( )
		Location	
		Model number	
		Serial number	
		Setting	
		Others	
Wall outlet	N	☐ Not applicable ☐ Applicable	
		Location	
		Voltage	V
		Breaker	A
		Other information	
Li-ion battery remaining energy	Q/N/O	☐ Not applicable ☐ Applicable ( )	
Shift position/operation	R	☐ P ☐ R ☐ N ☐ D ☐ ECO ☐ When operating (⇒)	
Weather condition	R/Q/N/O	☐ Not applicable ☐ Applicable	
		Weather	
		Temperature	˚C (or ˚F)
Occurrence frequency		☐ All the time ☐ Once ☐ Sometimes (times in the past) ☐ Others ( )	
Timing of recovery from malfunction		☐ POWER OFF ☐ Removal of 12V battery terminal ☐ Shift lever operation ☐ During driving ☐ READY ☐ Others ( )	

[Memo]

JSCIA0785GB

ADDITIONAL SERVICE WHEN REMOVING 12V BATTERY NEGATIVE TERMINAL

Description

INFOID:0000000008747007

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:0000000008747008

1.CHECK VEHICLE SPECIFICATIONS

Check vehicle specifications.

Models with NISSAN genuine navigation system>>GO TO 2.
Except above>>GO TO 3.

2.PERFORM VCM TIMER ADJUSTMENT

Perform VCM timer adjustment. Refer to AV-166, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure" (Navigation without BOSE) or AV-312, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure" (Navigation with BOSE).

>> END

3.SET COMBINATION METER TIME

Set the combination meter clock right.

>> END

ADDITIONAL SERVICE WHEN REPLACING VCM

Description

INFOID:0000000008747009

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-144, "Work Procedure".

Work Procedure

INFOID:0000000008747010

1.SAVE VCM DATA

1. Turn off the power and wait at least 20 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 5.

2.REPLACE VCM

1. Turn off the power and wait at least 20 seconds.
2. Replace VCM. Refer to EVC-426, "Removal and Installation".

>> GO TO 3.

3.PERFORM VCM KEY ID REGISTRATION

Refer to SEC-70, "VCM : Work Procedure".

>> GO TO 4.

4.WRITE VCM DATA

1. Select “WRITE DATA AFTER REPLACE CPU” in “WORK SUPPORT” mode using CONSULT.
2. Follow the instruction of CONSULT display.
   NOTE:
   The data saved by “SAVE DATA FOR CPU REPLACE” is written to VCM.

Is operation completed successfully?

YES >> GO TO 9.
NO >> GO TO 7.

5.REPLACE VCM

1. Turn off the power and wait at least 20 seconds.
2. Replace VCM. Refer to EVC-426, "Removal and Installation".

>> GO TO 6.

6.PERFORM VCM KEY ID REGISTRATION

Refer to SEC-70, "VCM : Work Procedure".

>> GO TO 7.

7.WRITE VIN DATA

Perform EVC-149, "Work Procedure".

>> GO TO 8.

8. LI-ION BATTERY ID REGISTRATION

Refer to “Li-ion Battery Registration Operation Manual”.

>> GO TO 9.

9. PERFORM ACCELERATE PEDAL CLOSED POSITION LEARNING

Perform EVC-146, "Work Procedure".

>> GO TO 10.

10. SET VCM TIMER

Models with navigation system: Perform AV-166, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure" (Navigation without BOSE) or AV-312, "ADDITIONAL SERVICE WHEN REMOVING BATTERY NEGATIVE TERMINAL : Work Procedure" (Navigation with BOSE).
Models without navigation system: Set the combination meter clock right. Refer to MWI-35, "INFORMATION DISPLAY : System Description".

>> GO TO 11.

11. 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

ACCELERATOR PEDAL RELEASED POSITION LEARNING

Description

INFOID:0000000008747011

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:0000000008747012

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

Description

INFOID:0000000008747013

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

CAUTION:

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

Work Procedure

INFOID:0000000008747014

1. LI-ION BATTERY GRADUAL CAPACITY LOSS DATA CLEAR

With CONSULT

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

>> END

LI-ION BATTERY JUNCTION BOX DATA CLEAR

Description

INFOID:0000000008747015

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:0000000008747016

1.LI-ION BATTERY JUNCTION BOX DATA CLEAR

With CONSULT

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

>> END

WRITE VEHICLE IDENTIFICATION NUMBER DATA

Description

INFOID:0000000008747017

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:0000000008747018

1.CHECK VIN

Check the VIN of the vehicle and note it. Refer to GI-23, "Information About Identification or Model Code".

>> GO TO 2.

2.PERFORM VIN REGISTRATION

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

>> END

LOAD BATTERY IDENTIFICATION DATA

Description

INFOID:0000000008747019

Load Battery Identification Data must be performed after the following operation.
- Li-ion battery is replaced.
- Li-ion battery controller is replaced.
- VCM is replaced.

NOTE:
If Load Battery Identification Data is not performed, VCM detects the DTC “P3102”.

Work Procedure

INFOID:0000000008747020

Refer to “Li-ion Battery Registration Operation Manual”.

DTC/CIRCUIT DIAGNOSIS

POWER SUPPLY AND GROUND CIRCUIT

VCM

VCM : Diagnosis Procedure

INFOID:0000000008747021

1.CHECK FUSE

Check that the following fuse is not fusing.

Power supply	Fuse No.
12V Battery	43
	77
Power switch ON	6
	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	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

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

3.CHECK 12V BATTERY POWER SUPPLY-1

1. Insert the fuse which pulled out.
2. Check the voltage between VCM harness connector and ground.

+		−	Voltage
VCM			
Connector	Terminal		
E61	11	Ground	12V battery power supply

Is the inspection result normal?

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

4.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
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	
E14	42	E61	11	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check power supply circuit for 12V battery power supply.
NO >> Repair or replace error-detected parts.

5.CHECK POWER ON POWER SUPPLY-2

Check the voltage between VCM harness connector and ground.

+		–	Voltage (Approx.)
VCM			
Connector	Terminal		
E62	79	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Pull out #77 fuse.
2. Check the continuity between #77 fuse terminal and VCM harness connector.

+	–		Continuity
	VCM		
	Connector	Terminal	
#77 fuse terminal	E62	79	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check power supply circuit for 12V battery power supply.
NO >> Repair or replace error-detected parts.

7.CHECK POWER ON POWER SUPPLY-1

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

+		–	Voltage (Approx.)
VCM			
Connector	Terminal		
E61	51	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 8.

8.CHECK POWER ON POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect IPDM E/R 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	
E15	57	E61	51	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

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

9.CHECK POWER ON POWER SUPPLY-2

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

+		–	Voltage (Approx.)
VCM			
Connector	Terminal		
E62	74	Ground	12V battery voltage

Is the inspection result normal?

YES >> INSPECTION END
NO >> GO TO 10.

10.CHECK POWER ON POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect ignition relay-2 (fuse block).
3. Check the continuity between ignition relay-2 (fuse block) terminal and VCM harness connector.

+	–		Continuity
Ignition relay-2 (fuse block)	VCM		
Terminal	Connector	Terminal	
5	E62	74	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check ignition relay-2, and check power supply circuit for power ON power supply.
NO >> Repair or replace error-detected parts.

U1000 CAN COMM CIRCUIT

Description

INFOID:0000000008747022

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:0000000008747023

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U1000	CAN COMM CIRCUIT (CAN communication circuit)	When VCM is not transmitting or receiving CAN communication signal or EV system CAN communication for 2 seconds or more.	• CAN communication system • EV system CAN communication system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-154, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747024

Perform the trouble diagnosis for CAN communication system. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

U1010 CONTROL MODULE (CAN)

DTC Logic

INFOID:0000000008747025

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
U1010	CONTROL UNIT (CAN) [Control unit (CAN)]	Detecting error during the initial diagnosis of CAN controller of VCM.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.DTC REPRODUCTION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-155, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747026

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn power switch ON.
2. Erase self-diagnostic result.
3. Perform DTC confirmation procedure again. Refer to EVC-155, "DTC Logic".
4. Check self-diagnostic result.

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P0A00 COOLANT TEMPERATURE SENSOR

DTC Logic

INFOID:0000000008747033

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A00	COOLANT TEMPERATURE SENSOR (Motor electronics coolant temperature sensor circuit)	• VCM detects that coolant temperature sensor voltage remains less than 0.1 V for 2.5 seconds. • VCM detects coolant temperature sensor voltage remains more than 4.9 V for 2.5 seconds.	• Harness or connectors (The sensor circuit is open or shorted.) • Coolant temperature sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-156, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747034

1.CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-1

1. Turn power switch OFF.
2. Disconnect coolant temperature sensor harness connector.
3. Turn power switch ON.
4. 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 7.
NO >> GO TO 2.

2.CHECK COOLANT TEMPERATURE SENSOR POWER SUPPLY-2

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

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	121	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
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> GO TO 8.
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	110	E69	1	Existed

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

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6. CHECK VCM POWER SUPPLY CIRCUIT

Check VCM power supply circuit. Refer to EVC-151, "VCM : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace error-detected parts.

7. CHECK COOLANT TEMPERATURE SENSOR

Check coolant temperature sensor. Refer to EVC-158, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace coolant temperature sensor. Refer to HCO-14, "Exploded View".

8.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Is the inspection result normal?

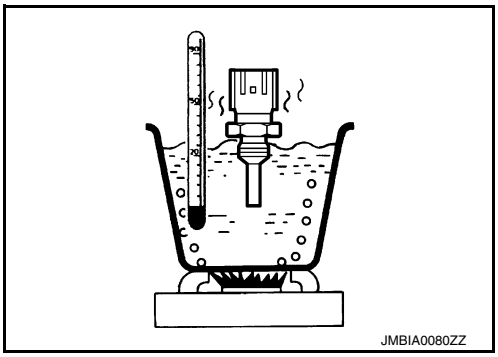
YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection

INFOID:0000000008747035

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. Refer to HCO-14, "Exploded View".

P0A0B HIGH VOLTAGE CONNECTOR INTERLOCK DETECT CIRCUIT

Description

INFOID:0000000008747038

The connection detecting circuit is used to detect the connection status of the PDM (Power Delivery Module) cover and the bus bar cover of PDM (Power Delivery Module).
The connection detecting circuit consists of two circuits (i.e. power supply circuit and signal input circuit). When the PDM (Power Delivery Module) cover and the bus bar cover are installed normally, their protrusions press the internal switch of PDM (Power Delivery Module). Accordingly, the connection detecting circuit is energized and a voltage signal is input.

DTC Logic

INFOID:0000000008747039

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A0B	HV SYSTEM INTERLOCK ERROR (High voltage system interlock circuit performance)	VCM detects that high voltage harness connector interlock circuit voltage remains excessively high for 0.5 seconds or more immediately before M/C relay turns ON.	• Harness or connectors • VCM • PDM (Power Delivery Module)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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-159, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747040

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.OVERALL FUNCTION CHECK

With CONSULT

1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “HV INTERLOCK (DC/DC)”.
2. Check that “On” is displayed.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 2.

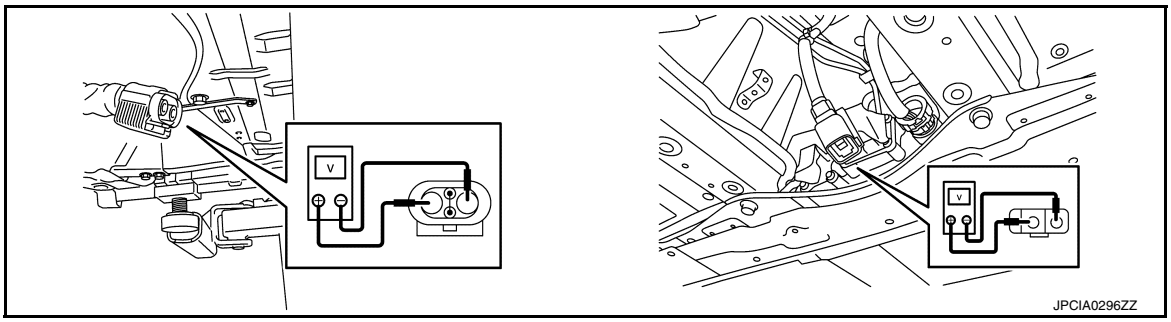
2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

CAUTION:

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

>> GO TO 3.

3.CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY

1. Disconnect PDM (Power Delivery Module) harness connector.
2. Reconnect 12V battery negative terminal.
3. Turn power switch ON.
4. Check the voltage between PDM (Power Delivery Module) harness connector and ground.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	12	Ground	3 – 7 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4. CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the harness for short to power, between PDM (Power Delivery Module) harness connector and VCM harness connector.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	12	Ground	0 V

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6. CHECK CONNECTION DETECTING CIRCUIT SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the harness for short to power, between PDM (Power Delivery Module) harness connector and VCM harness connector.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	15	Ground	0 V

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-53, "Intermittent Incident".

Inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace error-detected parts.

8. REPLACE VCM

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Reconnect harness connector and parts disconnected.
3. Perform DTC Confirmation Procedure. Refer to EVC-159, "DTC Logic".

Is DTC P0A0B detected again?

YES >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
NO >> INSPECTION END

P0A8D 12V BATTERY POWER SUPPLY

DTC Logic

INFOID:0000000008747041

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-162, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747042

1.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is DTC (excluding P0A8D) related to DC/DC converter detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 3.

3.CHECK 12V BATTERY POWER SUPPLY

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

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

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4. CHECK FUSE

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

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace the fuse after replacing the applicable circuit.

5. CHECK IPDM E/R

1. Insert the fuse which pulled out.
2. Remove IPDM E/R. Refer to PCS-29, "Removal and Installation".
3. Check the continuity between IPDM E/R connector terminals.

IPDM E/R		Continuity
+	–	
Terminal		
2	42	Existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".

6. CHECK 12V BATTERY POWER SUPPLY CIRCUIT

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

+		–		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E14	42	E61	11	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P0A8E 12V BATTERY POWER SUPPLY

DTC Logic

INFOID:0000000008747043

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-164, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747044

1.CHECK 12V BATTERY

Check that the correct 12V battery is installed.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace 12V battery with a correct one.

2.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is DTC (excluding P0A8E) related to DC/DC converter detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 4.

4.CHECK DC/DC CONVERTER POWER VOLTAGE VARIABLE CONTROL SIGNAL

With CONSULT

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace VCM. Refer to EVC-426, "Removal and Installation".

P0A8F 12V BATTERY POWER SUPPLY

DTC Logic

INFOID:0000000008747045

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A8F	14V POWER SUPPLY (14 V power module system performance)	When shift is except P range, VCM detects that a voltage of 12V battery power supply remains less than 12 V for 10 seconds.	• Harness or connectors (The sensor circuit is open or shorted.) • DC/DC converter • IPDM E/R

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Power switch	READY
Shift position	Except P range

2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-166, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747046

1.INTERVIEW THE CUSTOMER

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

Power switch	ON
Shift position	Except P range

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

Is the inspection result normal?

YES >> Explain the customer that this is the normal operation.
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any DTC that related DC/DC converter other than P0A8F detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 4.

4. CHECK 12V BATTERY POWER SUPPLY

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

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

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 5.

5. CHECK FUSE

1. Pull out #43 fuse.
2. Check 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 IPDM E/R

1. Insert the fuse which pulled out.
2. Remove IPDM E/R.
3. Check the continuity between IPDM E/R connector terminals.

IPDM E/R		Continuity
+	–	
Terminal		
2	42	Existed

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".

7. CHECK 12V BATTERY POWER SUPPLY CIRCUIT

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

+		–		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E14	42	E61	11	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P0A94 DC/DC CONVERTER

DTC Logic

INFOID:0000000008747047

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0A94	DC/DC CONVERTER (DC/DC converter performance)	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 converter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-168, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747048

1.CHECK DC/DC CONVERTER STATUS SIGNAL

With CONSULT

1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “DC/DC CONV STATUS”.
2. Check that the value of “DC/DC CONV STATUS” is other than “3”.

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Perform trouble diagnosis for detected DTC. Refer to VC-34, "DTC Index".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-168, "DTC Logic".

Is DTC P0A94 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P0AA0 SYSTEM MAIN RELAY

DTC Logic

INFOID:0000000008747049

DTC DETECTION LOGIC

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

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA0	HYBRID BATT POSITIVE CONTACTOR (Hybrid battery positive contactor circuit)	• A traction motor inverter input voltage is 240 V or more for 9 seconds or more while starting the EV system. • A traction motor inverter input voltage is 190 V or more for 1 minute or more while starting the EV system.	• Harness or connectors • Battery J/B • Electric compressor • PTC heater • Traction motor inverter • High voltage harness

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

CAUTION:
Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC “P0AA0” detected?

YES >> Proceed to EVC-169, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747050

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:
- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:
- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

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

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to power, between Li-ion battery harness connector and VCM harness connector.

+		–	Voltage
Li-ion battery			
Connector	Terminal		
B24	17	Ground	0 V
	14		
	11		

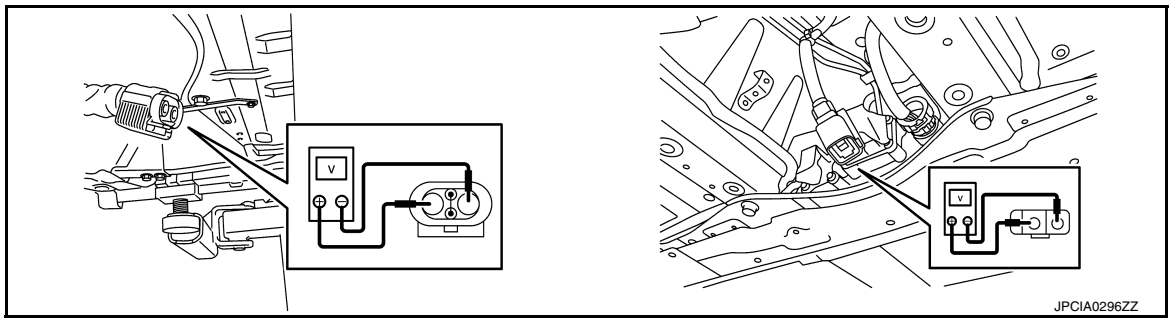
Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

3.PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 4.

4. CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace electric compressor. And then, GO TO 9. Refer to HA-37, "Removal and Installation" (With heat pump system) or HA-95, "Removal and Installation" (Without heat pump system).

5. CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PTC heater. And then, GO TO 9. Refer to HAC-205, "Removal and Installation" [(Auto A/C (with heat pump)] orHAC-374, "Removal and Installation" [(Auto A/C (without heat pump)].

6. CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

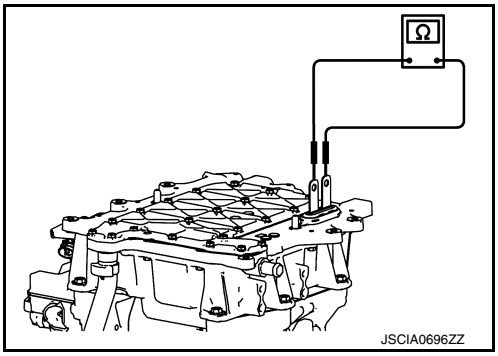
Is the inspection result normal?

YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 9.
NO >> GO TO 7.

7.CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace traction motor inverter. And then, GO TO 9. Refer to TMS-108, "Removal and Installation".

8.CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace malfunctioning harness. And then, GO TO 9.

9.REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P0AA1 SYSTEM MAIN RELAY +

DTC Logic

INFOID:0000000008747051

DTC DETECTION LOGIC

WARNING:

- **When this DTC is detected, the implementation of the DTC confirmation procedure may damage other parts. To prevent damage from occurring, perform EVC-174, "Diagnosis Procedure" first. After repairing malfunctioning part, perform the DTC confirmation procedure.**
- **To erase DTC, always repair malfunctioning part first.**

NOTE:

- To Clear DTC P0AA1, perform “SPECIFIC DTC CLEAR” in “WORK SUPPORT” of CONSULT.
- If DTC P0AA1 is displayed with DTC P0AA2, P31D4, P31DB, or P31DD, perform diagnosis for DTC P0AA2, P31D4, P31DB, or P31DD.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA1	HYBRID BATT POSITIVE CONTACTOR (Hybrid battery positive contactor circuit stuck closed)	The voltage of the traction motor inverter is 160 V or more and the voltage does not decreases 100 V or more even after a lapse of the specified time after starting diagnosis.	• Harness or connectors • Battery J/B • Electric compressor • PTC heater • Traction motor inverter • High voltage harness

DTC CONFIRMATION PROCEDURE

WARNING:

- **When this DTC is detected, the implementation of the DTC confirmation procedure may damage other parts. To prevent damage from occurring, perform EVC-174, "Diagnosis Procedure" first. After repairing malfunctioning part, perform the DTC confirmation procedure.**
- **To erase DTC, always repair malfunctioning part first.**

1.PRECONDITIONING

CAUTION:

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

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY and perform test drive.
2. Turn power switch OFF and wait at least 130 seconds.
3. Turn power switch ON.
4. Check self-diagnostic result.

Is the DTC detected?

YES >> Proceed to EVC-174, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009315678

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

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

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to power, between Li-ion battery harness connector and VCM harness connector.

+		–	Voltage
Li-ion battery			
Connector	Terminal		
B24	17	Ground	0 V
	14		
	11		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

3.PRECONDITIONING

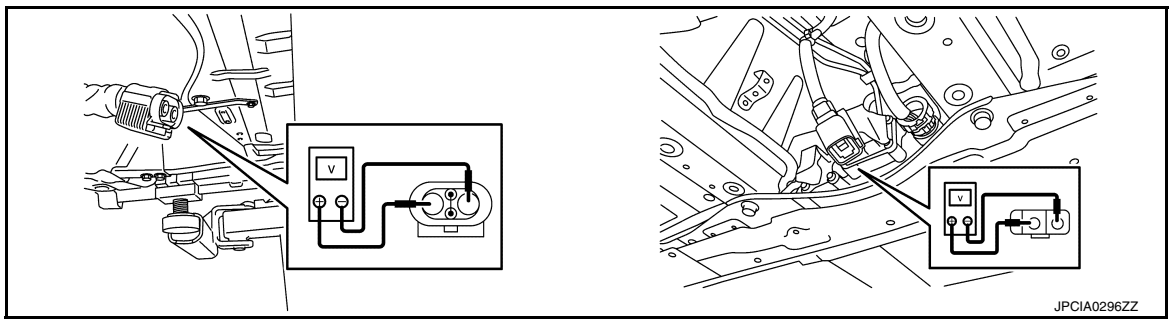
WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".

3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 4.

4. CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		
+	–	Resistance
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		
+	–	Resistance
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace electric compressor. And then, GO TO 9. Refer to HA-37, "Removal and Installation" (With heat pump system) or HA-95, "Removal and Installation" (Without heat pump system).

5. CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PTC heater. And then, GO TO 9. Refer to HAC-205, "Removal and Installation" [(Auto A/C (with heat pump)] orHAC-374, "Removal and Installation" [(Auto A/C (without heat pump)].

6.CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

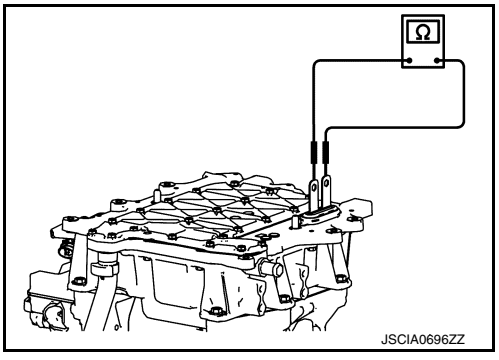
Is the inspection result normal?

YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 9.
NO >> GO TO 7.

7.CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace traction motor inverter. And then, GO TO 9. Refer to TMS-108, "Removal and Installation".

8.CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace malfunctioning harness. And then, GO TO 9.

9. REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P0AA2 SYSTEM MAIN RELAY +

DTC Logic

INFOID:0000000008747053

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-179, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747054

1.CHECK SYSTEM MAIN RELAY GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SYSTEM MAIN RELAY 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 >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

3. CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

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

+		–		Continuity
VCM		Li-ion battery		
Connector	terminal	Connector	terminal	
E61	54	B24	17	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair harness or connector.

P0AA4 SYSTEM MAIN RELAY -

DTC Logic

INFOID:0000000008747055

DTC DETECTION LOGIC

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

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA4	HYBRID BATT NEGATIVE CONTACTOR (Hybrid battery negative contactor circuit stuck closed)	During the stop state from READY or charging state, the voltage of the traction monitor inverter is 100 V or more.	• Harness or connectors • Battery J/B • Electric compressor • PTC heater • Traction motor inverter • High voltage harness

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

CAUTION:
Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-181, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009315684

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:
- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

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

• **Erase DTC after the work is completed.**

1.CHECK SYSTEM MAIN RELAY DRIVE POWER VOLTAGE

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

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

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to power, between Li-ion battery harness connector and VCM harness connector.

+		–	Voltage
Li-ion battery			
Connector	Terminal		
B24	17	Ground	0 V
	14		
	11		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

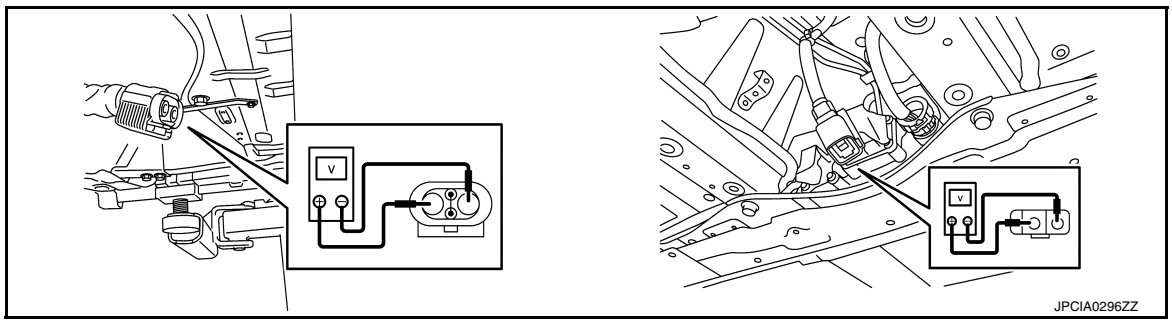
3.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 4.

4. CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace electric compressor. And then, GO TO 9. Refer to HA-37, "Removal and Installation" (With heat pump system) or HA-95, "Removal and Installation" (Without heat pump system).

5. CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PTC heater. And then, GO TO 9. Refer to HAC-205, "Removal and Installation" [(Auto A/C (with heat pump)] orHAC-374, "Removal and Installation" [(Auto A/C (without heat pump)].

6. CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

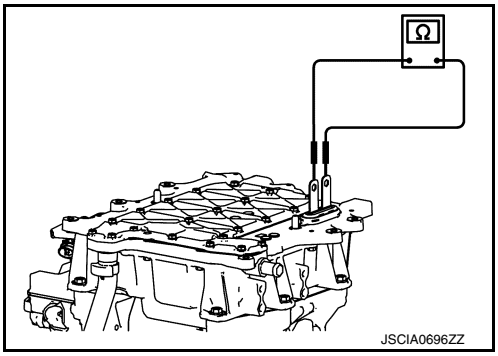
Is the inspection result normal?

YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 9.
NO >> GO TO 7.

7.CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace traction motor inverter. And then, GO TO 9. Refer to TMS-108, "Removal and Installation".

8.CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace malfunctioning harness. And then, GO TO 9.

9.REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P0AA5 SYSTEM MAIN RELAY -

DTC Logic

INFOID:0000000008747057

DTC DETECTION LOGIC

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

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-186, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747058

1.CHECK SYSTEM MAIN RELAY GROUND CIRCUIT

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

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

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SYSTEM MAIN RELAY 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 >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

3. CHECK HARNESS

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

+		–		Continuity
VCM		Li-ion battery		
Connector	terminal	Connector	terminal	
E61	28	B24	14	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair harness or connector.

P0AA6 HIGH VOLTAGE SYSTEM ISOLATION

Description

INFOID:0000000008747059

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:0000000008747060

DTC DETECTION LOGIC

NOTE:

- DTC “P0AA6” is not detected when insulation resistance decreases between quick charge relay and quick charge port. In this case, insulation check performed by the quick charger becomes NG, resulting in no implementation of quick charge.
- DTC “P0AA6” is not detected when insulation resistance decreases between normal charge port and PDM (Power Delivery Module). In this case, the “Fault” lamp of EVSE control box blinks and normal charge does not start even when trying to perform normal charge.

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P0AA6	HYBRID BATT VOLT SYS ISOLATION (Hybrid battery voltage system isolation fault)	VCM detects a insulation resistance calculated based on IR sensor signal sent from Li-ion battery is 380 kΩ or less.	• High voltage harness or connectors • Electric compressor • PTC heater • Traction motor • PDM (Power Delivery Module) • Li-ion battery

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Maintain the following conditions for at least 50 seconds.

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

2. Check DTC.

Is the DTC detected?

YES >> Proceed to EVC-189, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Maintain the following conditions for at least 30 minutes.

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

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-189, "Diagnosis Procedure".
NO >> GO TO 4.

4. PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT

1. Maintain the following conditions for at least 30 minutes.

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

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-189, "Diagnosis Procedure".
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE-4

With CONSULT

1. Shift selector lever in D position.
2. Drive the vehicle at more than 15 km (10 MPH) at least 40 seconds.
   CAUTION:
   Always drive vehicle at safe speed.
3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-189, "Diagnosis Procedure".
NO >> GO TO 6.

6. PERFORM DTC CONFIRMATION PROCEDURE-5

With CONSULT

1. Stop the vehicle and turn power switch OFF.
2. Connect quick charge connector.
3. Perform quick charging (charging status indicator is ON) at least 20 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-189, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747062

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

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

- **Erase DTC after the work is completed.**

1.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 2
NO >> Repair or replace the error-detected part.

2.IDENTIFY THE MODE USED AT THE OCCURRENCE OF MALFUNCTION

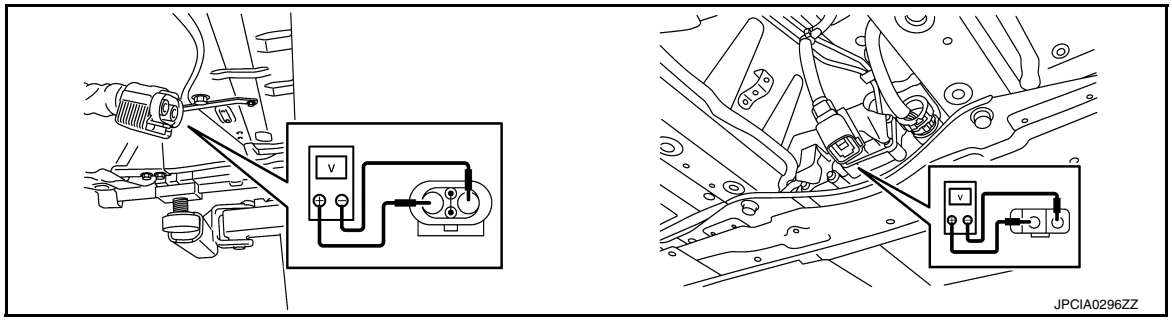
On which DTC Confirmation Procedure is the DTC P0AA6 detected?

DTC Confirmation Procedure-1>>GO TO 12.
DTC Confirmation Procedure-2>>GO TO 3.
DTC Confirmation Procedure-3>>GO TO 6.
DTC Confirmation Procedure-4>>GO TO 8.
DTC Confirmation Procedure-5>>GO TO 10.

3.PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 4.

4.CHECK INSULATION RESISTANCE OF ELECTRIC COMPRESSOR

Check insulation resistance of electric compressor. Refer to HAC-186, "Component Inspection".

CAUTION:

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 5.

5. CHECK REFRIGERANT GAS

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

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

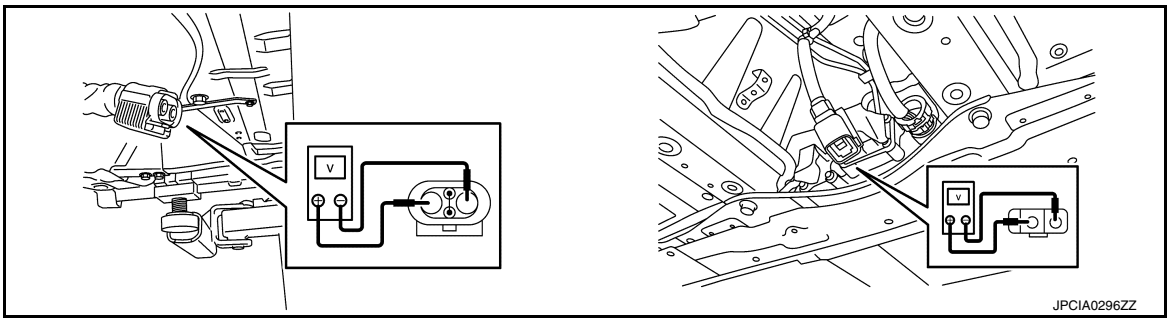
Is the inspection result normal?

YES >> Replace electric compressor. Refer to HA-37, "Removal and Installation" (With heat pump system) or HA-95, "Removal and Installation" (Without heat pump system).
NO >> Change refrigerant gas and compressor oil.

6. PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



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

Standard : 5 V or less

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

>> GO TO 7.

7. CHECK INSULATION RESISTANCE OF PTC HEATER

Check insulation resistance of PTC heater. Refer to HAC-188, "Component Inspection" [Auto A/C (with heat pump)] or HAC-356, "Component Inspection" [Auto A/C (without heat pump)].

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

Is the inspection result normal?

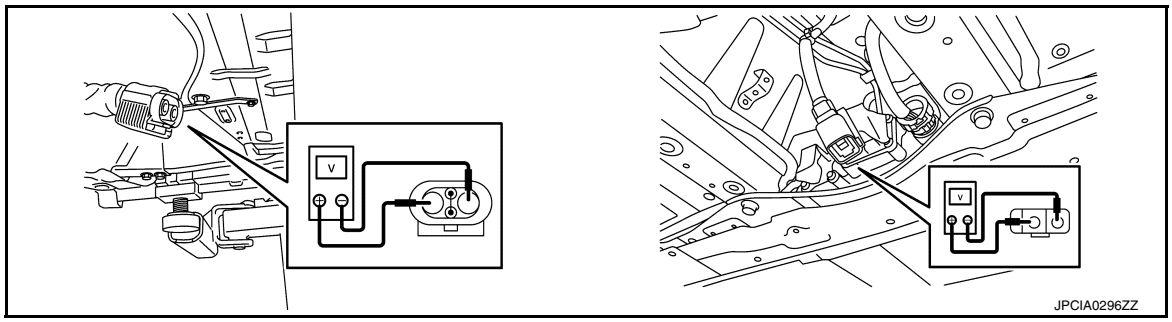
YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

NO >> Replace PTC heater. Refer to HAC-208, "Removal and Installation" [Auto A/C (with heat pump)] or HAC-374, "Removal and Installation" [Auto A/C (without heat pump)].

8. PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



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

Standard : 5 V or less

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

>> GO TO 9.

9. CHECK INSULATION RESISTANCE OF TRACTION MOTOR INVERTER

Check insulation resistance of traction motor inverter. Refer to TMS-105, "Component Inspection".
CAUTION:

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

Is the inspection result normal?

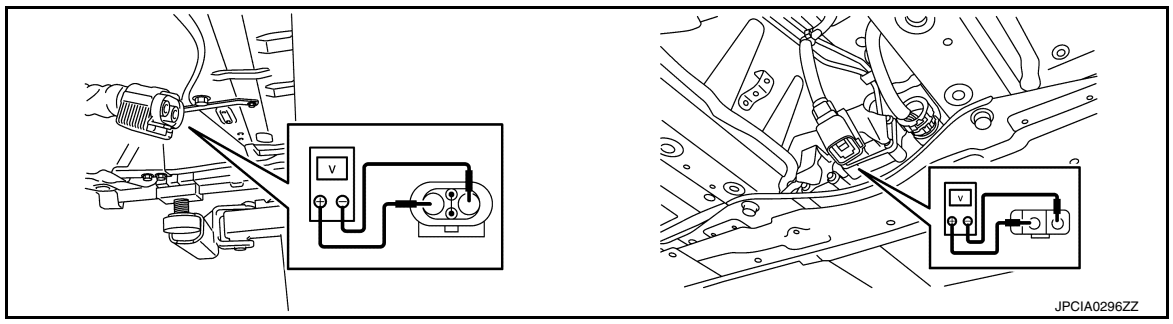
YES >> Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".
NO >> Replace traction motor. Refer to TMS-114, "Removal and Installation".

10. PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".

3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 11.

11. CHECK INSULATION RESISTANCE OF PDM (POWER DELIVERY MODULE)

Check insulation resistance of PDM (Power Delivery Module). Refer to VC-107, "Diagnosis Procedure".

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

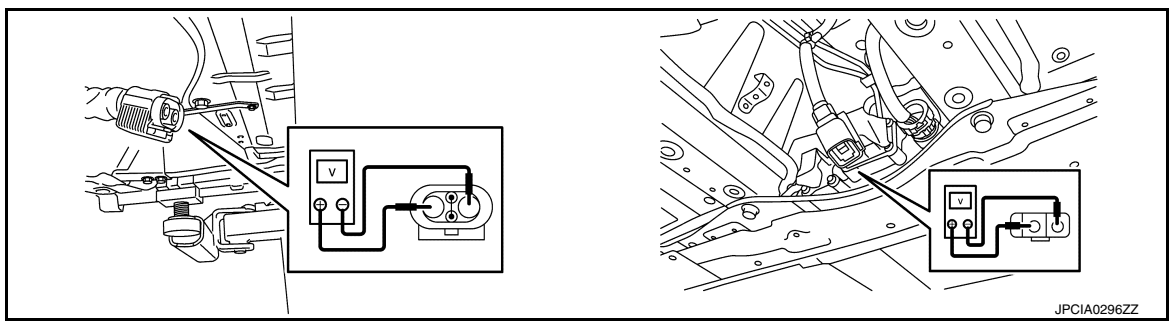
Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".

12. PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

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

>> GO TO 13.

13. CHECK INSULATION RESISTANCE OF HIGH VOLTAGE HARNESS

WARNING:

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

1. Disconnect Li-ion battery high voltage harness connector (H3).
2. Check the insulation resistance of high voltage harness with an insulation resistance tester (Multi tester), between Li-ion battery and PDM (Power Delivery Module).

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

+		–	Resistance
Li-ion battery			
Connector	Terminal		
H3	37	Ground	5.6 MΩ
	38		

Is the inspection result normal?

YES >> GO TO 19.
NO >> GO TO 14.

14. CHECK INSULATION RESISTANCE OF ELECTRIC COMPRESSOR

Check insulation resistance of electric compressor. Refer to HAC-186, "Component Inspection" [Auto A/C (with heat pump)] or HAC-354, "Component Inspection" [Auto A/C (without heat pump)].

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

Is the inspection result normal?

YES >> GO TO 16.
NO >> GO TO 15.

15. CHECK REFRIGERANT GAS

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

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

Is the inspection result normal?

YES >> Replace electric compressor. Refer to HA-37, "Removal and Installation" (With heat pump system) or HA-95, "Removal and Installation" (Without heat pump system).
NO >> Change refrigerant gas and compressor oil.

16. CHECK INSULATION RESISTANCE OF PDM (POWER DELIVERY MODULE)

1. Remove high voltage harness, normal charge port, and quick charge port from PDM (Power Delivery Module). Refer to VC-126, "Disassembly and Assembly".
2. Check insulation resistance of PDM (Power Delivery Module). Refer to VC-107, "Diagnosis Procedure".

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

Is the inspection result normal?

YES >> GO TO 17.
NO >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".

17. CHECK INSULATION RESISTANCE OF TRACTION MOTOR

Check insulation resistance of traction motor. Refer to TMS-103, "Component Inspection".

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

Is the inspection result normal?

YES >> GO TO 18.
NO >> Replace traction motor. Refer to TMS-114, "Removal and Installation".

18. CHECK INSULATION RESISTANCE OF TRACTION MOTOR INVERTER

Check insulation resistance of traction motor inverter. Refer to TMS-105, "Component Inspection".

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

Is the inspection result normal?

YES >> Replace high voltage harness between PDM (Power Delivery Module) and Li-ion battery.
NO >> Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".

19. CHECK INSULATION RESISTANCE OF PTC HEATER

Check insulation resistance of PTC heater. Refer to HAC-188, "Component Inspection" [Auto A/C (with heat pump)] or HAC-356, "Component Inspection" [Auto A/C (without heat pump)].

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

Is the inspection result normal?

YES >> GO TO 20.
NO >> Replace PTC heater. Refer to HAC-208, "Removal and Installation" [Auto A/C (with heat pump)] or HAC-374, "Removal and Installation" [Auto A/C (without heat pump)].

20. CHECK INSULATION RESISTANCE OF LI-ION BATTERY

Check insulation resistance of Li-ion battery. Refer to EVB-176, "Component Inspection".

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P1550, P1551, P1552 BATTERY CURRENT SENSOR

DTC Logic

INFOID:0000000008747063

DTC DETECTION LOGIC

NOTE:
If DTC P1550 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1550	BATTERY CURRENT SENSOR (Battery current sensor)	The output voltage of the battery current sensor remains within the specified range during READY or charging.	• Harness or connectors (Battery current sensor circuit is open or shorted.) • Battery current sensor
P1551	BATTERY CURRENT SENSOR (Battery current sensor)	An excessively low voltage from the sensor is sent to VCM.	
P1552	BATTERY CURRENT SENSOR (Battery current sensor)	An excessively high voltage from the sensor is sent to VCM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

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

Is DTC detected?

YES >> Proceed to EVC-196, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

1. Turn power switch OFF and wait at least 20 seconds.
2. Maintain the following conditions for at least 60 seconds.

Power switch	READY
Selector lever	P range
Brake pedal	Fully released
Ambient air temperature	10°C (50°F) or more

3. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-196, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747064

1.CHECK BATTERY CURRENT SENSOR POWER SUPPLY-1

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.

Battery current sensor			Voltage (Approx.)
Connector	+	–	
	Terminal		
E66	4	2	5 V

Is the inspection result normal?

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

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between battery current sensor harness connector and ground.

+		–	Voltage (Approx.)
Battery current sensor			
Connector	Terminal		
E66	4	Ground	5 V

Is the inspection result normal?

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

3.CHECK VCM GROUND CIRCUIT

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

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		–		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	2	E62	120	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

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.

–		+		
Battery current sensor		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	4	E62	96	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 for short to power and short to ground, between the following terminals.

VCM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E61	36	Accelerator pedal position sensor 1	E101	3
E62	97	Accelerator pedal position sensor 2	E101	2
	98	Refrigerant pressure sensor	E49	3

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-151, "VCM : Diagnosis Procedure".
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.

+		–		
Battery current sensor		VCM		Continuity
Connector	Terminal	Connector	Terminal	
E66	1	E62	95	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-198, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

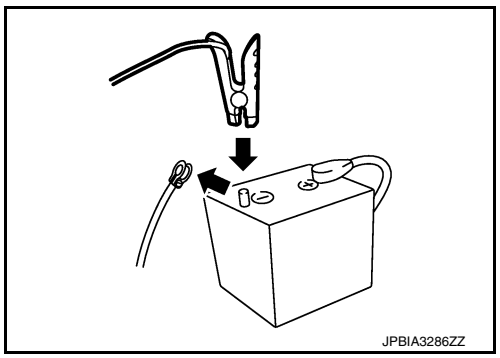
Component Inspection

INFOID:0000000008747065

1.CHECK BATTERY CURRENT SENSOR

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

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



VCM			Voltage (Approx.)
Connector	+	-	
	Terminal		
E62	95 (Battery current sensor signal)	120	2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-59, "How to Handle 12V Battery".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

P1554 BATTERY CURRENT SENSOR

DTC Logic

INFOID:0000000008747066

DTC DETECTION LOGIC

NOTE:
If DTC P1554 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1554	BATTERY CURRENT SENSOR (Battery current sensor)	The output voltage of the battery current sensor is lower than the specified value while the battery voltage is high enough.	• 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-200, "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-200, "Diagnosis Procedure".

Component Function Check

INFOID:0000000008747067

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.

VCM			Voltage
Connector	+	-	
	Terminal	Terminal	
E62	95 (Battery current sensor signal)	120	Above 2.37 V at least once

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-200, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009345596

1.CHECK BATTERY CURRENT SENSOR POWER SUPPLY-1

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.

Battery current sensor			Voltage (Approx.)
Connector	+	–	
	Terminal		
E66	4	2	5 V

Is the inspection result normal?

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

2.CHECK BATTERY CURRENT SENSOR POWER SUPPLY-2

Check the voltage between battery current sensor harness connector and ground.

+		–	Voltage (Approx.)
Battery current sensor			
Connector	Terminal		
E66	4	Ground	5 V

Is the inspection result normal?

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

3.CHECK VCM GROUND CIRCUIT

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

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK BATTERY CURRENT SENSOR GROUND CIRCUIT

1. Check the continuity between battery current sensor harness connector and VCM harness connector.

+		–		Continuity
Battery current sensor		VCM		
Connector	Terminal	Connector	Terminal	
E66	2	E62	120	Existed

2. Also check harness for short to power.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

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	4	E62	96	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 for short to power and short to ground, between the following terminals.

VCM		Sensor		
Connector	Terminal	Name	Connector	Terminal
E61	36	Accelerator pedal position sensor 1	E101	3
E62	97	Accelerator pedal position sensor 2	E101	2
	98	Refrigerant pressure sensor	E49	3

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-151, "VCM : Diagnosis Procedure".
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	1	E62	95	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-202, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

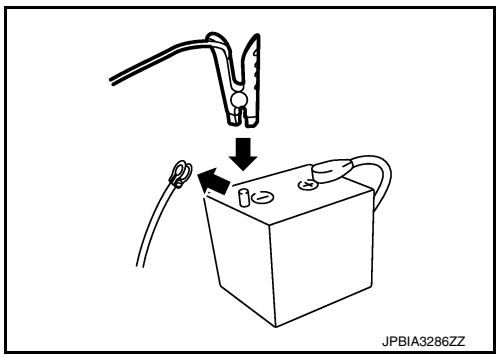
Component Inspection

INFOID:0000000009345597

1.CHECK BATTERY CURRENT SENSOR

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

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



VCM			Voltage (Approx.)
Connector	+	-	
	Terminal		
E62	95 (Battery current sensor signal)	120	2.5 V

Before measuring the terminal voltage, confirm that the battery is fully charged. Refer to PG-59, "How to Handle 12V Battery".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

P1556, P1557 BATTERY TEMPERATURE SENSOR

DTC Logic

INFOID:0000000008747070

DTC DETECTION LOGIC

NOTE:
If DTC P1556 or P1557 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1556	BATTERY TEMPERATURE SENSOR (Battery temperature sensor)	Signal voltage from Battery temperature sensor remains 0.1 V or less for 5 seconds or more.	• 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)	Signal voltage from Battery temperature sensor remains 4.84 V or more for 5 seconds or more.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-204, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747071

1.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY

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 and ground.

+		−	Voltage (Approx.)
Battery current sensor			
Connector	Terminal		
E66	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn 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	107	Existed

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

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-151, "VCM : Diagnosis Procedure".
NO >> Repair or replace error-detected parts.

3.CHECK BATTERY TEMPERATURE 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	2	E62	120	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-205, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

Component Inspection

INFOID:0000000008747072

1.CHECK BATTERY TEMPERATURE SENSOR

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

Battery current sensor		Condition	Resistance
+	–		
Terminal			
3	2	Temperature: 25°C (77°F)	1.9 – 2.1 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace battery current sensor (with battery temperature sensor). Refer to PG-69, "Removal and Installation".

P155A BATTERY TEMPERATURE SENSOR

DTC Logic

INFOID:0000000008747073

DTC DETECTION LOGIC

NOTE:
If DTC P155A is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P155A	BATTERY TEMPERATURE SENSOR (Battery temperature sensor)	A ambient temperature of 12V battery remains 50°C (122°F) or more for 10 seconds or more.	• Harness or connectors [Battery current sensor (Battery temperature sensor) circuit is shorted.] • Battery current sensor (Battery temperature sensor)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Drive the vehicle under the following conditions.

Coolant temperature	Less than 20°C (68°F)
Vehicle speed	20 km/h (13 MPH) or more

2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-206, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009345599

1.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY

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 and ground.

+		−	Voltage (Approx.)
Battery current sensor			
Connector	Terminal		
E66	3	Ground	5 V

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK BATTERY TEMPERATURE SENSOR POWER SUPPLY CIRCUIT

1. Turn 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	107	Existed

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

Is the inspection result normal?

YES >> Perform the trouble diagnosis for power supply circuit. Refer to EVC-151, "VCM : Diagnosis Procedure".
NO >> Repair or replace error-detected parts.

3.CHECK BATTERY TEMPERATURE 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	2	E62	120	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-207, "Component Inspection".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace battery current sensor. Refer to PG-69, "Removal and Installation".

Component Inspection

INFOID:0000000009345600

1.CHECK BATTERY TEMPERATURE SENSOR

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

Battery current sensor		Condition	Resistance
+	–		
Terminal			
3	2	Temperature: 25°C (77°F)	1.9 – 2.1 kΩ

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace battery current sensor (with battery temperature sensor). Refer to PG-69, "Removal and Installation".

P1564 ASCD STEERING SWITCH

DTC Logic

INFOID:0000000008747076

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1564	ASCD SWITCH (ASCD switch)	• An excessively high voltage signal from the ASCD steering switch is sent to VCM. • VCM detects that input signal from the ASCD steering switch is out of the specified range. • VCM detects that the ASCD steering switch is stuck ON.	• Harness or connectors (The switch circuit is open or shorted.) • ASCD steering switch • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Press CANCEL switch for at least 10 seconds, then release it and wait at least 10 seconds.
3. Press RESUME/ACCELERATE switch for at least 10 seconds, then release it and wait at least 10 seconds.
4. Press SET/COAST switch for at least 10 seconds, then release it and wait at least 10 seconds.
5. Press ECO mode switch for at least 10 seconds, then release it and wait at least 10 seconds.
6. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-208, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747077

1.CHECK ASCD STEERING SWITCH CIRCUIT

With CONSULT

1. Turn power switch ON.
2. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “ASCD MAIN SW”, “ASCD CANCEL SW”, “RESUME/ACC SW”, “ASCD SET SW”, and “ECO MODE”.
3. Check each item indication under the following conditions.

Monitor item	Condition		Indication
ASCD MAIN SW	ASCD MAIN switch	Pressed	On
		Released	Off
ASCD CANCEL SW	CANCEL switch	Pressed	On
		Released	Off
RESUME/ACC SW	RESUME/ACCELERATE switch	Pressed	On
		Released	Off
ASCD SET SW	SET/COAST switch	Pressed	On
		Released	Off

Monitor item	Condition	Indication
ECO MODE	Operate the ECO mode SW to put into ECO mode.	On
	Operate the ECO mode SW again to cancel ECO mode.	Off

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK ASCD STEERING SWITCH GROUND CIRCUIT

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

+		–		Continuity
Spiral cable		VCM		
Connector	Terminal	Connector	Terminal	
M112	32	E62	125	Existed

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

Is the inspection result normal?

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

3.CHECK ASCD STEERING SWITCH INPUT SIGNAL CIRCUIT

1. Check the continuity between spiral cable harness connector and VCM harness connector.

+		–		Continuity
Spiral cable		VCM		
Connector	Terminal	Connector	Terminal	
M112	25	E62	111	Existed

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK ASCD STEERING SWITCH

Refer to EVC-209, "Component Inspection (ASCD STEERING SWITCH)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace ASCD steering switch. Refer to SR-20, "Exploded View".

Component Inspection (ASCD STEERING SWITCH)

INFOID:0000000008747078

1.CHECK ASCD STEERING SWITCH

1. Turn power switch OFF.
2. Disconnect spiral cable harness connector.
3. Check resistance between spiral cable harness connector terminals under the following conditions.

Combination switch		Condition	Resistance (Ω)
Connector	Terminals		
M112	25 and 32	ASCD main switch: Pressed	Approx. 0
		CANCEL switch: Pressed	Approx. 309
		SET/COAST switch: Pressed	Approx. 741
		RESUME/ACCELERATE switch: Pressed	Approx. 1,406
		ECO mode switch: Pressed	Approx. 2,586
		All ASCD steering switches: Released	Approx. 5,456

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace ASCD steering switch. Refer to SR-20, "Exploded View".

P1572 BRAKE PEDAL POSITION SWITCH

DTC Logic

INFOID:0000000008747079

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition		Possible cause
P1572	brake pedal position 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 brake pedal position switch are sent to the VCM at the same time.	• Harness or connectors (The stop lamp switch circuit is shorted.) • Harness or connectors (The brake pedal position switch circuit is shorted.) • Stop lamp switch • brake pedal position switch • Incorrect stop lamp switch installation • Incorrect brake pedal position switch installation • VCM
		B	brake pedal position switch signal is not sent to VCM for extremely long time while the vehicle is being driven.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

With ASCD system>>GO TO 2.
Without ASCD system>>GO TO 4.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch ON (VDC switch OFF).
2. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “VEHICLE SPEED” and “GEAR POSITION”.
3. Press ASCD MAIN switch and check that CRUISE lamp illuminates.
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

5. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-212, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Drive the vehicle for at least 5 consecutive seconds under the following conditions.
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   This procedure may be conducted with the drive wheels lifted in the shop or by driving the vehicle. If a road test is expected to be easier, it is unnecessary to lift the vehicle.

VEHICLE SPEED	More than 30 km/h (19 MPH)
GEAR POSITION	D or R
Driving location	Depress the brake pedal for more than 5 seconds so as not to come off from the above-mentioned vehicle speed.

2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-212, "Diagnosis Procedure".
NO >> GO TO 4.

4. PERFORM COMPONENT FUNCTION CHECK

Perform component function check. Refer to EVC-212, "Component Function Check".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-212, "Diagnosis Procedure".

Component Function Check

INFOID:0000000009325446

1. COMPONENT FUNCTION CHECK

With CONSULT

1. Turn power switch ON.
2. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “ASCD BRAKE SW” and “STOP LAMP SW”.
3. Check the indication under the following conditions.

Item	Condition		Indication
ASCD BRAKE SW	Brake pedal	Slightly de-pressed	Off
		Fully released	On
STOP LAMP SW		Slightly de-pressed	On
		Fully released	Off

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-212, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747080

1. CHECK OVERALL FUNCTION-1

With CONSULT

1. Turn power switch ON.
2. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “ASCD BRAKE SW”.
3. Check “ASCD BRAKE SW” indication under the following conditions.

Monitor item	Condition		Indication
ASCD BRAKE SW	Brake pedal	Slightly de-pressed	Off
		Fully released	On

Is the inspection result normal?

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

2. CHECK BRAKE PEDAL POSITION SWITCH

Check brake pedal position switch. Refer to EVC-215, "Component Inspection (Brake Pedal Position Switch)"

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace brake pedal position switch. Refer to BR-523, "Exploded View".

3. CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY

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

+		–	Voltage
Brake pedal position switch			
Connector	Terminal		
E112	1	Ground	Battery voltage

Is the inspection result normal?

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

4. CHECK BRAKE PEDAL POSITION SWITCH POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Pull out #3 fuse.
3. Check that the fuse is not fusing.
4. Check the continuity between brake pedal position switch harness connector and fuse terminal.

+		–	Continuity
Brake pedal position switch			
Connector	Terminal		
E112	1	#3 fuse terminal	Existed

5. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for power ON power supply circuit.
NO >> Repair or replace error-detected parts.

5. CHECK BRAKE PEDAL POSITION SWITCH SIGNAL

1. Turn power switch OFF.
2. Install the brake pedal position switch. Refer to BR-514, "Inspection and Adjustment".
3. Reconnect brake pedal position switch harness connector.
4. Disconnect VCM harness connector.
5. Turn power switch ON.
   NOTE:
   Brake pedal is fully released.
6. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	113	Ground	Battery voltage

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 6.

6. CHECK BRAKE PEDAL POSITION SWITCH INPUT SIGNAL CIRCUIT

1. Turn power switch OFF.

2. Disconnect brake pedal position switch harness connector.
3. Check the continuity between brake pedal position switch harness connector and VCM harness connector.

+		–		Continuity
Brake pedal position switch		VCM		
Connector	Terminal	Connector	Terminal	
E112	2	E62	113	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

7.CHECK OVERALL FUNCTION-2

With CONSULT

Select “STOP LAMP SW” and check indication under the following conditions.

Monitor item	Condition		Indication
STOP LAMP SW	Brake pedal	Slightly depressed	On
		Fully released	Off

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 8.

8.CHECK STOP LAMP SWITCH

Refer to EVC-216, "Component Inspection (Stop Lamp Switch)"

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace stop lamp switch. Refer to BR-523, "Exploded View".

9.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	3	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Pull out #77 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	3	#77 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply circuit.
NO >> Repair or replace error-detected parts.

11. CHECK STOP LAMP SWITCH SIGNAL

1. Turn power switch OFF.
2. Install the stop lamp switch. Refer to BR-514, "Inspection and Adjustment".
3. Reconnect stop lamp switch harness connector.
4. Disconnect VCM harness connector.
5. Depress the brake pedal.
6. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	101	Ground	Battery voltage

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 12.

12. CHECK STOP LAMP SWITCH INPUT SIGNAL CIRCUIT

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

+		–		Continuity
Stop lamp switch		VCM		
Connector	Terminal	Connector	Terminal	
E102	4	E62	101	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

Component Inspection (Brake Pedal Position Switch)

INFOID:0000000008747081

1. CHECK BRAKE PEDAL POSITION SWITCH-1

1. Turn power switch OFF.
2. Disconnect brake pedal position switch harness connector.
3. Check the continuity between brake pedal position switch terminals under the following conditions.

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

Is the inspection result normal?

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

2.CHECK BRAKE PEDAL POSITION SWITCH-2

1. Adjust brake pedal position switch installation. Refer to BR-524, "Inspection and Adjustment".
2. Check the continuity between brake pedal position 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 brake pedal position switch. Refer to BR-523, "Exploded View".

Component Inspection (Stop Lamp Switch)

INFOID:0000000008747082

1.CHECK STOP LAMP SWITCH-1

1. Turn power 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
3 and 4	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-2

1. Adjust stop lamp switch installation. Refer to BR-524, "Inspection and Adjustment".
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
3 and 4	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-523, "Exploded View".

P1574 ASCD VEHICLE SPEED SENSOR

Description

INFOID:0000000008747083

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-65, "AUTOMATIC SPEED CONTROL DEVICE (ASCD) : System Description" for ASCD functions.

DTC Logic

INFOID:0000000008747084

DTC DETECTION LOGIC

DTC	CONSULT screen terms (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.	• Electrically-driven intelligent brake unit • Traction motor • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY.
2. Push the VDC OFF switch to stop the VDC control.
3. Drive the vehicle at more than 40 km/h (25 MPH).
   CAUTION:
   Always drive vehicle at a safe speed.
4. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-217, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747085

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-28, "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-44, "DTC Index".

3.CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P1805 BRAKE SWITCH

DTC Logic

INFOID:0000000008747086

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P1805	BRAKE SWITCH (Brake switch)	Stop lamp signal is not sent to VCM for extremely long time while the vehicle is driving.	• Harness or connectors (Stop lamp switch circuit is open or shorted.) • Stop lamp switch

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

NOTE:
Since this DTC is difficult to be confirmed, check component function to judge the normality.

>> Proceed to EVC-219, "Component Function Check".

Component Function Check

INFOID:0000000008747087

1.CHECK BRAKE SWITCH FUNCTION

With CONSULT
1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “STOP LAMP SW”.
2. Check “STOP LAMP SW” indication under the following conditions.

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-219, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747088

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	OFF
Slightly depressed	ON

Is the inspection result normal?

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

2.CHECK STOP LAMP SWITCH

Check stop lamp switch. Refer to EVC-220, "Component Inspection (Stop Lamp Switch)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace stop lamp switch. Refer to BR-523, "Exploded View".

3.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.

+		−	Voltage
Stop lamp switch			
Connector	Terminal		
E102	3	Ground	Battery voltage

3. Also check harness for short to ground.

Is the inspection result normal?

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

4.CHECK STOP LAMP SWITCH POWER SUPPLY CIRCUIT

1. Pull out #77 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	3	#77 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for 12V battery power supply circuit.
NO >> Repair or replace error-detected parts.

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	4	E62	101	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

Component Inspection (Stop Lamp Switch)

INFOID:0000000009345601

1.CHECK STOP LAMP SWITCH-1

1. Turn power 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
3 and 4	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-2

1. Adjust stop lamp switch installation. Refer to BR-524, "Inspection and Adjustment".
2. Check the continuity between stop lamp switch terminals under the following conditions.

Terminals	Condition		Continuity
3 and 4	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-523, "Exploded View".

P2122, P2123 APP SENSOR

DTC Logic

INFOID:0000000008747090

DTC DETECTION LOGIC

NOTE:
If DTC P2122 or P2123 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2122	APP SENSOR D (Throttle/Pedal position sensor/switch “D” circuit low)	An excessively low voltage from the accelerator pedal position sensor 1 is sent to VCM.	• Harness or connectors (APP sensor 1 circuit is open or shorted.) • Accelerator pedal position sensor 1
P2123	APP SENSOR D (Throttle/Pedal position sensor/switch “D” circuit high)	An excessively high voltage from the accelerator pedal position sensor 1 is sent to VCM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Turn power switch ON and wait at least 1 second.
2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-222, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747091

1.CHECK APP SENSOR 1 POWER SUPPLY-1

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	3	5	5 V

Is the inspection result normal?

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

2.CHECK APP SENSOR 1 POWER SUPPLY-2

Check the voltage between APP sensor harness connector and ground.

+		–	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E101	3	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.

+		–		Continuity
APP sensor		VCM		
Connector	Terminal	Connector	Terminal	
E101	3	E61	36	Existed

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

Is the inspection result normal?

YES >> Check VCM power supply circuit. Refer to EVC-151, "VCM : 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	5	E61	62	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	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "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	4	E62	49	Existed

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

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK APP SENSOR

Refer to EVC-224, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace Accelerator pedal. Refer to ACC-4, "Removal and Installation".

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000008747092

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

1. Turn power switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn power switch ON.
4. Check the voltage VCM harness connector terminals under the following conditions.

VCM			Condition		Voltage (V)
Connector	+	–			
	Terminal	Terminal			
E61	49 (APP sensor 1)	62	Accelerator pedal	Fully released	0.6 - 0.9
				Fully depressed	3.9 - 4.8
E62	108 (APP sensor 2)	122		Fully released	0.3 - 0.45
				Fully depressed	1.95 - 2.4

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

P2127, P2128 APP SENSOR

DTC Logic

INFOID:0000000008747093

DTC DETECTION LOGIC

NOTE:
If DTC P2127 or P2128 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2127	APP SENSOR E (Throttle/Pedal position sensor/switch “E” circuit low)	An excessively low voltage from the APP sensor 2 is sent to VCM.	• Harness or connectors (Accelerator pedal position sensor 2 circuit is shorted.) • Accelerator pedal position sensor 2
P2128	APP SENSOR E (Throttle/Pedal position sensor/switch “E” circuit high)	An excessively high voltage from the APP sensor 2 is sent to VCM.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-225, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747094

1.CHECK APP SENSOR 2 POWER SUPPLY-1

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	2	6	5 V

Is the inspection result normal?

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

2.CHECK APP SENSOR 2 POWER SUPPLY-2

Check the voltage between APP sensor harness connector and ground.

+		–	Voltage (Approx.)
APP sensor			
Connector	Terminal		
E101	2	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.

+		–		Continuity
APP sensor		VCM		
Connector	Terminal	Connector	Terminal	
E101	2	E62	97	Existed

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

Is the inspection result normal?

YES >> Perform trouble diagnosis for VCM power supply circuit. Refer to EVC-151, "VCM : 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	6	E62	122	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	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "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	1	E62	108	Existed

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

Is the inspection result normal?

YES >> GO TO 7.
NO >> Repair or replace error-detected parts.

7.CHECK APP SENSOR

Check APP sensor. Refer to EVC-227, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace Accelerator pedal. Refer to ACC-4, "Removal and Installation".

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000009325573

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

1. Turn power switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn power switch ON.
4. Check the voltage VCM harness connector terminals under the following conditions.

VCM			Condition		Voltage (V)
Connector	+	–			
	Terminal	Terminal			
E61	49 (APP sensor 1)	62	Accelerator pedal	Fully released	0.6 - 0.9
				Fully depressed	3.9 - 4.8
E62	108 (APP sensor 2)	122		Fully released	0.3 - 0.45
				Fully depressed	1.95 - 2.4

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

P2138 APP SENSOR

DTC Logic

INFOID:0000000008747096

DTC DETECTION LOGIC

NOTE:
If DTC P2138 is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P2138	APP SENSOR (Throttle/Pedal position sensor/switch “D” / “ E” voltage correlation)	VCM detects abnormal signal of APP sensor 1 and APP sensor 2 at a time.	• Harness or connectors (APP sensor 1 or 2 circuit is open or shorted.) • APP sensor

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-228, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747097

1.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	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR SIGNAL CIRCUIT

1. Disconnect APP sensor harness connector.
2. Check the continuity between APP sensor harness connector terminals.

APP sensor			Continuity
Connector	+	–	
	Terminal		
E101	4	1	Not existed

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

Is the inspection result normal?

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

3.CHECK APP SENSOR

Check APP sensor. Refer to EVC-229, "Component Inspection (Accelerator Pedal Position Sensor)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace Accelerator pedal. Refer to ACC-4, "Removal and Installation".

Component Inspection (Accelerator Pedal Position Sensor)

INFOID:0000000009325574

1.CHECK ACCELERATOR PEDAL POSITION (APP) SENSOR

1. Turn power switch OFF.
2. Reconnect all harness connectors disconnected.
3. Turn power switch ON.
4. Check the voltage VCM harness connector terminals under the following conditions.

VCM			Condition		Voltage (V)
Connector	+	–			
	Terminal	Terminal			
E61	49 (APP sensor 1)	62	Accelerator pedal	Fully released	0.6 - 0.9
				Fully depressed	3.9 - 4.8
E62	108 (APP sensor 2)	122		Fully released	0.3 - 0.45
				Fully depressed	1.95 - 2.4

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace accelerator pedal. Refer to ACC-4, "Removal and Installation".

P3100 EV SYSTEM CAN COMMUNICATION

Description

INFOID:0000000008747099

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:0000000008747100

DTC DETECTION LOGIC

NOTE:
If DTC P3100 is displayed with DTC P3191 or P3193, perform diagnosis for DTC P3191 or P3193.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3100	COMMUNICATION ERROR (Communication error)	VCM cannot receive EV system CAN communication signal from LBC and traction motor inverter for 5 seconds or more when VCM starts-up.	• Harness or connectors • LBC • Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT
1. Turn power switch ON and wait at least 20 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-230, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT
1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect EVSE (with AC power input) and wait at least 20 seconds.
4. Turn power switch ON.
5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-230, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747101

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-230, "DTC Logic".

Is DTC“ P3100” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3101 VCM

DTC Logic

INFOID:0000000008747102

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3101	VCM (Vehicle control module)	VCM calculation function is malfunctioning.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON wait at least 10 seconds.
2. Set the vehicle to READY.
   NOTE:
   If the vehicle does not enter the READY state, proceed to the next step with the power switch ON.
3. Shift selector lever to the entire position from “P” to “D”.
4. Turn power switch OFF and wait at least 20 seconds.
5. Turn power switch ON wait at least 10 seconds.
6. Turn power switch OFF and wait at least 20 seconds.
7. Turn power switch ON.
8. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-232, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747103

1.PERFORM CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-232, "DTC Logic".
3. Check self-diagnostic result.

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3102 LI-ION BATTERY

Description

INFOID:0000000008747104

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

DTC Logic

INFOID:0000000008747105

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	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3102	INVALID BATTERY (Invalid battery)	Detects invalid Li-ion battery ID.	• Improper replacement of Li-ion battery or Li-ion battery controller. • Li-ion battery • Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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-233, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747106

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-45, "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. Refer to “Li-ion Battery Registration Operation Manual”.
NO >> Replace Li-ion battery. Refer to EVB-194, "Removal and Installation" (without Li-ion battery heater) or EVB-194, "Removal and Installation" (with Li-ion battery heater).

P3117 A/C SYSTEM

Description

INFOID:0000000008747107

This DTC shows a decrease in insulation resistance of the high voltage circuit.
When detecting a decrease in insulation resistance of the high voltage circuit during use of air-conditioner, VCM turns ON/OFF the electric compressor and the PTC heater to check changes in insulation resistance and identifies a decrease in insulation resistance of the air-conditioning system.

DTC Logic

INFOID:0000000008747108

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3117	A/C SYSTEM (Air conditioner system)	When VCM detects a decrease in insulation resistance of A/C system.	• Electric compressor • A/C refrigerant gas • PTC heater

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Set the vehicle as the following condition and wait at least 30 minutes.

Power switch	READY
Vehicle speed	0 km/h (0 MPH)
A/C switch	ON
A/C set temperature	Full cold

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-235, "Diagnosis Procedure"
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Set the vehicle as the following condition and wait at least 30 minutes.

Power switch	READY
Vehicle speed	0 km/h (0 MPH)
A/C switch	ON
A/C set temperature	Full hot

2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-235, "Diagnosis Procedure"
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747109

1.CHECK A/C REFRIGERANT GAS

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

NOTE:

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

Is the inspection result normal?

YES-1 (DTC P3117 is detected during Step 1 of DTC CONFIRMATION PROCEDURE)>>Replace electric compressor. Refer to HA-37, "Removal and Installation" (with heat pump system) or HA-95, "Removal and Installation" (without heat pump system).

YES-2 (DTC P3117 is detected during Step 2 of DTC CONFIRMATION PROCEDURE)>>Replace PTC heater. Refer to HAC-208, "Removal and Installation" [auto A/C (with heat pump)] or HAC-374, "Removal and Installation" [auto A/C (without heat pump)].

NO >> Change A/C refrigerant gas and compressor oil.

P311C HIGH VOLTAGE CIRCUIT

DTC Logic

INFOID:0000000008747110

DTC DETECTION LOGIC

NOTE:
If DTC P311C is displayed with DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD, perform diagnosis for DTC P0AA2, P0AA5, P31D4, P31DB, P31DC, or P31DD.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P311C	HIGH VOLTAGE SYSTEM (High voltage system)	Remains all of following condition for 0.2 seconds. • Li-ion battery current: 5.5 A or more • Input voltage to traction motor inverter: 24 V or less • Pre-charge impossible	• High voltage circuit • Li-ion battery J/B • Traction motor inverter • PDM (Power Delivery Module) • Electric compressor • PTC heater
		Remains all of following condition for 0.5 seconds. • Li-ion battery current: less than 5.5 A • Input voltage to traction motor inverter: 24 V or less • Pre-charge impossible	
		Remains all of following condition for 0.5 seconds. • Difference between Li-ion battery voltage and input voltage to traction motor inverter 100 V or more. • Pre-charge impossible	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

CAUTION:
Since this DTC may be displayed if a malfunction is detected in other systems, check them for malfunction before performing this diagnosis.
- Turn power switch OFF and wait at least 20 seconds.
- Make sure that 12V battery voltage is 11 V or more.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-236, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747111

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

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

- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

With CONSULT

Check self-diagnostic result in “MOTOR”.

Is any DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".

NO >> GO TO 2.

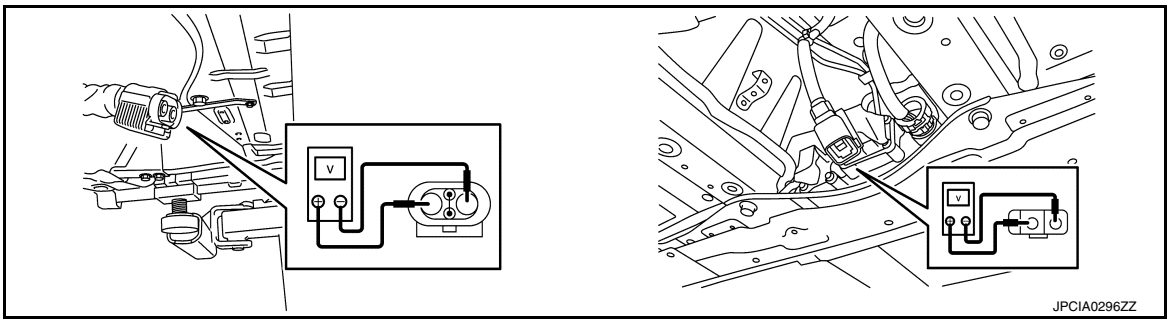
2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

CAUTION:

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

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		
+	–	Resistance
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		
+	–	Resistance
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace electric compressor. And then, GO TO 10. Refer to HA-37, "Removal and Installation" (with heat pump system) or HA-95, "Removal and Installation" (without heat pump system).

4.CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace PTC heater. And then, GO TO 10. Refer to HAC-205, "Removal and Installation" [(Auto A/C (with heat pump)] orHAC-374, "Removal and Installation" [(Auto A/C (without heat pump)].

5.CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

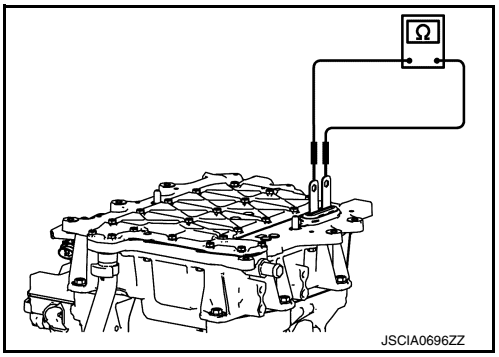
Is the inspection result normal?

YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 10.
NO >> GO TO 6.

6. CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace traction motor inverter. And then, GO TO 10. Refer to TMS-108, "Removal and Installation".

7. CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 8.

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

8.CHECK PDM (POWER DELIVERY MODULE)

Check the short circuit between PDM (Power Delivery Module) harness connector terminals.

PDM (Power Delivery Module)		Resistance
+	–	
Terminal		
38	39	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation". And then, GO TO 10.

9.CHECK SERVICE PLUG FUSE

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

Is the fuse is fusing?

YES >> Replace service plug. And then, GO TO 10.
NO >> GO TO 10.

10.REPLACE LI-ION BATTERY JUNCTION BOX

Replace Li-ion battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P312A EV SYSTEM CAN COMMUNICATION

Description

INFOID:0000000008747112

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:0000000008747113

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312A	COMMUNICATION ERROR (Communication error)	CAN communication of the EV system CAN connecting unit does not stop for 25.5 seconds or more immediately before the VCM self-shutoff.	• Harness or connectors • LBC • Traction motor inverter • On board charger • Electric shift control module • A/C auto amp. • TCU • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

NOTE:
Disconnect CONSULT if it is connected.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-242, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect EVSE (with AC power input) and wait at least 10 seconds.
4. Disconnect EVSE and wait at least 1 minutes.
5. Turn power switch ON.
6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-242, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747114

1.CHECK VCM POWER SUPPLY-1

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	57	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #55 fuse.
3. Check the fuse is not fusing.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK VCM POWER SUPPLY-2

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

+		–	Voltage
VCM			
Connector	Terminal		
E61	51	Ground	12V battery voltage

Is the inspection result normal?

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

4.CHECK VCM POWER SUPPLY CIRCUIT

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

+		–		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E15	57	E61	51	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

5.CHECK VCM POWER SUPPLY-3

1. Turn power switch OFF.

2. Disconnect VCM harness connector.
3. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	74	Ground	0 V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK VCM POWER SUPPLY-4

1. Disconnect ignition relay-2 (fuse block).
2. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	74	Ground	0 V

Is the inspection result normal?

YES >> The ignition relay-2 may stick to ON. Check the related circuits.
NO >> The harness between fuse block and VCM may become shorted with power. Check the related circuits.

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

1. Reconnect VCM harness connector.
2. Disconnect traction motor inverter harness connector (F13).
3. Turn power switch ON and erase DTC.
4. Perform confirmation procedure. Refer to EVC-241, "DTC Logic".

Is DTC “P312A” detected?

YES >> GO TO 8.
NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power.

8. CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect traction motor inverter harness connector.
3. Disconnect LBC harness connector (B24).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-241, "DTC Logic".

Is “P312A” detected?

YES >> GO TO 9.
NO >> Check LBC power supply (POWER ON) circuit for short to power.

9. CHECK PDM (POWER DELIVERY MODULE) POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect LBC harness connector.
3. Disconnect PDM (Power Delivery Module) harness connector (F23).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-241, "DTC Logic".

Is DTC “P312A” detected?

YES >> GO TO 10.
NO >> Check on board charger power supply (POWER ON) circuit for short to power.

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

1. Turn power switch OFF.

2. Reconnect PDM (Power Delivery Module) harness connector.
3. Disconnect A/C auto amp. harness connector (M55).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-241, "DTC Logic".

Is DTC “P312A” detected?

YES-1 (With TCU)>>GO TO 11.
YES-2 (Without TCU)>>GO TO 12.
NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power.

11. CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect A/C auto amp. harness connector.
3. Disconnect TCU harness connector (M67).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-241, "DTC Logic".

Is DTC “P312A” detected?

YES >> GO TO 12.
NO >> Check TCU power supply (POWER ON) circuit for short to power.

12. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Is DTC “P312A” detected?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P312B EV SYSTEM RESTART ERROR

DTC Logic

INFOID:0000000008747115

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312B	RESTART ERROR (Restart error)	The traction motor inverter and the PDM (Power Delivery Module) cannot be activated for 30 seconds or more at a restart before the completion of VCM self shut off.	• Harness or connectors • Traction motor inverter • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Turn OFF the power switch. Between 5 seconds later and within 10 seconds, turn ON the power switch again. Wait at least 1 minute.
3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-246, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect EVSE (with AC power input) and wait at least 10 seconds.
4. Turn power switch ON.
5. Disconnect EVSE and wait at least 1 minutes.
6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-246, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT

1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect quick charge connector.
4. Start quick charge and wait at least 60 seconds.
5. Turn power switch ON.
6. Stop quick charge and wait at least 60 seconds.
7. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-246, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747116

1.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS OF PDM (POWER DELIVERY MODULE)

Perform self-diagnosis of PDM (Power Delivery Module).

Is DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-245, "DTC Logic".

Is DTC “P312B” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P312C, P3130 TRACTION MOTOR INVERTER CONDENSER DISCHARGE ERROR

DTC Logic

INFOID:0000000008747117

DTC DETECTION LOGIC

NOTE:
If DTC P312C or P3130 is displayed with DTC P0AA0 or P0AA1, perform diagnosis for DTC P0AA0 or P0AA1.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312C P3130	INVERTER DISCHARGE ERROR (Inverter discharge error)	Traction motor inverter voltage is 54 V or more for 14 seconds during stop of READY or charge	• Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY and perform test drive.
2. Turn power switch OFF and wait at least 20 seconds.
3. Turn power switch ON and wait at least 1 minutes.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-247, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747118

1.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT
Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE AGAIN

Perform confirmation procedure again. Refer to EVC-247, "DTC Logic"

Is DTC “P312C” or “P3130” detected?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P312D QUICK CHARGE ERROR

DTC Logic

INFOID:0000000008747119

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312D	QUICK CHARGE RELAY (Quick charge relay)	Immediately before starting quick charge, the quick charger cannot be ready for 60 seconds.	• Harness or connector • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
2. Connect quick charge connector.
3. Start the quick charging and wait at least 2 minutes.
4. Turn power switch ON.
5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-248, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747120

1.PERFORM SELF-DIAGNOSIS OF PDM (POWER DELIVERY MODULE)

With CONSULT

Perform self-diagnosis of PDM (Power Delivery Module).

Is DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-248, "DTC Logic".

Is DTC detected?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P312E READY OFF ERROR

DTC Logic

INFOID:0000000008747121

DTC DETECTION LOGIC

NOTE:
If DTC P312E is displayed with DTC P317A, P3191, P31A7, or P319C, perform diagnosis for DTC P317A, P3191, P31A7, or P319C.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312E	READY OFF ERROR (Ready off error)	• During the shutdown from READY, battery current remains 5.5 A or more for 25.5 seconds or more. • During the shutdown from READY, traction motor inverter is not ready for discharge for 25.5 seconds or more.	• Harness or connector • LBC • Traction motor inverter • A/C auto amp. • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY.
2. Operate the automatic air conditioning system (A/C switch ON).
3. Turn power switch OFF as automatic air conditioning system ON condition
4. Wait at least 30 seconds.
5. Turn power switch ON.
6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-249, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747122

1.PERFORM SELF-DIAGNOSIS OF PDM (POWER DELIVERY MODULE)

With CONSULT
Perform self-diagnosis of PDM (Power Delivery Module).

Is DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 2.

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

With CONSULT
Perform self-diagnosis of A/C auto amp.

Is DTC detected?

YES >> Check the DTC. Refer to HAC-58, "DTC Index" [auto A/C (with heat pump)] or HAC-260, "DTC Index" [auto A/C (without heat pump)].
NO >> GO TO 3.

3.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT

Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF LBC

With CONSULT

Perform self-diagnosis of LBC.

Is DTC detected?

YES >> Check the DTC. Refer to EVB-45, "DTC Index".
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-249, "DTC Logic".

Is DTC “P312E” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P312F CHARGE OFF ERROR

DTC Logic

INFOID:0000000008747123

DTC DETECTION LOGIC

NOTE:
If DTC P312F is displayed with DTC P317A, P3191, P3196, P319C, P31A1, P31A7, or P31AE, perform diagnosis for DTC P317A, P3191, P3196, P319C, P31A1, P31A7, or P31AE.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P312F	CHARGE OFF ERROR (Charge off error)	During the shutdown from charging, 10 seconds pass without satisfying the following conditions: • Battery current is 5.5 A or less • Traction motor inverter is ready for discharge. • Quick charge relay OFF	• Harness or connector • LBC • Traction motor inverter • A/C auto amp. • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT
1. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
2. Connect EVSE (with AC power input) and wait at least 60 seconds.
3. Disconnect EVSE and wait at lease 30 seconds.
4. Turn power switch ON.
5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-251, "Diagnosis Procedure".
NO-1 (with quick charge port)>>GO TO 3.
NO-2 (without quick charge port)>>INSPECTION END

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT
1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect quick charge connector.
4. Start quick charging and wait at least 60 seconds.
5. Stop quick charge and wait at lease 30 seconds.
6. Turn power switch ON.
7. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-251, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747124

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

With CONSULT
Perform self-diagnosis of A/C auto amp.

Is DTC detected?

YES >> Check the DTC. Refer to HAC-58, "DTC Index" [auto A/C (with heat pump)] or HAC-260, "DTC Index" [auto A/C (without heat pump)].
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS OF POWER DELIVERY MODULE

With CONSULT
Perform self-diagnosis of PDM (Power Delivery Module).

Is DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 3.

3. PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT
Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 4.

4. PERFORM SELF-DIAGNOSIS OF LBC

With CONSULT
Perform self-diagnosis of LBC.

Is DTC detected?

YES >> Check the DTC. Refer to EVB-45, "DTC Index".
NO >> GO TO 5.

5. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-251, "DTC Logic".

Is DTC “P312F” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3131 SYSTEM SHUTOFF ERROR

DTC Logic

INFOID:0000000008747125

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3131	SYSTEM SHUTOFF TIMEOUT (System shut-off time out)	When before shutdown, all of the following conditions are fulfilled for 31 minutes or more. • VCM does not receive a EV system activation request signal. • Either of EV system CAN connection unit is not shut-down	• Harness or connectors • LBC • Traction motor inverter • PDM (Power Delivery Module) • Electric shift control module (built in to VCM) • A/C auto amp. • TCU • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

NOTE:
Disconnect the CONSULT if it is connected.

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch ON.
2. Turn power switch OFF and wait at least 35 minutes.
   NOTE:
   After the completion of the self shutoff of VCM, the next step can be performed without waiting for 35 minutes. To confirm the completion of self shutoff, check that the power supply terminal voltage of the battery current sensor changes to approximately 0 V.
3. Turn power switch ON.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-254, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect EVSE (with AC power input) and wait at least 10 seconds.
4. Disconnect EVSE and wait at least 35 minutes.
   NOTE:
   After the completion of the self shutoff of VCM, the next step can be performed without waiting for 35 minutes. To confirm the completion of self shutoff, check that the power supply terminal voltage of the battery current sensor changes to approximately 0 V.
5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-254, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009325612

1.CHECK VCM POWER SUPPLY-1

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	57	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #55 fuse.
3. Check the fuse is not fusing.

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Replace the fuse after repairing the applicable circuit.

3.CHECK VCM POWER SUPPLY-2

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

+		–	Voltage
VCM			
Connector	Terminal		
E61	51	Ground	12V battery voltage

Is the inspection result normal?

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

4.CHECK VCM POWER SUPPLY CIRCUIT

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

+		–		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E15	57	E61	51	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

5.CHECK VCM POWER SUPPLY-3

1. Turn power switch OFF.

2. Disconnect VCM harness connector.
3. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	74	Ground	0 V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6. CHECK VCM POWER SUPPLY-4

1. Disconnect ignition relay-2 (fuse block).
2. Check the voltage between VCM harness connector and ground.

+		–	Voltage
VCM			
Connector	Terminal		
E62	74	Ground	0 V

Is the inspection result normal?

YES >> The ignition relay-2 may stick to ON. Check the related circuits.
NO >> The harness between fuse block and VCM may become shorted with power. Check the related circuits.

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

1. Reconnect VCM harness connector.
2. Disconnect traction motor inverter harness connector (F13).
3. Turn power switch ON and erase DTC.
4. Perform confirmation procedure. Refer to EVC-253, "DTC Logic".

Is DTC “P3131” detected?

YES >> GO TO 8.
NO >> Check traction motor inverter power supply (POWER ON) circuit for short to power.

8. CHECK LBC POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect traction motor inverter harness connector.
3. Disconnect LBC harness connector (B24).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-253, "DTC Logic".

Is “P3131” detected?

YES >> GO TO 9.
NO >> Check LBC power supply (POWER ON) circuit for short to power.

9. CHECK PDM (POWER DELIVERY MODULE) POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect LBC harness connector.
3. Disconnect PDM (Power Delivery Module) harness connector (F23).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-253, "DTC Logic".

Is DTC “P3131” detected?

YES >> GO TO 10.
NO >> Check on board charger power supply (POWER ON) circuit for short to power.

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

1. Turn power switch OFF.

2. Reconnect PDM (Power Delivery Module) harness connector.
3. Disconnect A/C auto amp. harness connector (M55).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-253, "DTC Logic".

Is DTC “P3131” detected?

YES-1 (With TCU)>>GO TO 11.
YES-2 (Without TCU)>>GO TO 12.
NO >> Check A/C auto amp. power supply (POWER ON) circuit for short to power.

11. CHECK TCU POWER SUPPLY (POWER ON) CIRCUIT

1. Turn power switch OFF.
2. Reconnect A/C auto amp. harness connector.
3. Disconnect TCU harness connector (M67).
4. Turn power switch ON and erase DTC.
5. Perform confirmation procedure. Refer to EVC-253, "DTC Logic".

Is DTC “P3131” detected?

YES >> GO TO 12.
NO >> Check TCU power supply (POWER ON) circuit for short to power.

12. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Is DTC “P3131” detected?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P3135 SLIGHT COLLISION DETECTION

DTC Logic

INFOID:0000000009314802

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3135	SLIGHT COLLISION DETECTION (Slight collision detection)	VCM received car crash information signal from air bag diagnosis sensor unit	• Air bag inflated • CAN communication signal • Air bag diagnosis sensor unit • VCM

DTC CONFIRMATION PROCEDURE

1.CHECK AIR BAG MODULE

Check that the air bag modules are not inflating.

Is air bag module inflating?

YES >> Refer to SR-15, "For Side and Rollover Collision".
NO >> GO TO 2.

2.PRECONDITIONING

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

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

Turn power switch ON and wait at least 5 seconds.

Is DTC detected?

YES >> Proceed to EVC-257, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009325617

1.CHECK THE IMPLEMENTATION OF AIR BAG MODULE REPLACEMENT

Check to see if there is a record of air bag module replacement.

Is there a record of air bag module replacement?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-258, "DTC Logic".

Is DTC “P3135” detected again?

YES >> GO TO 3.
NO >> INSPECTION END

3.CHECK SLIGHT COLLISION DETECTION SIGNAL

With CONSULT

On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “LIGHT CRASH JUDGMENT”.

Is indicated “0”?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Replace air bag diagnosis sensor unit. Refer to SR-38, "Removal and Installation".

P3137 CAR CRASH DETECTION

DTC Logic

INFOID:0000000008747127

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3137	CAR CLASH (Car crash)	VCM received slight collision detection signal from air bag diagnosis sensor unit	• Air bag inflated • CAN communication signal • Air bag diagnosis sensor unit • VCM

DTC CONFIRMATION PROCEDURE

1.CHECK AIR BAG MODULE

Check that the air bag modules are not inflating.

Is air bag module inflating?

YES >> Refer to SR-15, "For Side and Rollover Collision".
NO >> GO TO 2.

2.PRECONDITIONING

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

>> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE

Turn power switch ON and wait at least 5 seconds.

Is DTC detected?

YES >> Proceed to EVC-258, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747128

1.CHECK THE IMPLEMENTATION OF AIR BAG MODULE REPLACEMENT

Check to see if there is a record of air bag module replacement.

Is there a record of air bag module replacement?

YES >> GO TO 2.
NO >> GO TO 3.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-258, "DTC Logic".

Is DTC “P3137” detected again?

YES >> GO TO 3.
NO >> INSPECTION END

3.CHECK SLIGHT COLLISION DETECTION SIGNAL

With CONSULT

On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “CLASH DETECT INFO”.

Is indicated “##”?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Replace air bag diagnosis sensor unit. Refer to SR-38, "Removal and Installation".

P3141 PDM (POWER DELIVERY MODULE)

Description

INFOID:0000000008747129

If the situation is not improved under the operation of the Charge Insulation Resistance Loss Protection Control, VCM stops charging and detects DTC P3141. For details of the protection control, refer to EVC-425, "Description".

DTC Logic

INFOID:0000000008747130

DTC DETECTION LOGIC

NOTE:
If DTC P3141 is displayed with other DTC, first perform the trouble diagnosis for other DTC.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3141	PDM (POWER DELIVERY MODULE) [PDM (Power Delivery Module)]	The Charge Insulation Resistance Loss Protection Control is repeated more than the specified number of times.	PDM (Power Delivery Module)

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-259, "Component Function Check".

Component Function Check

INFOID:0000000008747131

1.CHECK OPERATIONAL HISTORY OF CHARGE INSULATION RESISTANCE LOSS PROTECTION CONTROL

With CONSULT
1. Turn power switch OFF and wait at least 20 seconds.
2. Perform normal charging at least 15 seconds.
   CAUTION:
   Never turn ON the power switch during normal charging.
3. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “PRTCTN CNT OPERAT HIST 1”.
4. Check that “0” is indicated.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-259, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747132

1.PERFORM SELF-DIAGNOSIS

With CONSULT
Perform self-diagnosis of VCM.

Is DTC other than P3141 detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.REPLACE PDM (POWER DELIVERY MODULE)

1. Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Turn power switch ON.
3. Erase self-diagnostic result.
4. Turn power switch OFF.

5. Perform normal charge at least 15 seconds.
   CAUTION:
   Never turn the power switch to ON during normal charge.
6. Check that normal charge operates normally.
7. Stop normal charge.
8. Check self-diagnostic result of VCM and PDM (Power Delivery Module).

Is any DTC detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index" (VCM), VC-34, "DTC Index" [PDM (Power Delivery Module)].
NO >> INSPECTION END

P315C CHARGE RELAY

DTC Logic

INFOID:0000000008747133

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P315C	CHARGE RELAY (Charge relay)	VCM detects DTC P31CA or P31CB.	• Harness or connectors • Normal charge relay • PDM (Power Delivery Module)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when DTC P31CA or P31CB is detected. If this DTC is displayed, perform trouble diagnosis for DTC P31CA or P31CB.

>> Proceed to EVC-261, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747134

Perform trouble diagnosis for P31CA or P31CB. Refer to EVC-322, "DTC Logic".

P315E ABS/VDC

DTC Logic

INFOID:0000000008747135

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P315E	VDC SYSTEM (VDC system)	VCM detected torque request signal error for 2 seconds	• ABS actuator and electric unit (control unit) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch OFF and wait at least 60 seconds.
2. Turn power switch OFF and wait at least 10 seconds.
3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-262, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747136

1.PERFORM SELF-DIAGNOSIS OF VCM

Perform self-diagnosis of VCM.

Is DTC detected other than P315E?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

1. Replace ABS actuator and electric unit (control unit). Refer to BRC-176, "Removal and Installation".
2. Erase DTC.
3. Perform DTC confirmation procedure. Refer to EVC-262, "DTC Logic".

Is DTC “P315E” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P316A MOTOR SPEED

DTC Logic

INFOID:0000000008747139

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P316A	MOTOR SPEED (Motor speed)	VCM received motor speed invalid value from traction motor inverter.	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Set the vehicle to READY and wait at least 60 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-263, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Perform test drive.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-263, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747140

1.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT

Perform self-diagnosis of traction motor.

>> Perform diagnosis procedure of detected DTC. Refer to TMS-28, "DTC Index".

P316C, P316D, P316E PDM (POWER DELIVERY MODULE)

DTC Logic

INFOID:0000000009314804

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P316C P316D P316E	PD MODULE SYSTEM (Power Delivery Module system)	VCM receives a DTC detection signal sent from PDM (Power Delivery Module).	PDM (Power Delivery Module)

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when PDM (Power Delivery Module) detects a DTC. If the DTC is displayed, perform trouble diagnosis for a DTC that detected by PDM (Power Delivery Module).

>> Proceed to EVC-264, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009314805

Perform the self-diagnosis of PDM (Power Delivery Module).

P316F PDM (POWER DELIVERY MODULE)

DTC Logic

INFOID:0000000008747141

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P316F	PD MODULE SYSTEM (Power delivery Module system)	The charge electricity of the PDM (Power Delivery Module) is less than 0.1KW	• Harness or connector • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

1. Perform normal charging and wait at least 10 minutes.
2. Turn power switch ON.
3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-265, "Diagnosis Procedure".
NO (Without quick charge port)>>INSPECTION END
NO (With quick charge port)>>GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

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

Is DTC detected?

YES >> Proceed to EVC-265, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747142

1.CHECK PDM (POWER DELIVERY MODULE) OUTPUT POWER-1

With CONSULT

1. Turn power switch OFF.
2. Perform normal charging.
3. Turn power switch ON.
4. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “OBC OUT PWR”.

Is value 0kW?

YES >> GO TO 3.
NO-1 (with quick charge port)>>GO TO 2.
NO-2 (without quick charge port)>>Replace VCM. Refer to EVC-426, "Removal and Installation".

2.CHECK PDM (POWER DELIVERY MODULE) OUTPUT POWER-2

With CONSULT

1. Turn power switch OFF.
2. Perform quick charging.
3. Turn power switch ON.
4. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “OBC OUT PWR”.

Is value 0 kW?

YES >> INSPECTION END (quick charger malfunction)
NO >> Replace VCM. Refer to EVC-426, "Removal and Installation".

3. PERFORM SELF-DIAGNOSIS OF PDM (POWER DELIVERY MODULE)

Perform self-diagnosis of PDM (Power Delivery Module).

Is any DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> Check to see if there is a factor causing a situation that battery charge does not start. Refer to EVC-412, "Symptom Index".

P3170, P3171 PDM (POWER DELIVERY MODULE)

DTC Logic

INFOID:0000000009314806

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detection condition	Possible cause
P3170	PD MODULE SYSTEM (Power Delivery module system)	VCM receives a DTC detection signal sent from PDM (Power Delivery Module).	PDM (Power Delivery Module)
P3171			

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when PDM (Power Delivery Module) detects a DTC. If the DTC is displayed, perform trouble diagnosis for a DTC that detected by PDM (Power Delivery Module).

>> Proceed to EVC-267, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009314807

Perform the self-diagnosis of PDM (Power Delivery Module).

P3172, P3173 PDM (POWER DELIVERY MODULE)

DTC Logic

INFOID:0000000008747143

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3172	PD MODULE SYSTEM (Power Delivery Module system)	VCM detects an error signal that is received from PDM (Power Delivery Module) via EV system CAN communication.	PDM (Power Delivery Module)
P3173			

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when PDM (Power Delivery Module) detects a DTC. If the DTC is displayed, perform trouble diagnosis for a DTC that detected by PDM (Power Delivery Module).

>> Proceed to EVC-268, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747144

Perform the self-diagnosis of PDM (Power Delivery Module).

P3175 VCM

DTC Logic

INFOID:0000000008747145

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3175	VCM (VCM)	VCM detects a CAN error signal that is received from electric shift control module via CAN communication for 0.1 seconds or more.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-269, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747146

1.REPLACE VCM

Replace the VCM. Refer to EVC-426, "Removal and Installation".

>> INSPECTION END

P3176 TRACTION MOTOR INVERTER CONDENSER

DTC Logic

INFOID:0000000008747147

DTC DETECTION LOGIC

NOTE:
If DTC P3176 is displayed with DTC P0A94, P311C, P317A, P3191, P319C, P31A7, P31D4, P31D7, or P31DD, perform diagnosis for DTC P0A94, P311C, P317A, P3191, P319C, P31A7, P31D4, P31D7, or P31DD.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3176	INVERTER CONDENSER (Inverter condenser)	Immediately before READY or the start of charge, pre-charging cannot be performed for 5 seconds or more.	• High voltage harness • LBC • PDM (Power Delivery Module) • Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-270, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747148

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:
- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:
- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.PERFORM SELF-DIAGNOSIS OF VCM

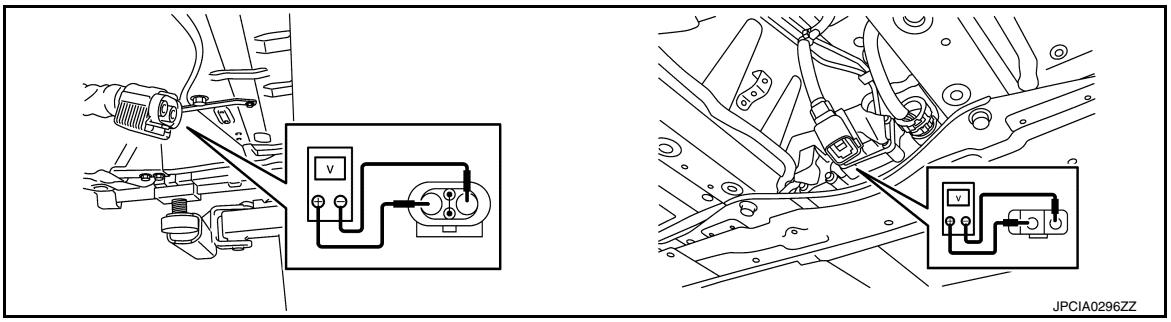
With CONSULT
Perform self-diagnosis of VCM.
Is DTC detected other than P3176?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



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

Standard : 5 V or less

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

>> GO TO 3.

3.CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace electric compressor. And then, GO TO 9. Refer to HA-37, "Removal and Installation" (with heat pump system) or HA-95, "Removal and Installation" (without heat pump system).

4. CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace PTC heater. And then, GO TO 9. Refer to HAC-208, "Removal and Installation" [auto A/C (with heat pump)] or HAC-374, "Removal and Installation" [auto A/C (without heat pump)].

5. CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Is the inspection result normal?

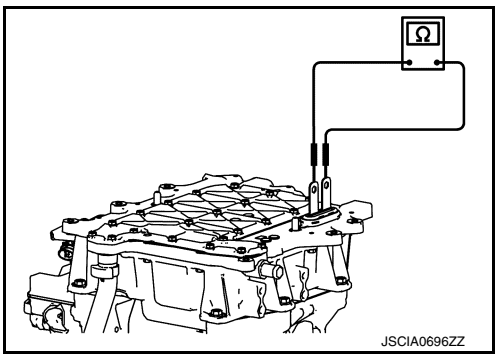
YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 9.
NO >> GO TO 6.

6. CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".

2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace traction motor inverter. And then, GO TO 9. Refer to TMS-108, "Removal and Installation".

7. CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-126, "Disassembly and Assembly".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace malfunctioning harness. And then, GO TO 9.

8. CHECK PDM (POWER DELIVERY MODULE)

Check the short circuit between PDM (Power Delivery Module) terminals.

PDM (Power Delivery Module)		
+	–	Resistance
Terminal		
38	39	3 kΩ or more

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace PDM (Power Delivery Module). And then, GO TO 9. Refer to VC-119, "Removal and Installation".

9.REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P3177 ECU ACTIVATION ERROR

DTC Logic

INFOID:0000000008747149

DTC DETECTION LOGIC

NOTE:
If DTC P3177 is displayed with DTC P316C, P316D, P316E, P3170, P3171, P3173, P317A, or P3191, perform diagnosis for DTC P316C, P316D, P316E, P3170, P3171, P3173, P317A, or P3191.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3177	ECU ACTIVATION ERROR (ECU activation error)	When EV system starts up, PDM (Power Delivery Module) or traction motor inverter does not permit EV system activation.	• Charging system • Traction motor system • EVSE • Quick charger • External input

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT
1. Set the vehicle to READY and wait at least 200 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-276, "TYPE 1 : Diagnosis Procedure".
NO-1 (with quick charge port)>>GO TO 3.
NO-2 (without quick charge port)>>GO TO 4.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT
1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect quick charge connector.
4. Start quick charging and wait at least 200 seconds.
5. Turn power switch ON.
6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-276, "TYPE 2 : Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT
1. Turn power switch OFF.
2. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
3. Connect normal charge connector (with AC power input) and wait at least 200 seconds.
   CAUTION:
   When performing the DTC Confirmation Procedure before Diagnosis Procedure, use the EVSE used at the occurrence of malfunction.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-277, "TYPE 3 : Diagnosis Procedure".
NO-1 (before performing diagnosis procedure)>>Proceed to EVC-277, "TYPE 3 : Diagnosis Procedure".

NO-2 (after performing diagnosis procedure)>>INSPECTION END

TYPE 1

TYPE 1 : Diagnosis Procedure

INFOID:0000000008747150

1.CHECK DTC

With CONSULT

Check DTC.

Is any DTC other than P3177 detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

With CONSULT

Check self-diagnostic result in “MOTOR”.

Is any DTC detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

TYPE 2

TYPE 2 : Diagnosis Procedure

INFOID:0000000008747151

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

With CONSULT

Check DTC.

Is any DTC other than P3177 detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 3.

3.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

With CONSULT

Check self-diagnostic result in “MOTOR”.

Is any DTC detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 4.

4.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT

Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

TYPE 3

TYPE 3 : Diagnosis Procedure

INFOID:0000000008747152

1.PERFORM NORMAL CHARGING

1. Erase DTC of all ECU.
2. Turn power switch OFF.
3. Check that the charging status indicator is not illuminating, and wait at least 20 seconds.
4. Connect normal charge connector (with AC power input) and wait at least 200 seconds.
   CAUTION:
   - **Use an EVSE other than the one used for the previous DTC confirmation procedure.**
   - **Use NISSAN genuine EVSE or an equivalent.**
5. Check DTC.

Is DTC P3177 detected again?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK CONDITION

Check adherence to the following conditions at the occurrence of the malfunction:
- No interruption in the indoor power and EVSE.
- Use of the specified EVSE.
- Proper connection of EVSE.
- EVSE LED (FAULT) is not ON or blinking.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

3.CHECK DTC

With CONSULT
Check DTC.

Is any DTC other than P3177 detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 4.

4.CHECK SELF-DIAGNOSTIC RESULT IN PDM (POWER DELIVERY MODULE)

With CONSULT
Check self-diagnostic result in “CHARGER/PD MODULE”.

Is any DTC detected?

YES >> Check the DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 5.

5.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

With CONSULT
Check self-diagnostic result in “MOTOR”.

Is any DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 6.

6.CHECK CONDITION

Check and study the following items:
- No interruption in the indoor power and EVSE.
- Use of the specified EVSE.
- Proper connection of EVSE.
- PDM (Power Delivery Module) remains cold.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P3178 ECU ACTIVATION ERROR

DTC Logic

INFOID:0000000008747153

DTC DETECTION LOGIC

NOTE:
If DTC P3178 is displayed with DTC P0AA0, P317A, P3191, P3193, P319C, P319E, P31A7, or P31A9, perform diagnosis for DTC P0AA0, P317A, P3191, P3193, P319C, P319E, P31A7, or P31A9.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3178	ECU ACTIVATION ERROR (ECU activation error)	When EV system starts up, Li-ion battery or traction motor inverter does not permit EV system activation.	• Harness or connectors • Li-ion battery system • Traction motor system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Turn power switch ON and wait at least 20 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-278, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747154

1.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT
Perform self-diagnosis of VCM.

Is DTC other than P3178 detected?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN TRACTION MOTOR INVERTER

With CONSULT
Check self-diagnostic result in “MOTOR”.

Is any DTC detected?

YES >> Check the DTC. Refer to TMS-28, "DTC Index".
NO >> GO TO 3.

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

With CONSULT
Check self-diagnostic result in “HV BAT”.

Is any DTC detected?

YES >> Check the DTC. Refer to EVB-45, "DTC Index".
NO >> Check high voltage harness connector installation condition of Li-ion battery and traction motor inverter.

P3179, P317A, P317B TRACTION MOTOR INVERTER

DTC Logic

INFOID:0000000008747155

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3179 P317A P317B	MOTOR SYSTEM (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

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when the traction motor inverter detects a DTC. If this DTC is displayed, perform trouble diagnosis for a DTC that detected by traction motor inverter.

>> Proceed to EVC-279, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747156

Perform the self-diagnosis of traction motor inverter.

P317D TRACTION MOTOR INVERTER

DTC Logic

INFOID:0000000008747157

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P317D	MOTOR SYSTEM (Motor system)	• The estimated torque value from the traction motor inverter to VCM remains greater/smaller than the torque command value from VCM to the traction motor inverter for the specified time. • The difference between the estimated power consumption calculated based on a torque value from VCM to the traction motor inverter and the actual power consumption calculated based on a high voltage battery voltage and current is 54 kW or more.	• Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY and perform test drive.
   CAUTION:
   Always drive vehicle at a safe speed.
   NOTE:
   DTC can be reproduced more easily when vehicle speed is higher.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-280, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747158

1.CHECK TRACTION MOTOR TORQUE

With CONSULT

1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “TRG MOTOR TORQ 1” and “CURRENT MOTOR TORQ”.
2. Shift selector lever in P range.
3. Set the vehicle to READY.
4. Check that the difference between values indicated by “TRG MOTOR TORQ 1” and “CURRENT MOTOR TORQ” is within 20 N·m.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".

2.REPLACE VCM

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Turn power switch ON and erase DTC.
3. Perform DTC confirmation procedure. Refer to EVC-280, "DTC Logic".

Is DTC “P317D” detected again?

YES >> Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".

NO >> INSPECTION END

P317E, P3180, P3182 LI-ION BATTERY

DTC Logic

INFOID:0000000008747159

DTC DETECTION LOGIC

DTC No.	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P317E P3180 P3182	HV BATTERY SYSTEM (High voltage battery system)	VCM detects an error signal that is received from LBC via CAN communication for 0.02 seconds or more.	Li-ion battery system

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when LBC detects a DTC. If this DTC is displayed, perform trouble diagnosis for a DTC that detected by LBC.

>> Proceed to EVC-282, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747160

Perform the self-diagnosis of LBC.

P3183 LI-ION BATTERY

DTC Logic

INFOID:0000000008747161

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3183	HV BATTERY SYSTEM (High voltage battery system)	After a lapse of 0.3 seconds from M/C RELAY ON, the following state remains for 2.8 seconds or more: LBC's calculation result to the VCM-set example question is incorrect.	• LBC • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-283, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747162

1.REPLACE LBC

1. Replace LBC. Refer to EVB-214, "LI-ION BATTERY CONTROLLER : Exploded View".
2. Turn power switch ON and erase DTC.
3. Perform DTC confirmation procedure. Refer to EVC-283, "DTC Logic".

Is DTC “P3183” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3187 ELECTRIC SHIFT

DTC Logic

INFOID:0000000009314808

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3187	ELECTRIC SHIFT SYSTEM (Electric shift system)	VCM receives a DTC detection signal sent from electric shift control module.	Electric shift control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-284, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314809

1.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

With CONSULT

Check self-diagnostic result in “SHIFT”.

Is any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-284, "DTC Logic".

Is the DTC “P3187” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3188 ELECTRIC SHIFT

DTC Logic

INFOID:0000000009328752

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3188	ELECTRIC SHIFT SYSTEM (Electric shift system)	VCM receives a DTC detection signal sent from electric shift control module.	Electric shift control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-285, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009328753

1.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

With CONSULT

Check self-diagnostic result in “SHIFT”.

Is any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-284, "DTC Logic".

Is the DTC “P3188” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3189 ELECTRIC SHIFT

DTC Logic

INFOID:0000000009314810

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3189	ELECTRIC SHIFT SYSTEM (Electric shift system)	VCM receives a DTC detection signal sent from electric shift control module.	Electric shift control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-286, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Set the vehicle to READY.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-286, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314811

1.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

With CONSULT

Check self-diagnostic result in “SHIFT”.

Is any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-286, "DTC Logic".

Is the DTC “P3189” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P318A ELECTRIC SHIFT

DTC Logic

INFOID:0000000008747165

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318A	ELECTRIC SHIFT SYSTEM (Electric shift system)	Difference between target shift position signal and current shift position signal for 1.6 seconds.	• Electric shift system • Electric shift control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

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 >> Proceed to EVC-287, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Shift the selector lever to the entire position from P to D, and shift it to N position.
   NOTE:
   Hold the lever at each position for 3 seconds or more.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-287, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747166

1.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is DTC detected other than P318A?

YES >> Check the DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

Check self-diagnostic result in “SHIFT”.

Is any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.

2. Perform DTC confirmation procedure again. Refer to EVC-287, "DTC Logic".

Is the DTC “P318A” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

P318B ELECTRIC SHIFT

DTC Logic

INFOID:0000000008747167

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318B	ELECTRIC SHIFT SYSTEM (Electric shift system)	• VCM detects invalid signal of shift position signal sent from electric shift control module. • VCM receives abnormal shift position signal for 0.1 seconds or more.	• Electric shift system • Electric control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-289, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009328922

1.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

With CONSULT

Check self-diagnostic result in “SHIFT”.

Is any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-289, "DTC Logic".

Is the DTC “P318B” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P318C ELECTRIC SHIFT

DTC Logic

INFOID:0000000009314812

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318C	ELECTRIC SHIFT SYSTEM (Electric shift system)	Differ between current shift position and shift position signal sent from the electric shift control module.	Electric shift control module (built in to VCM)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-291, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Shift the selector lever to the entire position from R to D, and shift it to P position.
   CAUTION:
   Hold the lever at each position for 15 seconds or more.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-291, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT

1. Set the vehicle to READY.
2. Drive the vehicle at 15 km/h (10 MPH) with the selector lever in D range. From this condition, shift the selector lever in R range.
   CAUTION:
   Always drive vehicle at safe speed.
3. Stop the vehicle.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-291, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-4

With CONSULT

1. Drive the vehicle at 15 km/h (10 MPH) with the selector lever in R range. From this condition, shift the selector lever in D range.
   CAUTION:
   Always drive vehicle at safe speed.
2. Stop the vehicle.

3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-291, "Diagnosis Procedure".
NO >> GO TO 6.

6. PERFORM DTC CONFIRMATION PROCEDURE-5

With CONSULT

1. Shift the selector lever to P range and turn power switch OFF.
2. Connect EVSE and start normal charge.
3. Turn power switch ON.
4. Shift the selector lever to other than P range.
5. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-291, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314813

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-290, "DTC Logic".

Is the DTC “P318C” detected again?

YES >> Peplace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P318D CAN COMMUNICATION

DTC Logic

INFOID:0000000008747169

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P318D	COMMUNICATION ERROR (Communication error)	When VCM is not transmitting CAN communication signal for 2 seconds or more.	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-292, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747170

1.PERFORM CONFIRMATION PROCEDURE AGAIN

1. Erase DTC.
2. Perform confirmation procedure again. Refer to EVC-292, "DTC Logic".

Is DTC “P318D” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

P3191, P319C, P31A7 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747171

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3191 P319C P31A7	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from traction motor inverter via CAN communication	• CAN communication • Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-293, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747172

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any EV system CAN error (U1000 excluded) other than DTC P3191, P319C, and P31A7 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-293, "DTC Logic".

Is DTC P3191, P319C, or P31A7 detected again?

YES >> Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE TRACTION MOTOR INVERTER

With CONSULT

1. Replace traction motor inverter. Refer to TMS-108, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-293, "DTC Logic".

Is DTC P3191, P319C, or P31A7 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3193, P319E, P31A9 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747173

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3193 P319E P31A9	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from LBC via CAN communication	• CAN communication • LBC • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-295, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747174

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any EV system CAN error (U1000 excluded) other than DTC P3193, P319E, and P31A9 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-295, "DTC Logic".

Is DTC P3193, P319E, or P31A9 detected again?

YES >> Replace LBC. Refer to EVB-214, "LI-ION BATTERY CONTROLLER : Exploded View".
NO >> INSPECTION END

4.REPLACE LBC

With CONSULT

1. Replace LBC. Refer to EVB-214, "LI-ION BATTERY CONTROLLER : Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-295, "DTC Logic".

Is DTC P3193, P319E, or P31A9 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3194, P319F, P31AA CAN COMMUNICATION

DTC Logic

INFOID:0000000008747175

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3194 P319F P31AA	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from ABS actuator and electric unit (control unit) via CAN communication	• CAN communication • ABS actuator and electric unit (control unit) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-297, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747176

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P3194, P319F, and P31AA detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-297, "DTC Logic".

Is DTC P3194, P319F, or P31AA detected again?

YES >> Replace ABS actuator and electric unit (control unit). Refer to BRC-176, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE ABS ACTUATOR AND ELECTRIC UNIT (CONTROL UNIT)

With CONSULT

1. Replace ABS actuator and electric unit (control unit). Refer to BRC-176, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-297, "DTC Logic".

Is DTC P3194, P319F, or P31AA detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3195, P31A0, P31AB CAN COMMUNICATION

DTC Logic

INFOID:0000000008747177

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3195 P31A0 P31AB	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from electrically-driven intelligent brake unit via CAN communication	• CAN communication • Electrically-driven intelligent brake unit • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-299, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747178

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P3195, P31A0, and P31AB detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-299, "DTC Logic".

Is DTC P3195, P31A0, or P31AB detected again?

YES >> Replace electrically-driven intelligent brake unit. Refer to BR-533, "Removal and installation".
NO >> INSPECTION END

4.REPLACE ELECTRICALLY-DRIVEN INTELLIGENT BRAKE UNIT

With CONSULT

1. Replace electrically-driven intelligent brake unit. Refer to BR-533, "Removal and installation".
2. Perform DTC confirmation procedure again. Refer to EVC-299, "DTC Logic".

Is DTC P3195, P31A0, or P31AB detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> INSPECTION END

P3196, P31A1, P31AE EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747179

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3196 P31A1 P31AE	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from PDM (Power Delivery Module) via CAN communication	• CAN communication • PDM (Power Delivery Module) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-301, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747180

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any EV system CAN error (U1000 excluded) other than DTC P3196, P31A1, and P31AE detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-301, "DTC Logic".

Is DTC P3196, P31A1, or P31AE detected again?

YES >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE PDM (POWER DELIVERY MODULE)

With CONSULT

1. Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-301, "DTC Logic".

Is DTC P3196, P31A1, or P31AE detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P3197, P31A2, P31AD EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747181

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P3197 P31A2 P31AD	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from electric shift control module via CAN communication	• CAN communication • Electric shift control module (built in to VCM) • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-303, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747182

1.CHECK SELF-DIAGNOSTIC RESULT IN ELECTRIC SHIFT CONTROL MODULE

With CONSULT

Check self-diagnostic result in “SHIFT”.

Are any DTC detected?

YES >> Check the DTC. Refer to TM-50, "DTC Index".
NO >> GO TO 2.

2.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

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

3.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-303, "DTC Logic".

Is DTC P3197, P31A2, or P31AD detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

P31AF, P31B3 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747183

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31AF P31B3	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from A/C auto amp. via CAN communication	• CAN communication • A/C auto amp. • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-304, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747184

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any EV system CAN error (U1000 excluded) other than DTC P31AF and P31B3 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-304, "DTC Logic".

Is DTC P31AF or P31B3 detected again?

YES >> Replace A/C auto amp. Refer to HAC-194, "Removal and Installation" (with heat pump), HAC-362, "Removal and Installation" (without heat pump).
NO >> INSPECTION END

4.REPLACE A/C AUTO AMP.

With CONSULT

1. Replace A/C auto amp. Refer to HAC-194, "Removal and Installation" (with heat pump), HAC-362, "Removal and Installation" (without heat pump).
2. Perform DTC confirmation procedure again. Refer to EVC-304, "DTC Logic".

Is DTC P31AF or P31B3 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31B0, P31B4 CAN COMMUNICATION

DTC Logic

INFOID:0000000008747185

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31B0 P31B4	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from AV control unit via CAN communication	• CAN communication • AV control unit • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-306, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747186

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P31B0 and P31B4 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-306, "DTC Logic".

Is DTC P31B0 or P31B4 detected again?

YES >> Replace AV control unit. Refer to AV-205, "Removal and Installation" (navigation without BOSE), AV-377, "Removal and Installation" (navigation with BOSE), AV-503, "Removal and Installation" (with telematics).
NO >> INSPECTION END

4.REPLACE AV CONTROL UNIT

With CONSULT

1. Replace AV control unit. Refer to AV-205, "Removal and Installation" (navigation without BOSE), AV-377, "Removal and Installation" (navigation with BOSE), AV-503, "Removal and Installation" (with telematics).

2. Perform DTC confirmation procedure again. Refer to EVC-306, "DTC Logic".

Is DTC P31B0 or P31B4 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31B2, P31B5 CAN COMMUNICATION

DTC Logic

INFOID:0000000008747187

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31B2 P31B5	COMMUNICATION ERROR	VCM detects an error signal that is received from combination meter via CAN communication	• CAN communication • Combination meter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-308, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747188

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P31B2 and P31B5 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-308, "DTC Logic".

Is DTC P31B2 or P31B5 detected again?

YES >> Replace combination meter. Refer to MWI-107, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE COMBINATION METER

With CONSULT

1. Replace combination meter. Refer to MWI-107, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-308, "DTC Logic".

Is DTC P31B2 or P31B5 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31B6 CAN COMMUNICATION

DTC Logic

INFOID:0000000008747189

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31B6	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from IPDM E/R via CAN communication	• CAN communication • IPDM E/R • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-310, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747190

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P31B6 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-310, "DTC Logic".

Is DTC P31B6 detected again?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE IPDM E/R

With CONSULT

1. Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-310, "DTC Logic".

Is DTC P31B6 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> INSPECTION END

P31B7 CAN COMMUNICATION

DTC Logic

INFOID:0000000008747191

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31B7	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from air bag diagnosis sensor unit via CAN communication	• CAN communication • Air bag diagnosis sensor unit • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-312, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747192

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P31B7 detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-312, "DTC Logic".

Is DTC P31B7 detected again?

YES >> Replace air bag diagnosis sensor unit. Refer to SR-38, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE AIR BAG DIAGNOSIS SENSOR UNIT

With CONSULT

1. Replace air bag diagnosis sensor unit. Refer to SR-38, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-312, "DTC Logic".

Is DTC P31B7 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31B8 EV SYSTEM CAN COMMUNICATION

DTC Logic

INFOID:0000000008747193

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31B8	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from TCU via CAN communication	• CAN communication • TCU • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-314, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747194

1.CHECK TCU CONDITION

Check that the TCU activation is performed normally. Refer to AV-485, "ADDITIONAL SERVICE WHEN USING TELEMATICS SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION : Description".

Is TCU activation performed normally?

YES >> GO TO 2.
NO >> Perform TCU activation. Refer to AV-485, "ADDITIONAL SERVICE WHEN USING TELEMATICS SYSTEM FOR THE FIRST TIME/RE-SUBSCRIPTION : Work Procedure".

2.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

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

3.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any EV system CAN error (U1000 excluded) other than DTC P31B8 detected?

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

4.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-314, "DTC Logic".

Is DTC P31B8 detected again?

YES >> Replace TCU. Refer to AV-504, "Removal and Installation".

NO >> INSPECTION END

5.REPLACE TCU

With CONSULT

1. Replace TCU. Refer to AV-504, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-314, "DTC Logic".

Is DTC P31B8 detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31BA CAN COMMUNICATION

DTC Logic

INFOID:0000000009314814

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31BA	COMMUNICATION ERROR (Communication error)	When VCM detects an error signal that is received from BCM via CAN communication	• CAN communication • BCM • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-316, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314815

1.PERFORM TROUBLE DIAGNOSIS FOR CAN COMMUNICATION

Perform trouble diagnosis for CAN communication. Refer to LAN-16, "Trouble Diagnosis Flow Chart".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK SELF-DIAGNOSTIC RESULT IN VCM

With CONSULT

Check self-diagnostic result in “EV/HEV”.

Is any CAN error (U1000 excluded) other than DTC P31BA detected?

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

3.REPLACE VCM

With CONSULT

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-316, "DTC Logic".

Is DTC P31BA detected again?

YES >> Replace BCM. Refer to BCS-86, "Removal and Installation".
NO >> INSPECTION END

4.REPLACE BCM

With CONSULT

1. Replace BCM. Refer to BCS-86, "Removal and Installation".
2. Perform DTC confirmation procedure again. Refer to EVC-316, "DTC Logic".

Is DTC P31BA detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> INSPECTION END

P31C5, P31C6 VCM

DTC Logic

INFOID:0000000008747203

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31C5 P31C6	VCM (VCM)	VCM malfunction is detected	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-318, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 60 seconds.
3. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-318, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747204

1.CHECK VCM-1

With CONSULT

1. Erase DTC.
2. Turn power switch OFF and wait at least 20 seconds.
3. Disconnect 12V battery negative terminal and wait at least 1 minute. Refer to EVC-10, "Precautions for Removing of Battery Terminal".
4. Reconnect 12V battery negative terminal.
5. Turn power switch ON and wait at least 5 minutes.
6. Check DTC.

Is DTC “P31C5” or P31C6” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> GO TO 2.

2.CHECK VCM-2

With CONSULT

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON and wait at least 60 seconds.
3. Check DTC.

Is DTC “P31C5” or P31C6” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31C7 VCM

DTC Logic

INFOID:0000000008747205

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31C7	VCM (VCM)	VCM malfunction is detected	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-320, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Set timer charge start time to 5 minutes later.
2. Turn power switch OFF.
3. Connect EVSE (With AC power input) and wait until battery charge starts.
4. Wait at least 10 minutes after starting timer charge.
5. Turn the power switch ON while charging.
6. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-320, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747206

1.CHECK VCM

With CONSULT

1. Erase DTC.
2. Turn power switch OFF and wait at least 20 seconds.
3. Disconnect 12V battery negative terminal and wait at least 1 minute. Refer to EVC-10, "Precautions for Removing of Battery Terminal".
4. Reconnect 12V battery negative terminal.
5. Turn power switch ON and wait at least 6 minutes.
6. Check DTC.

Is DTC “P31C7” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE AGAIN

With CONSULT

Perform confirmation procedure again. Refer to EVC-320, "DTC Logic".

Is DTC “P31C7” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

P31CA, P31CB QUICK CHARGE RELAY

DTC Logic

INFOID:0000000008747209

DTC DETECTION LOGIC

NOTE:
If DTC P31CA or P31CB is displayed with DTC P3101, first perform diagnosis for DTC P3101.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31CA	PD MODULE (Power Delivery Module)	VCM received quick charge relay (-) stuck signal from PDM (Power Delivery Module).	• Harness or connectors • Quick charge relay • PDM (Power Delivery Module)
P31CB		VCM received quick charge relay (+) stuck signal from PDM (Power Delivery Module).	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Start quick charge and wait at least 30 seconds.
2. Stop quick charge and wait at least 30 seconds.
3. Turn power switch ON.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-322, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747210

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Erase DTC.
2. Perform the DTC confirmation procedure again using a quick charger other than the one that is used for the initial confirmation procedure. Refer to EVC-322, "DTC Logic".

Is DTC “P31CA” or “P31CB” detected again?

YES >> GO TO 2.
NO >> INSPECTION END (Quick charger malfunction)

2.PERFORM SELF-DIAGNOSIS OF PDM (POWER DELIVERY MODULE)

Perform self-diagnosis of PDM (Power Delivery Module).

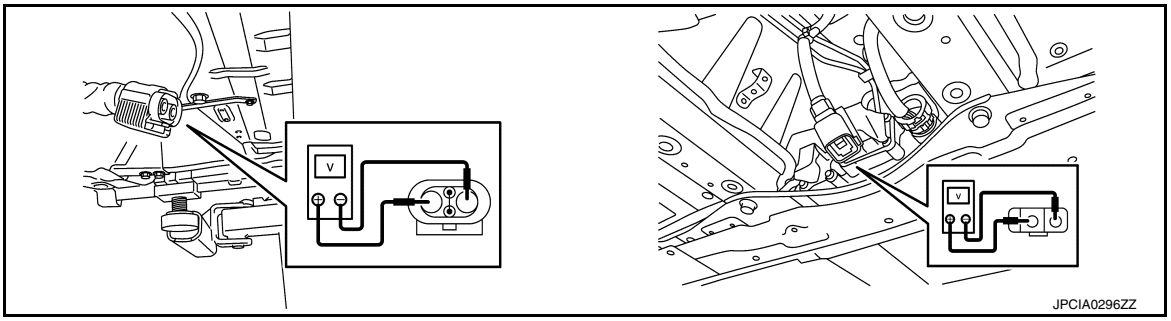
Is any DTC detected?

YES >> Perform diagnosis procedure of detected DTC. Refer to VC-34, "DTC Index".
NO >> GO TO 3.

3.PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Removal and Installation".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



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

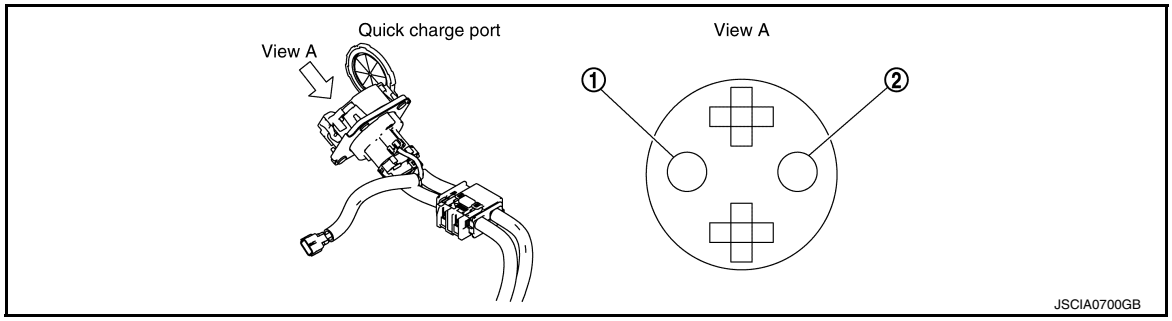
Standard : 5 V or less

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

>> GO TO 4.

4.CHECK QUICK CHARGE RELAY

1. Disconnect Li-ion battery harness connector (H3).
2. Check the continuity between Li-ion battery harness connector and quick charge port terminal (plug-in side).



①: #11 terminal (plug-in side)

②: #12 terminal (plug-in side)

+		–	Continuity
Li-ion battery		Quick charge port (plug-in side)	
Connector	Terminal	Terminal	
H3	38	11	Not existed
	37	12	

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".

P31D3 M/C RELAY

DTC Logic

INFOID:0000000009314816

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D3	M/C RELAY (Motor control relay)	When turn power switch ON (or READY), a voltage is input to A/C relay drive circuit of VCM even though VCM does not turn ON the M/C relay.	• Harness or connectors • M/C relay (stuck ON)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-325, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314817

1.CHECK A/C RELAY DRIVE CIRCUIT VOLTAGE

1. Turn power switch OFF.
2. Disconnect A/C relay.
3. Check the voltage between A/C relay harness connector terminals.

+		–	Voltage (Approx.)
A/C relay			
Connector	Terminal		
E52	1	Ground	0 V

Is the inspection result normal?

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

2.CHECK M/C RELAY

Check M/C relay. Refer to EVC-326, "Component Inspection (M/C Relay)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace M/C relay.

3.CHECK A/C RELAY DRIVE CIRCUIT

Check harness for short to power, between M/C relay harness connector and A/C relay harness connector.

+		–	Voltage
M/C relay			
Connector	Terminal		
E65	5	Ground	0 V

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK M/C RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to ground, between M/C relay harness connector and VCM harness connector.

+		–	Continuity
M/C relay			
Connector	Terminal		
E65	1	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

5.CHECK A/C RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to power, between A/C relay harness connector and VCM harness connector.

+		–	Voltage
A/C relay			
Connector	Terminal		
E52	2	Ground	0 V

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-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

Component Inspection (M/C Relay)

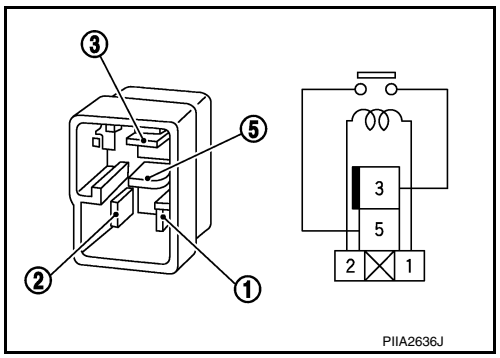
INFOID:0000000009314818

1.CHECK M/C RELAY

1. Turn power switch OFF.
2. Disconnect M/C relay.

3. Check the continuity between M/C relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 – 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.

P31D4 PRE-CHARGE RELAY

DTC Logic

INFOID:0000000008747211

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D4	PRE CHARGE RELAY (Pre-charge relay)	After operating the power switch from OFF to READY, a break occurs in the pre-charge relay drive circuit or resistance remains extremely high for 2.5 seconds or more.	• Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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-328, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747212

1.CHECK PRE-CHARGE RELAY GROUND CIRCUIT

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

Li-ion battery		Ground	Continuity
Connector	Terminal		
B24	10	Ground	Existed

Is inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-1

Check the resistance between Li-ion battery connector terminals.

Li-ion battery		Resistance
+	–	
Terminal		
10	11	Less than 5 kΩ

Is the inspection result normal?

YES >> GO TO 3.

NO >> Check the relay circuit of Li-ion battery for malfunction. If no malfunction is found, replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

3. CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-2

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

+		–		Continuity
VCM		Li-ion battery		
Connector	Terminal	Connector	Terminal	
E61	40	B24	11	Existed

3. Also check harness for short to power.

Is inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31D5 PRE-CHARGE RELAY

DTC Logic

INFOID:0000000008747213

DTC DETECTION LOGIC

NOTE:
If DTC P31D5 is displayed with DTC P0AA2, P31D4, P31DB, or P31DD, perform diagnosis for DTC P0AA2, P31D4, P31DB, or P31DD.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D5	PRE CHARGE RELAY (Pre-charge relay)	• The voltage of the traction motor inverter is 100 V or more immediately before starting charging or immediately before READY. • The voltage of the traction motor inverter is 100 V or more when only the system main relay 2 is ON.	• Harness or connectors • Battery J/B • Traction motor inverter • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Set the vehicle to READY and perform test drive.
2. Turn power switch OFF and wait at least for 60 seconds.
3. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-330, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747214

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:
- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:
- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.PERFORM SELF-DIAGNOSIS OF TRACTION MOTOR INVERTER

With CONSULT
Perform self-diagnosis of traction motor inverter.

Is DTC detected?

YES >> Perform detected DTC diagnosis procedure. Refer to TMS-28, "DTC Index".
NO >> GO TO 2.

2.CHECK SYSTEM MAIN RELAY DRIVE CIRCUIT

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

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

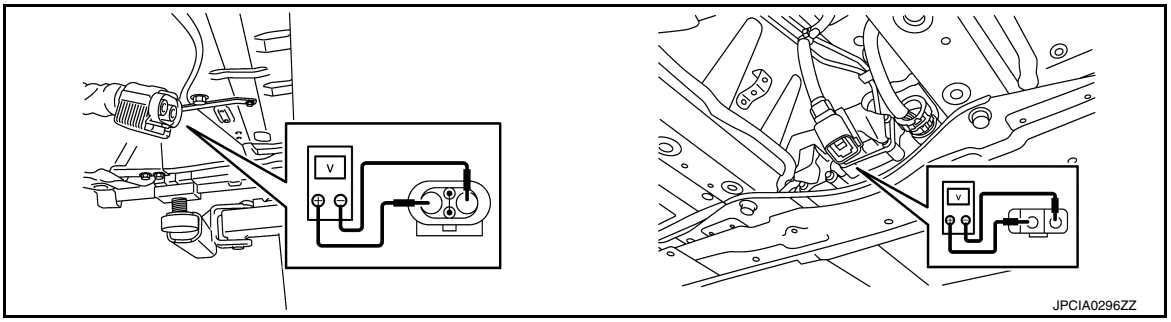
Is the inspection result normal?

YES >> GO TO 3.
NO >> Check harness for short to power.

3.PRECONDITIONING

WARNING:
Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".
Check voltage in high voltage circuit. (Check that condenser are discharged.)

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Removal and Installation".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



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

Standard : 5 V or less

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

>> GO TO 4.

4.CHECK ELECTRIC COMPRESSOR

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

With heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	2	3 kΩ or more

Without heat pump system

Electric compressor		Resistance
+	–	
Terminal		
1	3	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace electric compressor. And then, GO TO 10. Refer to HA-37, "Removal and Installation" (with heat pump system) or HA-95, "Removal and Installation" (without heat pump system).

5.CHECK PTC HEATER

1. Disconnect Li-ion battery harness connector (H19).
2. Check the short circuit between Li-ion battery terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PTC heater	H19	40	41	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 6.
NO >> Replace PTC heater. And then, GO TO 10. Refer to HAC-208, "Removal and Installation" (with heat pump system) orHAC-374, "Removal and Installation" (without heat pump system).

6.CHECK HIGH VOLTAGE HARNESS-1

1. Disconnect Li-ion battery harness connector (H3).
2. Check the short circuit between Li-ion battery harness connector terminals.

With heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

Without heat pump system

Connected to:	Li-ion battery			Resistance
	Connector	+	–	
		Terminal		
PDM (Power Delivery Module)	H3	37	38	3 kΩ or more

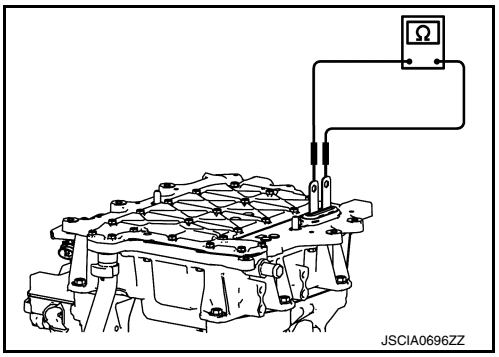
Is the inspection result normal?

YES >> The high voltage harness within Li-ion battery may be shorted. Check the related circuits. And then, GO TO 10.
NO >> GO TO 7.

7.CHECK TRACTION MOTOR INVERTER

1. Remove PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between traction motor inverter terminals.

Resistance : more than 3 kΩ



Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace traction motor inverter. And then, GO TO 10. Refer to TMS-108, "Removal and Installation".

8.CHECK HIGH VOLTAGE HARNESS-2

1. Remove high voltage harness from PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
2. Check the short circuit between high voltage harness connector (Li-ion battery side) and high voltage harness connector [PDM (Power Delivery Module) side].

With heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

Without heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Li-ion battery	H5	38	39	3 kΩ or more

3. Check the short circuit between high voltage harness connector (electric compressor side) and high voltage harness connector [PDM (Power Delivery Module) side].

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H6	42	41	3 kΩ or more

with heat pump system

Connected to:	PDM (Power Delivery Module)			Resistance
	Connector	+	–	
		Terminal		
Electric compressor	H7	41	42	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace malfunctioning harness. And then, GO TO 10.

9.CHECK PDM (POWER DELIVERY MODULE)

Check the short circuit between PDM (Power Delivery Module) terminals.

PDM (Power Delivery Module)		Resistance
+	–	
Terminal		
38	39	3 kΩ or more

Is the inspection result normal?

YES >> GO TO 10.
NO >> Replace PDM (Power Delivery Module). And then, GO TO 10. Refer to VC-119, "Removal and Installation".

10.REPLACE BATTERY JUNCTION BOX

Replace battery junction box. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

>> INSPECTION END

P31D6 F/S RELAY

DTC Logic

INFOID:0000000008747215

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D6	F/S RELAY (Fail-safe relay)	VCM detected the F/S relay stuck	• Harness or connectors • IPDM E/R • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-335, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747216

1.CHECK F/S RELAY OUTPUT VOLTAGE-1

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 2.

2.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-1

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	60	Ground	12V battery voltage

Is the inspection result normal?

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

3.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-2

1. Disconnect VCM harness connector.
2. Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	60	Ground	12V battery voltage

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> GO TO 4.

4. CHECK F/S RELAY DRIVE CIRCUIT

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

+		–	Continuity
IPDM E/R			
Connector	Terminal		
E15	60	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

5. CHECK F/S RELAY OUTPUT VOLTAGE-2

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> GO TO 6.

6. CHECK F/S RELAY OUTPUT VOLTAGE-3

1. Disconnect VCM harness connector.
2. Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	55	Ground	0 V

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Check harness for short to power, between VCM harness connector and IPDM E/R harness connector.

P31D7 F/S RELAY

DTC Logic

INFOID:0000000008747217

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D7	F/S RELAY (Fail-safe relay)	VCM detected the F/S relay open	• Harness or connectors • IPDM E/R • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-337, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747218

1.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #64 fuse.
3. Make sure that fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 2.
NO >> Replace the fuse after repairing the applicable circuit.

2.CHECK 12V BATTERY POWER SUPPLY

1. Insert the fuse which pulled out.
2. Disconnect IPDM E/R harness connector (E9).
3. Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E9	2	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> Check 12V battery power supply routing circuit.

3.CHECK F/S RELAY OUTPUT VOLTAGE

1. Reconnect IPDM E/R harness connector (E15).
2. Turn power switch ON.
3. 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 9.
NO >> GO TO 4.

4.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-1

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage (Approx.)
IPDM E/R			
Connector	Terminal		
E15	60	Ground	0 V

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 5.

5.CHECK F/S RELAY DRIVE CIRCUIT

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

+		–		Continuity
VCM		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E61	21	E15	60	Existed

Is 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		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

7.CHECK F/S RELAY DRIVE CIRCUIT VOLTAGE-2

1. Turn power switch OFF.
2. Disconnect IPDM E/R harness connector (E15).
3. Check the voltage between IPDM E/R connector and ground.

+		
IPDM E/R	–	Voltage
Terminal		
60	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".

8.CHECK F/S RELAY OUTPUT CIRCUIT

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

+			
IPDM E/R		–	Continuity
Connector	Terminal		
E15	55	Ground	Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Repair or replace error-detected parts.

9.CHECK F/S RELAY OUTPUT CIRCUIT

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

+		–		
VCM		IPDM E/R		Continuity
Connector	Terminal	Connector	Terminal	
E61	5	E15	55	Existed

Is inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31D8 CHARGE CONNECTOR LOCK RELAY

DTC Logic

INFOID:0000000009314819

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31D8	CHARGING CONNECTOR LOCK RLY (Charge connector lock relay)	Voltage of 5 V or more is input from the charge connector lock relay to VCM even when the charge connector lock relay is not ON.	• Harness or connectors • Charge connector lock relay (stuck ON)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Turn power switch OFF.
2. Connect EVSE.
3. Press the charge connector lock switch at the “LOCK” position. (Check that the charge connector lock is operating.)
4. Press the charge connector lock switch at the “OFF” position.
5. Disconnect EVSE.
6. Turn power switch ON and wait at least 5 seconds.
7. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-340, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314820

1.CHECK CHARGE CONNECTOR LOCK RELAY OUTPUT VOLTAGE-1

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E14	35	Ground	0 V

Is the inspection result normal?

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

2.CHECK CHARGE CONNECTOR LOCK RELAY DRIVE CIRCUIT-1

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E14	41	Ground	12V battery voltage

Is the inspection result normal?

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

3. CHECK CHARGE CONNECTOR LOCK RELAY DRIVE CIRCUIT-2

1. Disconnect IPDM E/R harness connector.
2. Disconnect VCM harness connector.
3. Check harness for short to ground, between charge connector lock relay harness connector and VCM harness connector.

+		–	Continuity
IPDM E/R			
Connector	Terminal		
E14	41	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

4. CHECK CHARGE CONNECTOR LOCK RELAY OUTPUT VOLTAGE-2

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

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E14	35	Ground	0 V

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> GO TO 5.

5. CHECK CHARGE CONNECTOR LOCK RELAY OUTPUT CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to power, between IPDM E/R harness connector and VCM harness connector.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E14	35	Ground	0 V

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-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> Repair or replace error-detected parts.

P31DB SYSTEM MAIN RELAY +

DTC Logic

INFOID:0000000008747219

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31DB	HV BATT MAIN RELAY + (High voltage battery main relay +)	System main relay 1 drive circuit remains short to ground for 2.5 seconds or more.	• Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

1. Set the vehicle to READY and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-343, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747220

1.CHECK SYSTEM MAIN RELAY 1 DRIVE CIRCUIT-1

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

+	–	Continuity
Li-ion battery		
Terminal		
17	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK SYSTEM MAIN RELAY 1 DRIVE CIRCUIT-2

1. Disconnect VCM harness connector.
2. Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

+		–	Continuity
Li-ion battery			
Connector	Terminal		
B24	17	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31DC SYSTEM MAIN RELAY -

DTC Logic

INFOID:0000000008747221

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31DC	HV BATT MAIN RELAY – (High voltage battery main relay –)	System main relay 2 drive circuit remains short to ground for 2.5 seconds or more.	• Harness or connectors • Li-ion battery J/B • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Set the vehicle to READY and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-344, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747222

1.CHECK SYSTEM MAIN RELAY 2 DRIVE CIRCUIT-1

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

+	–	Continuity
Li-ion battery		
Terminal		
14	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK SYSTEM MAIN RELAY 2 DRIVE CIRCUIT-2

1. Disconnect VCM harness connector.
2. Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

+		–	Continuity
Li-ion battery			
Connector	Terminal		
B24	14	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31DD PRE-CHARGE RELAY

DTC Logic

INFOID:0000000008747223

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31DD	PRE CHARGE RELAY (Pre-charge relay)	Pre-charge relay drive circuit remains short to ground for 2.5 seconds or more.	• Harness or connectors (Pre-charge relay drive circuit is shorted) • Pre-charge relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

1. Set the vehicle to READY and wait at least 5 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-345, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747224

1.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-1

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

+	–	Continuity
Li-ion battery		
Terminal		
11	Ground	Not existed

Is the inspection result normal?

YES >> GO TO 2.
NO >> Check short circuit between Li-ion battery harness and ground.

2.CHECK PRE-CHARGE RELAY DRIVE CIRCUIT-2

1. Disconnect VCM harness connector.
2. Check harness for short to ground, between VCM harness connector and Li-ion battery harness connector.

+		–	Continuity
Li-ion battery			
Connector	Terminal		
B89	11	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31DE SYSTEM MAIN RELAY

DTC Logic

INFOID:0000000008747225

DTC DETECTION LOGIC

NOTE:
This DTC shows a forced system main relay disconnection by fail-safe.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31DE	HV BATT MAIN RELAY (High voltage battery main relay)	When the system main relay is shut off, VCM accumulates high voltage current value, and the accumulated value reaches the specified value.	• Li-ion battery J/B • EV control system

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT
1. Turn power switch ON and wait at least 10 seconds.
2. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-346, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747226

1.PERFORM SELF-DIAGNOSIS OF VCM

With CONSULT
Perform self-diagnosis of VCM.

Is DTC detected other than P31DE?

YES >> Perform diagnosis procedure of detected DTC and then replace battery J/B. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".
NO >> Replace Li-ion battery J/B. Refer to EVB-219, "BATTERY JUNCTION BOX AND BATTERY HARNESS : Disassembly and Assembly".

P31E0 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

INFOID:0000000009329364

The connection detecting circuit is used to detect the connection status of the PDM (Power Delivery Module) cover and the bus bar cover of PDM (Power Delivery Module).
The connection detecting circuit consists of two circuits (i.e. power supply circuit and signal input circuit). When the PDM (Power Delivery Module) cover and the bus bar cover are installed normally, their protrusions press the internal switch of PDM (Power Delivery Module). Accordingly, the connection detecting circuit is energized and a voltage signal is input.

DTC Logic

INFOID:0000000008747228

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E0	HV SYSTEM INTERLOCK ERROR (High voltage system interlock error)	VCM detects an excessively low voltage of the connection detecting circuit for 2.5 seconds during READY.	• Harness or connectors (Connection detection circuit is open or shorted.) • PDM (Power Delivery Module)
		VCM detects an excessively low voltage of the connection detecting circuit for 0.5 seconds during power switch ON.	

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

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

Is DTC detected?

YES >> Proceed to EVC-347, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT
1. Set the vehicle to READY at least 10 seconds.
2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-347, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009329738

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**

- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.OVERALL FUNCTION CHECK

With CONSULT

1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “HV INTERLOCK (DC/DC)”.
2. Check that “On” is displayed.

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> GO TO 2.

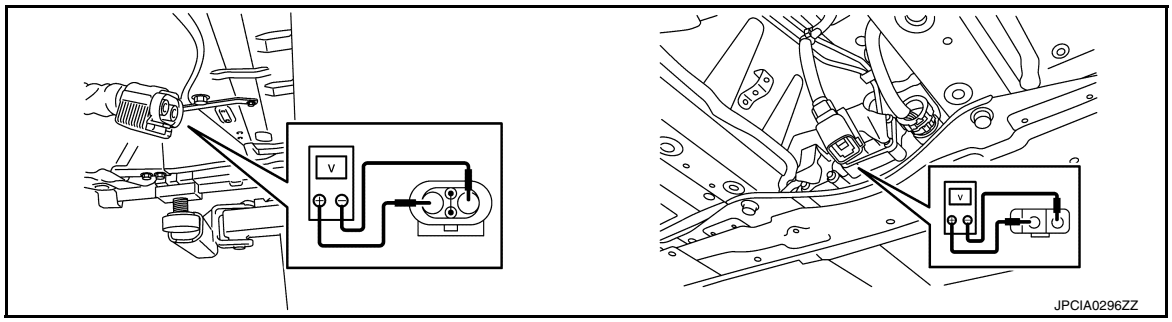
2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Exploded View".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

CAUTION:

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

>> GO TO 3.

3.CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY

1. Disconnect PDM (Power Delivery Module) harness connector.
2. Reconnect 12V battery negative terminal.
3. Turn power switch ON.

4. Check the voltage between PDM (Power Delivery Module) harness connector and ground.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	12	Ground	3 – 7 V

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4. CHECK CONNECTION DETECTING CIRCUIT POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the harness for short to power, between PDM (Power Delivery Module) harness connector and VCM harness connector.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	12	Ground	0 V

Is the inspection result normal?

YES >> GO TO 5.
NO >> Repair or replace error-detected parts.

5. CHECK INTERMITTENT INCIDENT

Check intermittent incident. Refer to GI-53, "Intermittent Incident".

Inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6. CHECK CONNECTION DETECTING CIRCUIT SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
3. Check the harness for short to power, between PDM (Power Delivery Module) harness connector and VCM harness connector.

+		–	Voltage
PDM (Power Delivery Module)			
Connector	Terminal		
F23	15	Ground	0 V

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-53, "Intermittent Incident".

Inspection result normal?

YES >> GO TO 8.
NO >> Repair or replace error-detected parts.

8. REPLACE VCM

1. Replace VCM. Refer to EVC-426, "Removal and Installation".
2. Reconnect harness connector and parts disconnected.
3. Perform DTC Confirmation Procedure. Refer to EVC-159, "DTC Logic".

Is DTC P31E0 detected again?

YES >> Replace PDM (Power Delivery Module). Refer to VC-119, "Removal and Installation".
NO >> INSPECTION END

P31E1 HIGH VOLTAGE CIRCUIT INTERLOCK ERROR

Description

INFOID:0000000008747230

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:0000000008747231

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E1	HV SYSTEM INTERLOCK ERROR (High voltage system interlock error)	VCM receives the connection malfunction signal via EV system CAN communication sent from Li-ion battery controller.	• Harness and connector (Connection detecting circuit within Li-ion battery) • High voltage harness • Service plug

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE-1

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-351, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM CONFIRMATION PROCEDURE-2

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-351, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747232

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**

- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.**
- **Refer to EVC-11, "High Voltage Precautions".**

CAUTION:

- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**
- **Erase DTC after the work is completed.**

1.CHECK SELF-DIAGNOSTIC RESULT IN LBC

Check self-diagnostic result in “HV BAT”.

Is any DTC detected?

YES >> Check the DTC. Refer to EVB-45, "DTC Index".
NO >> GO TO 2.

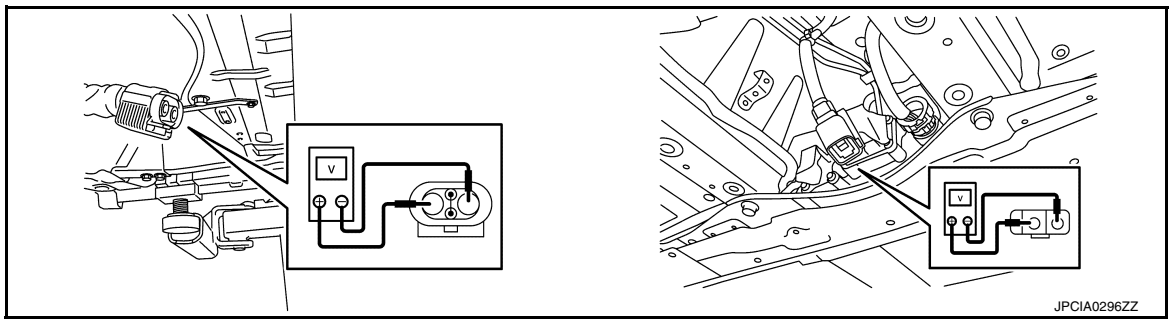
2.PRECONDITIONING

WARNING:

Disconnect high voltage. Refer to GI-33, "How to Disconnect High Voltage".

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to EVB-194, "Removal and Installation".
2. Disconnect high voltage harness connector and PTC heater harness connector from front side of Li-ion battery. Refer to EVB-194, "Removal and Installation".
3. Measure voltage between high voltage harness connector terminals and PTC heater harness connector terminals.



DANGER:

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

Standard : 5 V or less

CAUTION:

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

>> GO TO 3.

3.CHECK SERVICE PLUG

Check that the connection detection circuit within the service plug is not open. Refer to EVB-88, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace service plug.

4. 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 5.
NO >> Repair or replace error-detected parts.

5. CHECK HIGH VOLTAGE HARNESS CONNECTOR

1. Disconnect high voltage harness connector from Li-ion battery.
2. Check high voltage harness connector visually and tactually.
3. Check that the connection detection circuit (connector side) is not open.

Is the inspection result normal?

YES >> Check a circuit within the Li-ion battery.
NO >> Replace error-detected parts.

P31E5 VCM POWER SUPPLY

DTC Logic

INFOID:0000000009314821

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E5	VCM POWER SUPPLY (VCM power supply)	The voltage of any one of two 12V battery power supplies becomes approximately 3 V or less when the power switch is ON.	• Harness or connectors (Sensor power supply circuit is open or shorted)

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-354, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000009314822

1.STOP LAMP FUNCTION CHECK

1. Depress the brake pedal.
2. Check that the stop lamp lights up.

Is the inspection result normal?

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

2.CHECK FUSE

1. Turn power switch ON.
2. Pull out #77 fuse and check that the fuse is not fusing.

Is the inspection result normal?

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

3.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Disconnect VCM harness connector.
2. Check harness for short to ground, between #77 fuse terminal and VCM harness connector.

+	–	Continuity
#77 fuse terminal	Ground	Not existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

4.CHECK 12V BATTERY POWER SUPPLY

Check the voltage between #77 fuse terminal and ground.

+	–	Voltage
#77 fuse terminal	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Perform trouble diagnosis for 12V battery power supply.

5.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between #77 fuse terminal and VCM harness connector.

+	–		Continuity
	VCM		
	Connector	Terminal	
#77 fuse terminal	E62	79	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

6.CHECK FUSE

1. Turn power switch ON.
2. Pull out #43 fuse and check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 7.

7.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
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			
Connector	Terminal		
E14	42	Ground	Not existed

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-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Repair or replace error-detected parts.

9.CHECK 12V BATTERY POWER SUPPLY-1

1. Insert the fuse which pulled out.
2. Check the voltage between IPDM E/R harness connector and ground.

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

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 10.

10.CHECK 12V BATTERY POWER SUPPLY-2

Check IPDM E/R power supply circuit. Refer to PCS-28, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Repair or replace error-detected parts.

11.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
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	
E14	42	E61	11	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace error-detected parts.

12.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

P31E7 RESTART INHIBITION

DTC Logic

INFOID:0000000008747236

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E7	RESTART INHIBITION (Restart inhibition)	VCM detects DTC “P0AA6”.	VCM detects DTC “P0AA6”.

DTC CONFIRMATION PROCEDURE

1.INSPECTION START

NOTE:
This DTC is displayed when VCM detects DTC “P0AA6”. If this DTC displayed, perform trouble diagnosis for DTC “P0AA6”.

>> Proceed to EVC-357, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747237

Perform trouble diagnosis for DTC “P0AA6”. Refer to EVC-188, "DTC Logic".

P31E8 WATER PUMP

DTC Logic

INFOID:0000000008747238

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E8	WATER PUMP 1 (Water pump 1)	Electric water pump feedback duty keeps either of the following conditions for 30 seconds. • Less than 3% • 91% or more • Between 13% and 17%	• Harness or connectors • Electric water pump • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

With CONSULT

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

Is DTC detected?

YES >> Proceed to EVC-358, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747239

1.CHECK SELF-DIAGNOSTIC RESULT IN VCM

Check self-diagnostic result in “EV/HEV”.

Is DTC detected other than P31E8?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK WATER PUMP FEEDBACK DUTY-1

With CONSULT

1. Set the vehicle to READY.
2. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “W/P 1 CRNT SPD DUTY”.
3. Check “W/P 1 CRNT SPD DUTY” value.

Is value more than 91%?

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

3.CHECK WATER PUMP FEEDBACK DUTY-2

With CONSULT

Check “W/P 1 CRNT SPD DUTY” value.

Is value less than 3%?

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

4.CHECK WATER PUMP FEEDBACK DUTY-3

With CONSULT

1. On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “W/P 1 CRNT SPD DUTY” and “WATER PUMP 1 TRG DUTY”.
2. Check that “W/P 1 CRNT SPD DUTY” and “WATER PUMP 1 TRG DUTY” agree with the values listed below.

W/P 1 CRNT SPD DUTY	17 – 82%
WATER PUMP 1 TRG DUTY	20 – 80%

Are the above values satisfied?

YES >> GO TO 5.
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

5.CHECK WATER PUMP SIGNAL CIRCUIT

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

Electric water pump		VCM		Continuity
Connector	Terminals	Connector	Terminals	
E67	3	E61	20	Existed
	4		19	

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

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #71 fuse.
3. Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace the fuse after repairing the applicable circuit.

7.CHECK WATER PUMP INPUT POWER VOLTAGE

1. Insert the fuse which pulled out.
2. Disconnect water pump harness connector.
3. Turn power switch ON.
4. Check the voltage between water pump harness connector and ground.

+		–	Voltage
Electric water pump			
Connector	Terminal		
E67	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> Replace electric water pump. Refer to HCO-25, "Removal and Installation".
NO >> GO TO 8.

8.CHECK WATER PUMP INPUT POWER CIRCUIT-1

1. Turn power switch OFF.
2. Pull out #71 fuse.
3. Check the continuity between electric water pump harness connector and fuse terminal.

+		–	Continuity
Electric water pump			
Connector	Terminal		
E67	1	#71 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9.CHECK WATER PUMP INPUT POWER CIRCUIT-2

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

+		–	Continuity
M/C relay			
Connector	Terminal		
E65	5	#71 fuse terminal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-374, "Diagnosis Procedure".
NO >> Repair or replace error-detected parts.

P31E9 WATER PUMP

DTC Logic

INFOID:0000000008747240

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31E9	WATER PUMP 1 (Water pump 1)	Electric water pump feedback duty keeps between 82% and 91% for 30 seconds.	• Harness or connectors • Electric water pump • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-361, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747241

1.CHECK DTC

Perform self-diagnosis of VCM.

Is DTC detected other than P31E9?

YES >> Perform diagnosis procedure of detected DTC. Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK WATER PUMP FEEDBACK DUTY

With CONSULT

On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “W/P 1 CRNT SPD DUTY”.

Is value between 82% and 91%?

YES >> GO TO 3.
NO >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".

3.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #71 fuse.
3. Make sure that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the fuse after repairing the applicable circuit.

4.CHECK WATER PUMP INPUT POWER VOLTAGE

1. Insert the fuse which pulled out.
2. Disconnect water pump harness connector.
3. Turn power switch ON.
4. Check the voltage between water pump harness connector and ground.

+		–	Voltage
Electric water pump			
Connector	Terminal		
E67	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> Replace electric water pump. Refer to HCO-25, "Removal and Installation".
NO >> GO TO 5.

5. CHECK WATER PUMP INPUT POWER CIRCUIT-1

1. Turn power switch OFF.
2. Pull out #71 fuse.
3. Check the continuity between electric water pump harness connector and fuse terminal.

+		–	Continuity
Electric water pump			
Connector	Terminal		
E67	1	#71 fuse terminal	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 6.
NO >> Repair or replace error-detected parts.

6. CHECK WATER PUMP INPUT POWER CIRCUIT-2

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

+		–	Continuity
M/C relay			
Connector	Terminal		
F65	5	#71 fuse terminal	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay routing circuit. Refer to EVC-374, "Diagnosis Procedure".
NO >> Repair or replace error-detected parts.

P31EC WATER PUMP

DTC Logic

INFOID:0000000008747246

DTC DETECTION LOGIC

NOTE:
This DTC may be detected where there is the mixing of air into coolant.

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31EC	WATER PUMP 1 (Water pump 1)	Electric water pump feedback duty keeps between 3% and 7% for 30 seconds.	• Harness or connectors • Electric water pump • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

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

Is DTC detected?

YES >> Proceed to EVC-363, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747247

1.CHECK DTC

Perform self-diagnosis of VCM.

Is DTC detected other than P31EC?

YES >> Perform diagnosis procedure of detected DTC Refer to EVC-102, "DTC Index".
NO >> GO TO 2.

2.CHECK WATER PUMP FEEDBACK DUTY

On the CONSULT screen, select “EV/HEV” >> “DATA MONITOR” >> “W/P 1 CRNT SPD DUTY”.

Is value between 3% and 7%?

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

3.CHECK COOLANT

1. Turn power switch OFF.
2. Check that the coolant is free from air mixture.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Perform the air bleeding. Refer to HCO-12, "Refilling".

4.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn power switch ON and erase DTC.
2. Perform DTC confirmation procedure again. Refer to EVC-363, "DTC Logic".

Is DTC “P31EC” detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".

NO >> INSPECTION END

P31EE REFRIGERANT PRESSURE SENSOR

DTC Logic

INFOID:0000000008747250

DTC DETECTION LOGIC

NOTE:
If DTC P31EE is displayed with DTC P31E5, first perform the trouble diagnosis for DTC P31E5. Refer to EVC-354, "DTC Logic".

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31EE	REFRIGERANT PRESSURE SENSOR (Refrigerant pressure sensor)	• Signal voltage from refrigerant pressure sensor remains Approx. 0 V for 2.5 seconds or more • Signal voltage from refrigerant pressure sensor remains Approx. 4.7 V or more for 2.5 seconds or more	• Harness or connectors (Refrigerant pressure sensor circuit is open or shorted.) • Refrigerant pressure sensor • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM CONFIRMATION PROCEDURE

With CONSULT
1. Turn power switch ON at least 20 seconds.
2. Check self-diagnostic result.

Is DTC detected?

YES >> Proceed to EVC-365, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747251

1.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY-1

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	+	–	
	Terminal		
E49	3	1	5 V

Is the inspection result normal?

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

2.CHECK REFRIGERANT PRESSURE SENSOR POWER SUPPLY-2

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.

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	98	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-354, "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	123	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	58	Ground	Existed
	65		
E62	118		
	126		

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-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> Repair or replace error-detected parts.

7. CHECK REFRIGERANT PRESSURE SENSOR SIGNAL CIRCUIT

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

+		–		Continuity
Refrigerant pressure sensor		VCM		
Connector	Terminal	Connector	Terminal	
E49	3	E62	98	Existed

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

Is the DTC detected again?

YES >> Replace refrigerant pressure sensor. Refer to HA-43, "HIGH-PRESSURE FLEXIBLE HOSE : Removal and Installation".
NO >> Repair or replace error-detected parts.

P31F2 AV INFORMATION MISMATCH

DTC Logic

INFOID:0000000008747254

DTC DETECTION LOGIC

DTC	CONSULT screen terms (Trouble diagnosis content)	DTC detecting condition	Possible cause
P31F2	AV SET INFORMATION (AV set information)	Setting of timer charge does not succeed for 5 seconds after VCM receives a timer charge set signal.	• AV control unit • VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

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

>> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE-1

With CONSULT

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON.
3. Change the timer charge setting 1 on navigation display and wait at least 10 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-369, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE-2

With CONSULT

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON.
3. Change the timer charge setting 2 on navigation display and wait at least 10 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-369, "Diagnosis Procedure".
NO >> GO TO 4.

4.PERFORM DTC CONFIRMATION PROCEDURE-3

With CONSULT

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON.
3. Change the Climate Ctrl. Timer setting 1 on navigation display and wait at least 10 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-369, "Diagnosis Procedure".
NO >> GO TO 5.

5.PERFORM DTC CONFIRMATION PROCEDURE-4

1. Turn power switch OFF and wait at least 20 seconds.
2. Turn power switch ON.
3. Change the Climate Ctrl. Timer setting 2 on navigation display and wait at least 10 seconds.
4. Check DTC.

Is DTC detected?

YES >> Proceed to EVC-369, "Diagnosis Procedure".
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000008747255

1.REPLACE AV CONTROL UNIT

1. Replace AV control unit. Refer to AV-205, "Removal and Installation".
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to EVC-368, "DTC Logic".

Is the DTC detected again?

YES >> Replace VCM. Refer to EVC-426, "Removal and Installation".
NO >> INSPECTION END

COOLING FAN

Component Function Check

INFOID:0000000008747256

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-370, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747257

1.CHECK COOLING FAN CONTROL MODULE POWER SUPPLY

1. Turn power switch OFF.
2. Disconnect cooling fan control module harness connector.
3. Turn power switch ON.
4. Check the voltage between cooling fan control module harness connector and ground.

+		–	Voltage
Cooling fan control module			
Connector	Terminal		
E19	3	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 11.
NO >> GO TO 2.

2.CHECK 12V BATTERY POWER SUPPLY

1. Turn power switch OFF.
2. Remove cooling fan relay.
3. Check the voltage between cooling fan relay harness connector and ground.

+		–	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 12V battery power supply.

3.CHECK COOLING FAN RELAY OUTPUT VOLTAGE-1

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

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 COOLING FAN RELAY OUTPUT VOLTAGE-2

1. Turn power switch ON.
2. Check the voltage between fuse terminal 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		
F65	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-374, "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 terminal.

+		–	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

8. CHECK COOLING FAN RELAY GROUND CIRCUIT

1. Turn power switch OFF.

2. Check the continuity between cooling fan relay harness connector and ground.

+		–	Continuity
Cooling fan relay			
Connector	Terminal		
E18	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9. CHECK COOLING FAN CONTROL MODULE POWER SUPPLY CIRCUIT

1. Check the continuity between cooling fan relay harness connector and cooling fan control module harness connector.

+		–		Continuity
Cooling fan control module		Cooling fan relay		
Connector	Terminal	Connector	Terminal	
E19	3	E18	5	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace error-detected parts.

10. CHECK COOLING FAN RELAY

Refer to EVC-373, "Component Inspection (Cooling Fan Relay)".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Replace cooling fan relay.

11. CHECK COOLING FAN CONTROL MODULE GROUND CIRCUIT

1. Turn power switch OFF.
2. Check the continuity between cooling fan control module harness connector and ground.

+		–	Continuity
Cooling fan control module			
Connector	Terminal		
E19	1	Ground	Existed

Is the inspection result normal?

YES >> GO TO 12.
NO >> Repair or replace error-detected parts.

12. CHECK COOLING FAN MOTOR 1 AND 2

Check cooling fan motor. Refer to EVC-373, "Component Inspection (Cooling Fan Motor)".

Is the inspection result normal?

YES >> GO TO 13.
NO >> Replace malfunctioning cooling fan motor. Refer to HCO-22, "Exploded View".

13. 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	
E19	2	E62	128	Existed

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

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair or replace error-detected parts.

14. REPLACE COOLING FAN CONTROL MODULE

1. Replace cooling fan control module. Refer to HCO-22, "Exploded View".
2. Erase the DTC.
3. Perform component function check. Refer to EVC-370, "Component Function Check".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace VCM. Refer to EVC-426, "Removal and Installation".

Component Inspection (Cooling Fan Motor)

INFOID:0000000008747258

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 12V battery voltage as per the following, and check operation.

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-22, "Removal and Installation".

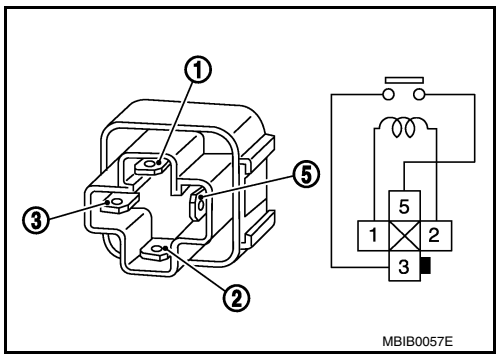
Component Inspection (Cooling Fan Relay)

INFOID:0000000008747259

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.

M/C RELAY

Diagnosis Procedure

INFOID:0000000008747260

1.CHECK BATTERY POWER SUPPLY-1

1. Turn power switch OFF.
2. Disconnect M/C relay.
3. Check the voltage between M/C relay harness connector and ground.

+		–	Voltage
M/C relay			
Connector	Terminal		
E65	2	Ground	12V battery voltage
	3		

Is the inspection result normal?

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

2.CHECK FUSIBLE LINK

1. Remove #G fusible link.
2. Check that the fusible link is not fusing.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the fusible link after repairing the applicable circuit.

3.CHECK BATTERY POWER SUPPLY-2

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 4.
NO >> Check power supply circuit for battery power supply.

4.CHECK BATTERY POWER SUPPLY CIRCUIT

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
		3	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

5.CHECK M/C RELAY

Check M/C relay. Refer to EVC-375, "Component Inspection (M/C Relay)".

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace M/C relay.

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	88	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	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

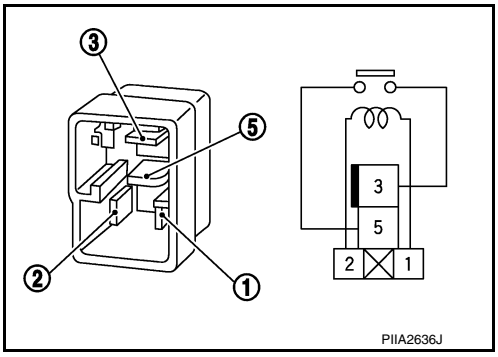
Component Inspection (M/C Relay)

INFOID:0000000008747261

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

Diagnosis Procedure

INFOID:0000000008747262

1.CHECK F/S CHG RELAY POWER SUPPLY-1

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-2

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-337, "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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

4.CHECK 12V BATTERY POWER SUPPLY-1

Check the voltage between F/S CHG relay harness connector and ground.

+		–	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 12V BATTERY POWER SUPPLY-2

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 12V 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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

8.CHECK F/S CHG RELAY

Check F/S CHG relay. Refer to EVC-378, "Component Inspection (F/S CHG Relay)".

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace F/S CHG relay.

9.CHECK F/S CHG RELAY CONTROL SIGNAL CIRCUIT

1. Turn power switch OFF.
2. Disconnect VCM harness connector.
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	E61	8	Existed

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

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace error-detected parts.

10.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

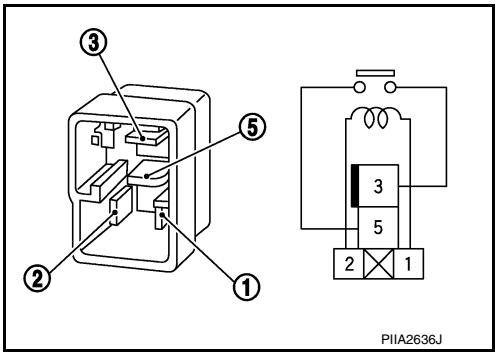
Component Inspection (F/S CHG Relay)

INFOID:0000000008747263

1.CHECK F/S CHG RELAY

1. Turn power switch OFF.
2. Remove F/S CHG relay.
3. Check the continuity between F/S CHG relay terminals under the following conditions.

Terminals	Conditions	Continuity
3 and 5	12 V direct current supply between terminals 1 and 2	Existed
	No current supply	Not existed



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace F/S CHG relay.

CHARGE CONNECTOR LOCK RELAY

Diagnosis Procedure

INFOID:0000000009330061

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 CHARGE CONNECTOR LOCK RELAY OUTPUT VOLTAGE

1. Insert the fuse which pulled put.
2. Press charge connector lock switch at the “OFF” position.
3. Connect EVSE.
4. Check the voltage between IPDM E/R harness connector and ground under the following conditions.

+		–	Condition	Voltage
IPDM E/R				
Connector	Terminal			
E14	35	Ground	• Power switch: OFF • Selector lever: P range • Immediately after the charge connector lock switch is pressed to “LOCK” position.	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 3.

3.CHECK 12V BATTERY POWER SUPPLY-1

1. Disconnect EVSE.
2. Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E14	41	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4.12V BATTERY POWER SUPPLY-2

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E9	2	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 5.
NO >> Check IPDM E/R power supply circuit. Refer to PCS-28, "Diagnosis Procedure".

5. CHECK CHARGE CONNECTOR LOCK RELAY DRIVE CIRCUIT

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

+		–	Continuity
IPDM E/R			
Connector	Terminal		
E14	41	Ground	Not existed

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6. CHECK CHARGE CONNECTOR LOCK RELAY DRIVE CIRCUIT

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

+		–		Continuity
IPDM E/R		VCM		
Connector	Terminal	Connector	Terminal	
E14	41	E62	78	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 VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

8. CHECK CHARGE CONNECTOR LOCK RELAY OUTPUT CIRCUIT

1. Disconnect EVSE.
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	
E14	35	E123	104	Existed

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

CHARGE PORT LID OPENER RELAY

Diagnosis Procedure

INFOID:0000000009330062

1.CHECK CHARGE PORT LID OPENER ACTUATOR RELAY POWER SUPPLY-1

1. Turn power switch OFF.
2. Disconnect charge port lid opener actuator relay.
3. Check the voltage between charge port lid opener actuator relay harness connector and ground.

+		–	Voltage
Charge port lid opener actuator relay			
Connector	Terminal		
E88	5	Ground	12V battery voltage

Is the inspection result normal?

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

2.CHECK CHARGE PORT LID OPENER ACTUATOR RELAY POWER SUPPLY-2

Check the voltage between IPDM E/R harness connector and ground.

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

Is the inspection result normal?

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

3.CHECK IPDM E/R POWER SUPPLY

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E9	2	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check 12V battery power supply circuit.

4.CHECK FUSE

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

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Replace the fuse after repairing the applicable circuit.

5.CHECK CHARGE PORT LID OPENER ACTUATOR RELAY POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and charge port lid opener actuator relay harness connector.

+		–		Continuity
IPDM E/R		Charge port lid opener actuator relay		
Connector	Terminal	Connector	Terminal	
E14	42	E88	5	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

6. CHARGE PORT LID OPENER ACTUATOR RELAY CONTROL SIGNAL VOLTAGE

Check the voltage between charge port lid opener actuator relay harness connector under the following condition.

+		–	Condition	Voltage
Charge port lid opener actuator relay				
Connector	Terminal			
E88	1	Ground	Immediately after the charge port lid opener switch is pressed.	12V battery voltage

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 7.

7. CHECK CHARGE PORT LID OPENER ACTUATOR RELAY DRIVE CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between VCM harness connector and charge port lid opener actuator relay harness connector.

+		–		Continuity
VCM		Charge port lid opener actuator relay		
Connector	Terminal	Connector	Terminal	
E61	23	E88	1	Existed

3. 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 CHARGE PORT LID OPENER SWITCH RELATED CIRCUIT

Check charge port lid opener switch related circuit. Refer to EVC-406, "Diagnosis Procedure".

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

9. CHECK CHARGE PORT LID OPENER ACTUATOR RELAY GROUND CIRCUIT

Check the continuity between charge port lid opener actuator relay harness connector and ground.

+		–	Continuity
Charge port lid opener actuator relay			
Connector	Terminal		
E88	2	Ground	Existed

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair or replace error-detected parts.

10. CHECK CHARGE PORT LID OPENER ACTUATOR RELAY

Check charge port lid opener actuator relay. Refer to EVC-384, "Component Inspection (Charge Port Lid Opener Actuator Relay)".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace charge port lid opener actuator relay.

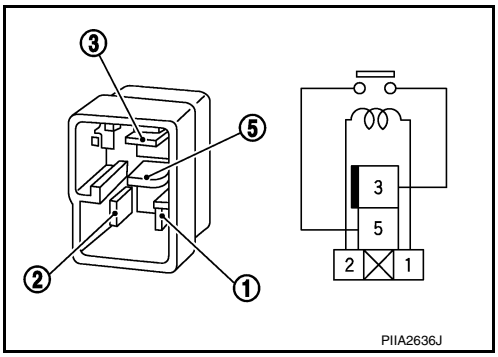
Component Inspection (Charge Port Lid Opener Actuator Relay)

INFOID:0000000009330063

1. CHECK CHARGE PORT LID OPENER ACTUATOR RELAY

1. Turn power switch OFF.
2. Disconnect charge port lid opener actuator relay.
3. Check the continuity between charge port lid opener actuator 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 charge port lid opener actuator relay.

REVERSE LAMP RELAY

Component Function Check

INFOID:0000000008747266

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-385, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747267

1.CHECK POWER ON POWER SUPPLY-1

1. Shift the selector lever in P position.
2. Turn power switch OFF.
3. Remove reverse lamp relay.
4. Turn power switch ON.
5. Check the voltage between reverse lamp relay harness connector and ground.

+		–	Voltage
Reverse lamp relay			
Connector	Terminal		
E27	1	Ground	12V battery voltage

Is the inspection result normal?

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

2.CHECK POWER ON POWER SUPPLY-2

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E15	58	Ground	12V battery voltage

Is the inspection result normal?

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

3.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 power ON power supply.
NO >> Replace the fuse after repairing the applicable circuit.

4.CHECK POWER ON POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between reverse lamp relay harness connector and IPDM E/R harness connector.

+		–		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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

5.CHECK POWER ON POWER SUPPLY-2

Check the voltage between reverse lamp relay harness connector and ground.

+		–	Voltage
Reverse lamp relay			
Connector	Terminal		
E27	3	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 7.
NO >> GO TO 6.

6.CHECK POWER ON POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect IPDM E/R harness connector.
3. Check the continuity between reverse lamp relay harness connector and IPDM E/R harness connector.

+		–		Continuity
Reverse lamp relay		IPDM E/R		
Connector	Terminal	Connector	Terminal	
E27	3	E15	58	Existed

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

7.CHECK REVERSE LAMP RELAY

Refer to EVC-387, "Component Inspection (Reverse Lamp Relay)".

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace reverse lamp relay.

8.CHECK REVERSE LAMP RELAY CONTROL SIGNAL CIRCUIT

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	70	Existed

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

Is the inspection result normal?

YES >> GO TO 9.

NO >> Repair or replace error-detected parts.

9.CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

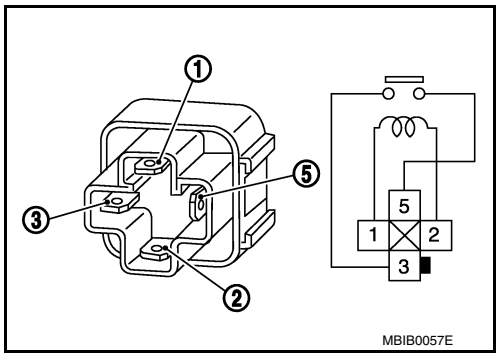
Component Inspection (Reverse Lamp Relay)

INFOID:0000000008747268

1.CHECK REVERSE LAMP RELAY

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.

A/C RELAY

Diagnosis Procedure

INFOID:0000000008747269

1.CHECK A/C RELAY POWER SUPPLY

1. Turn power switch OFF.
2. Remove A/C relay.
3. Turn power switch ON.
4. Check the voltage between A/C relay harness connector and ground.

+		–	Voltage
A/C relay			
Connector	Terminal		
E52	1	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 3.
NO >> GO TO 2.

2.CHECK A/C RELAY POWER SUPPLY CIRCUIT

1. Turn power switch OFF.
2. Disconnect M/C relay.
3. Check the continuity between A/C relay harness connector and M/C relay harness connector.

+		–		Continuity
M/C relay		A/C relay		
Connector	Terminal	Connector	Terminal	
E65	5	E52	1	Existed

Is the inspection result normal?

YES >> Perform trouble diagnosis for M/C relay related circuit. Refer to EVC-374, "Diagnosis Procedure".
NO >> Repair or replace error-detected parts.

3.CHECK 12V BATTERY POWER SUPPLY

Check the voltage between A/C relay harness connector and ground.

+		–	Voltage
A/C relay			
Connector	Terminal		
E52	3	Ground	12V battery voltage
	6		

Is the inspection result normal?

YES >> GO TO 6.
NO >> GO TO 4.

4.CHECK FUSE

1. Turn power switch OFF.
2. Pull out #32 fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 5.
NO >> Replace the fuse after repairing the applicable circuit.

5.CHECK 12V BATTERY POWER SUPPLY CIRCUIT

Check the continuity between A/C relay harness connector and fuse terminal.

+		–	Continuity
A/C relay			
Connector	Terminal		
E52	3	#32 fuse terminal	Existed
	6		

Is the inspection result normal?

YES >> Check 12V battery power supply circuit.
NO >> Repair or replace error-detected parts.

6.CHECK A/C RELAY

Refer to EVC-389, "Component Inspection (A/C Relay)".

Is the inspection result normal?

YES >> GO TO 7.
NO >> Replace A/C relay.

7.CHECK A/C RELAY CONTROL SIGNAL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between A/C relay harness connector and VCM harness connector.

+		–		Continuity
A/C relay		VCM		
Connector	Terminal	Connector	Terminal	
E52	2	E62	116	Existed

3. 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		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Component Inspection (A/C Relay)

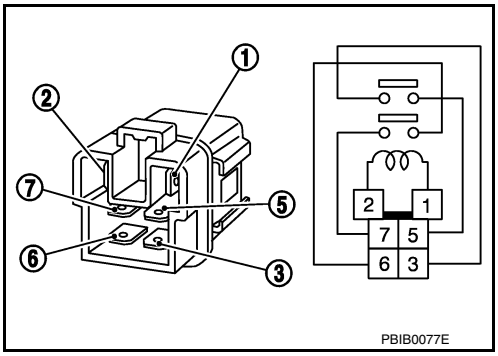
INFOID:0000000008747270

1.CHECK A/C RELAY

1. Turn power switch OFF.
2. Remove A/C relay.

3. Check the continuity between A/C relay terminals under the following conditions.

Conditions	Terminals	Continuity
12 V direct current supply between terminals 1 and 2	3 – 5	Existed
	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

Component Function Check

INFOID:0000000008747271

1.CHECK CHARGING STATUS INDICATOR FUNCTION

With CONSULT

1. Turn power switch ON.
2. Select “CHARGE STAT INDICATOR 1” of “ACTIVE TEST” mode in “EV/HEV” with CONSULT.
3. Activate the charging status indicator 1 and check that the indicator illuminates.
4. Check charging status indicator 2 and 3 in the same way.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-391, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000008747272

1.CHECK CHARGING STATUS INDICATOR POWER SUPPLY

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

+		–	Voltage
Charging status indicator			
Connector	Terminal		
M201	4	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> GO TO 2.

2.CHECK FUSE

Pull out #11 fuse and check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace the fuse after repair the applicable circuit.

3.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		
M201	4	#11 fuse terminal	Existed

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

Is the inspection result normal?

YES >> Check 12V battery power supply circuit.
NO >> Repair or replace error-detected parts.

4.CHECK CHARGING STATUS INDICATOR GROUND CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between charging status indicator harness connector and VCM harness connector.

Items	+		–		Continuity
	Charging status indicator		VCM		
	Connector	Terminal	Connector	Terminal	
Charging status indicator 1	M201	1	E62	115	Existed
Charging status indicator 2		2		89	
Charging status indicator 3		3		90	

3. Also check harness for short to ground and short to battery.

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	58	Ground	Existed
	65		
E62	118		
	126		

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-53, "Intermittent Incident".

Is the inspection result normal?

YES >> Replace charging status indicator. Refer to VC-154, "Removal and Installation".
NO >> Repair or replace error-detected parts.

IMMEDIATE CHARGING SWITCH

Diagnosis Procedure

INFOID:0000000008747273

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	1	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 #46 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 terminal.

+		–	Continuity
Immediate charging switch			
Connector	Terminal		
M65	1	#46 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.

+		–	Continuity
Immediate charging switch			
Connector	Terminal		
M65	4	Ground	Existed

Is the inspection result normal?

YES >> Replace immediate charging switch. Refer to VC-152, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6.CHECK IMMEDIATE CHARGING SWITCH POWER SUPPLY

1. Turn power switch OFF.
2. Turn OFF the headlamp.
3. Disconnect immediate charging switch harness connector.
4. Check the voltage between immediate charging switch harness connector and ground.

+		–	Voltage
Immediate charging switch			
Connector	Terminal		
M65	6	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.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.

+		–		Continuity
Immediate charging switch		VCM		
Connector	Terminal	Connector	Terminal	
M65	6	E62	129	Existed

3. 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 IMMEDIATE CHARGING SWITCH GROUND CIRCUIT

Check the continuity between immediate charging switch harness connector and ground.

+		–	Continuity
Immediate charging switch			
Connector	Terminal		
M65	8	Ground	Existed

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9.CHECK IMMEDIATE CHARGING SWITCH

Perform component inspection. Refer to EVC-395, "Component Inspection (Immediate Charging Switch)".

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace immediate charging switch. Refer to VC-152, "Removal and Installation".

Component Inspection (Immediate Charging Switch)

INFOID:0000000008747274

1. CHECK IMMEDIATE CHARGING SWITCH

1. Turn power switch OFF.
2. Disconnect immediate charging switch harness connector.
3. Check the continuity between immediate charging switch terminals under the following conditions.

Terminals	Condition		Continuity
6 and 8	Immediate charging switch	Released	Not existed
		Pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace immediate charging switch. Refer to VC-152, "Removal and Installation".

CHARGE CONNECTOR LOCK

Component Function Check

INFOID:0000000009330064

1.CHARGE CONNECTOR LOCK FUNCTION CHECK

1. Press the charge connector lock switch at the “OFF” position.
2. Turn power switch OFF.
3. Connect EVSE.
4. Switch the charge connector lock switch to “LOCK” position.
5. Check that the charge connector lock operates normally.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-396, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009330065

1.CHECK CHARGE CONNECTOR LOCK SWITCH RELATED CIRCUIT

Check charge connector lock switch related circuit. Refer to EVC-400, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK CHARGE CONNECTOR LOCK RELAY RELATED CIRCUIT

Check charge connector lock relay related circuit. Refer to EVC-379, "Diagnosis Procedure".

Is the inspection result normal?

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

3.CHECK CHARGE CONNECTOR LOCK ACTUATOR

Check charge connector lock actuator. Refer to EVC-396, "Component Inspection (Charge Connector Lock Actuator)".

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace charge connector lock actuator. Refer to VC-149, "Removal and Installation".

4.CHECK CHARGE CONNECTOR LOCK ACTUATOR CONTROL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between VCM harness connector and charge connector lock actuator harness connector.

+		–		Continuity
VCM		Charge connector lock actuator		
Connector	Terminal	Connector	Terminal	
E62	117	E87	1	Existed
	130		3	

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

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Component Inspection (Charge Connector Lock Actuator)

INFOID:0000000009330066

1.CHECK CHARGE CONNECTOR LOCK ACTUATOR

1. Turn power switch OFF.

2. Remove charge connector lock actuator. Refer to VC-149, "Removal and Installation".
3. Check the resistance between charge connector lock actuator connector terminals.

Charge connector lock actuator		Resistance
+	–	
Terminal		
1	3	2 – 4 Ω

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace charge connector lock actuator. Refer to VC-149, "Removal and Installation".

CHARGE PORT LID OPENER

Component Function Check

INFOID:0000000009330067

1.CHARGE PORT LID OPENER FUNCTION CHECK

1. Close charge port lid.
2. Press charge port lid opener switch.

Does the charge port lid open?

YES >> INSPECTION END
NO >> Proceed to EVC-398, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009330068

1.CHECK CHARGE PORT LID OPENER ACTUATOR RELAY RELATED CIRCUIT

Check charge port lid opener actuator relay related circuit. Refer to EVC-382, "Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace error-detected parts.

2.CHECK CHARGE PORT LID OPENER ACTUATOR

Check charge port lid opener actuator. Refer to EVC-399, "Component Inspection (Charge Port Lid Opener Actuator)".

Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace charge port lid opener actuator. Refer to DLK-206, "CHARGE PORT LID OPENER ACTUATOR : Removal and Installation".

3.CHECK CHARGE PORT LID OPENER ACTUATOR CONTROL CIRCUIT

1. Check the continuity between charge port lid opener actuator relay harness connector and charge port lid opener actuator harness connector.

+		–		Continuity
Charge port lid opener actuator relay		Charge port lid opener actuator		
Connector	Terminal	Connector	Terminal	
E88	3	E38	3	Existed

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

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK CHARGE PORT LID OPENER ACTUATOR GROUND CIRCUIT

Check the continuity between charge port lid opener actuator harness connector and ground.

+		–	Continuity
Charge port lid opener actuator relay			
Connector	Terminal		
E88	2	Ground	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Component Inspection (Charge Port Lid Opener Actuator)

INFOID:0000000009330069

1.CHECK CHARGE PORT LID OPENER ACTUATOR

1. Turn power switch OFF.
2. Remove charge port lid opener actuator. Refer to DLK-206, "CHARGE PORT LID OPENER ACTUATOR : Removal and Installation".
3. Check the resistance between charge port rid opener actuator connector terminals.

Charge port lid opener actuator		Resistance
+	–	
Terminal		
1	2	1 – 4 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge port lid opener actuator. Refer to DLK-206, "CHARGE PORT LID OPENER ACTUATOR : Removal and Installation".

CHARGE CONNECTOR LOCK SWITCH

Diagnosis Procedure

INFOID:0000000009330070

1.CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP FUNCTION CHECK-1

1. Turn power switch ON.
2. Turn ON the headlamp.
3. Check that the charge connector lock switch illumination lamp lights up.

Is the inspection result normal?

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

2.CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY

Check the voltage between charge connector lock switch harness connector and ground.

+		−	Voltage
Charge connector lock switch			
Connector	Terminal		
M94	2	ground	12V 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 the #46 fuse.
4. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the fusible link after repairing the applicable circuit.

4.CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY CIRCUIT

1. Disconnect charge connector lock switch harness connector.
2. Check the continuity between charge connector lock switch harness connector and fuse terminal.

+		−	Continuity
Charge connector lock switch			
Connector	Terminal		
M94	2	#46 fuse terminal	Existed

Is the inspection result normal?

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

5.CHECK CHARGE CONNECTOR LOCK SWITCH GROUND CIRCUIT

1. Turn power switch OFF.
2. Turn OFF the headlamp.
3. Disconnect charge connector lock switch harness connector.
4. Check the continuity between charge connector lock switch harness connector and ground.

+		–	Continuity
Charge connector lock switch			
Connector	Terminal		
M94	4	Ground	Existed

Is the inspection result normal?

YES >> Replace charge connector lock switch. Refer to VC-153, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6. CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP FUNCTION CHECK-2

1. Turn OFF the headlamp.
2. Press charge connector lock switch at the “LOCK” position.
3. Check that the “LOCK” lights up.

Is the inspection result normal?

YES >> GO TO 12.
NO >> GO TO 7.

7. CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY

Check the voltage between charge connector lock switch harness connector and ground.

+		–	Voltage
Charge connector lock switch			
Connector	Terminal		
M94	10	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 10.
NO >> GO TO 8.

8. CHECK FUSE

1. Turn power switch OFF.
2. Pull out #12 fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 9.
NO >> Replace the fuse after repairing the applicable circuit.

9. CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY CIRCUIT

1. Disconnect charge connector lock switch harness connector.
2. Check the continuity between charge connector lock switch harness connector and fuse terminal.

+		–	Continuity
Charge connector lock switch			
Connector	Terminal		
M94	10	#12 fuse terminal	Existed

Is the inspection result normal?

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

10. CHECK CHARGE CONNECTOR LOCK SWITCH INDICATOR CIRCUIT

1. Turn power switch OFF.
2. Disconnect charge connector lock switch harness connector.
3. Disconnect VCM harness connector.

4. Check the continuity between charge connector lock switch and VCM harness connector.

+		–		Continuity
Charge connector lock switch		VCM		
Connector	Terminal	Connector	Terminal	
M94	1	E62	87	Existed

5. 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 VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Replace charge connector lock switch. Refer to VC-153, "Removal and Installation".
NO >> Repair or replace error-detected parts.

12. CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP FUNCTION CHECK-3

1. Press charge connector lock switch at the “AUTO” position.
2. Check that the “AUTO” lights up.

Is the inspection result normal?

YES >> GO TO 18.
NO >> GO TO 13.

13. CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY

Check the voltage between charge connector lock switch harness connector and ground.

+		–	Voltage
Charge connector lock switch			
Connector	Terminal		
M94	10	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 16.
NO >> GO TO 14.

14. CHECK FUSE

1. Turn power switch OFF.
2. Pull out #12 fuse.
3. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace the fuse after repairing the applicable circuit.

15. CHECK CHARGE CONNECTOR LOCK SWITCH ILLUMINATION LAMP POWER SUPPLY CIRCUIT

1. Disconnect charge connector lock switch harness connector.
2. Check the continuity between charge connector lock switch harness connector and fuse terminal.

+		–	Continuity
Charge connector lock switch			
Connector	Terminal		
M94	10	#12 fuse terminal	Existed

Is the inspection result normal?

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

16. CHECK CHARGE CONNECTOR LOCK SWITCH INDICATOR CIRCUIT

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

+		–		Continuity
Charge connector lock switch		VCM		
Connector	Terminal	Connector	Terminal	
M94	5	E62	91	Existed

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

Is the inspection result normal?

YES >> GO TO 17.
NO >> Repair or replace error-detected parts.

17. CHECK VCM GROUND CIRCUIT

Check the continuity between VCM harness connector and ground.

+		–	Continuity
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Replace charge connector lock switch. Refer to VC-153, "Removal and Installation".
NO >> Repair or replace error-detected parts.

18. CHECK CHARGE CONNECTOR LOCK SWITCH

Check charge connector lock switch. Refer to EVC-404, "Component Inspection (Charge Connector Lock Switch)".

Is the inspection result normal?

YES >> GO TO 19.
NO >> Replace charge connector lock switch. Refer to VC-153, "Removal and Installation".

19. CHECK CHARGE CONNECTOR LOCK SWITCH SIGNAL POWER SUPPLY

1. Turn power switch ON.

2. Check the voltage between charge connector lock switch harness connector and ground.

+		–	Voltage
Charge connector lock switch			
Connector	Terminal		
M94	9	Ground	12V battery voltage
	8		

Is the inspection result normal?

YES >> GO TO 21.
NO >> GO TO 20.

20. CHECK CHARGE CONNECTOR LOCK SWITCH SIGNAL CIRCUIT

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

+		–		Continuity
Charge connector lock switch		VCM		
Connector	Terminal	Connector	Terminal	
M94	9	E62	94	Existed
	8		81	

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

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

21. CHECK CHARGE CONNECTOR LOCK SWITCH GROUND CIRCUIT

Check the continuity between charge connector lock switch harness connector and ground.

+		–	Continuity
Charge connector lock switch			
Connector	Terminal		
M94	3	Ground	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Repair or replace error-detected parts.

Component Inspection (Charge Connector Lock Switch)

INFOID:0000000009330071

1. CHECK CHARGE CONNECTOR LOCK SWITCH

1. Turn power switch OFF.
2. Disconnect charge connector lock switch harness connector.
3. Check the continuity between charge connector lock switch terminal under the following conditions.

Terminal	Condition		Continuity
6 – 9	Charge connector lock switch	LOCK position	Existed
		Except LOCK position	Not existed
6 – 8		AUTO	Existed
		Except AUTO position	Not existed

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace charge connector lock switch. Refer to VC-153, "Removal and Installation".

CHARGE PORT LID OPENER SWITCH

Diagnosis Procedure

INFOID:0000000009330072

1.CHARGE PORT LID OPENER SWITCH ILLUMINATION LAMP FUNCTION CHECK

1. Turn power switch ON.
2. Turn ON the headlamp.
3. Check that the charge port lid opener switch illumination lamp lights up.

Is the inspection result normal?

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

2.CHECK CHARGE PORT LID OPENER SWITCH ILLUMINATION LAMP POWER SUPPLY

Check the voltage between charge port lid opener switch harness connector and ground.

+		–	Voltage
Charge port lid opener switch			
Connector	Terminal		
M93	1	Ground	12V 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 #46 fuse.
4. Check that the fuse is not fusing.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Replace the fuse after repairing the applicable circuit.

4.CHECK CHARGE PORT LID OPENER SWITCH ILLUMINATION LAMP POWER SUPPLY CIRCUIT

1. Disconnect charge port lid opener switch harness connector.
2. Check the continuity between charge port lid opener switch harness connector and fuse terminal.

+		–	Continuity
Charge port lid opener switch			
Connector	Terminal		
M93	1	#46 fuse terminal	Existed

Is the inspection result normal?

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

5.CHECK CHARGE PORT LID OPENER SWITCH GROUND CIRCUIT

1. Turn power switch OFF.
2. Turn OFF the headlamp.
3. Disconnect charge port lid opener switch harness connector.
4. Check the continuity between charge port lid opener switch harness connector and ground.

+		–	Continuity
Charge port lid opener switch			
Connector	Terminal		
M93	4	Ground	Existed

Is the inspection result normal?

YES >> Replace charge port lid opener switch. Refer to DLK-225, "Removal and Installation".
NO >> Repair or replace error-detected parts.

6.CHECK CHARGE PORT LID OPENER SWITCH POWER SUPPLY

1. Turn power switch OFF.
2. Turn OFF the headlamp.
3. Disconnect charge port lid opener switch harness connector.
4. Check the voltage between charge port lid opener switch harness connector and ground.

+		–	Voltage
Charge port lid opener switch			
Connector	Terminal		
M93	6	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 8.
NO >> GO TO 7.

7.CHECK CHARGE PORT LID OPENER SWITCH SIGNAL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between charge port lid opener switch harness connector and VCM harness connector.

+		–		Continuity
Charge port lid opener switch		VCM		
Connector	Terminal	Connector	Terminal	
M93	6	E62	93	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

8.CHECK CHARGE PORT LID OPENER SWITCH GROUND CIRCUIT

Check the continuity between charge port lid opener switch harness connector and ground.

+		–	Continuity
Charge port lid opener switch			
Connector	Terminal		
M93	8	Ground	Existed

Is the inspection result normal?

YES >> GO TO 9.
NO >> Repair or replace error-detected parts.

9.CHECK CHARGE PORT LID OPENER SWITCH

Check charge port lid opener switch. Refer to EVC-408, "Component Inspection (Charge Port Lid Opener Switch)".

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace charge port lid opener switch. Refer to DLK-225, "Removal and Installation".

Component Inspection (Charge Port Lid Opener Switch)

INFOID:0000000009330073

1.CHECK CHARGE PORT LID OPENER SWITCH

1. Turn power switch OFF.
2. Disconnect charge port lid opener switch harness connector.
3. Check the continuity between charge port lid opener switch terminals under the following condition.

Terminal	Condition		Continuity
6 – 8	Charge port lid opener switch	Released	Not existed
		Pressed	Existed

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace charge port lid opener switch. Refer to DLK-225, "Removal and Installation".

CHARGE PORT LIGHT

Component Function Check

INFOID:0000000009330074

1.CHARGE PORT LIGHT FUNCTION CHECK

1. Close the charge port lid.
2. Press charge port lid opener switch.
3. Open the charge port lid and check that the charge port light lights up.

Is the inspection result normal?

YES >> INSPECTION END
NO >> Proceed to EVC-398, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000009330075

1.CHECK CHARGE PORT LIGHT POWER SUPPLY-1

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

+		–	Voltage
Charge port light			
Connector	Terminal		
E24	1	Ground	12V battery voltage

Is the inspection result normal?

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

2.CHECK CHARGE PORT LIGHT POWER SUPPLY-2

Check the voltage between IPDM E/R harness connector and ground.

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

Is the inspection result normal?

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

3.CHECK IPDM E/R POWER SUPPLY

Check the voltage between IPDM E/R harness connector and ground.

+		–	Voltage
IPDM E/R			
Connector	Terminal		
E9	2	Ground	12V battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Check power supply circuit.

4.CHECK FUSE

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

Is the inspection result normal?

YES >> Replace IPDM E/R. Refer to PCS-29, "Removal and Installation".
NO >> Replace the fuse after repairing applicable circuit.

5.CHECK CHARGE PORT LIGHT POWER SUPPLY CIRCUIT

1. Disconnect IPDM E/R harness connector.
2. Check the continuity between IPDM E/R harness connector and charge port light harness connector.

+		–		Continuity
IPDM E/R		Charge port light		
Connector	Terminal	Connector	Terminal	
E14	42	E24	1	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-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

6.CHECK CHARGE PORT LIGHT CONTROL CIRCUIT

1. Close the charge port lid.
2. Press charge port lid opener switch.
3. Check the voltage between charge port light harness connector terminals within 3 minutes of operating the charge port lid opener switch.

Charge port light			Voltage
Connector	+	–	
	Terminal		
E24	1	2	12V battery voltage

Is the inspection result normal?

YES >> Replace charge port light. Refer to INL-79, "Removal and Installation".
NO >> GO TO 7.

7.CHECK CHARGE PORT LIGHT CONTROL CIRCUIT

1. Disconnect VCM harness connector.
2. Check the continuity between VCM harness connector and charge port light harness connector.

+		–		Continuity
VCM		Charge port light		
Connector	Terminal	Connector	Terminal	
E62	82	E24	2	Existed

3. 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
VCM			
Connector	Terminal		
E61	58	Ground	Existed
	65		
E62	118		
	126		

Is the inspection result normal?

YES >> Check intermittent incident. Refer to GI-53, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

SYMPTOM DIAGNOSIS

EV CONTROL SYSTEM

Symptom Index

INFOID:0000000008747275

NOTE:
- Perform self-diagnoses with CONSULT before performing the symptom diagnosis.
- If any DTC is detected, perform the corresponding diagnosis.

Symptom	Reference page
READY status cannot be achieved.	EVC-413, "READY Status Cannot Be Achieved"
Unable to travel.	EVC-414, "Unable to Travel"
Low electrical consumption	EVC-415, "Low Electrical Consumption"
Power switch does not turn OFF.	EVC-416, "Power Switch Does Not Turn OFF"
No regeneration	EVC-417, "No Regeneration"
Decelerating force changes	EVC-418, "Decelerating Force Changes"
Normal charge does not start.	EVC-419, "Normal Charge Does Not Start"
Timer charge and remote charge does not start.	EVC-420, "Timer Charge and Remote Charge Does Not Start"
Immediate charge does not start.	EVC-421, "Immediate Charge Does Not Start"
Normal charge is not completed.	EVC-421, "Normal Charge Is Not Completed"
Quick charge does not start.	EVC-422, "Quick Charge Does Not Start"
Quick charge is not completed.	EVC-422, "Quick Charge Is Not Completed"
Full charge cannot be achieved.	EVC-423, "Full Charge Cannot Be Achieved"
Climate Ctrl. Timer does not start.	EVC-423, "Climate Ctrl. Timer Does Not Start"
Remote climate control does not start.	EVC-424, "Remote climate control Does Not Start"

READY Status Cannot Be Achieved

INFOID:0000000008747276

Symptom			Possible cause	Action
READY status cannot be achieved.	READY condition are not satisfied	BCM does not output a READY signal.	Abnormal stop lamp switch.	EVC-219, "Component Function Check"
			Abnormal stop lamp switch signal line.	Check the signal line between stop lamp switch and BCM.
			Abnormal power switch	PCS-73, "Component Function Check"
			Abnormal power switch signal line.	Check the signal line between BCM and VCM.
		A READY signal is not input to VCM.	Abnormal READY signal line	Check the signal line between BCM and VCM.
		VCM recognizes that the selector lever is in a range other than P and N.	Electric shift control system error.	Perform self-diagnosis of Electric shift control module.
		VCM recognizes that the charge connector is connected.	• Abnormal normal charge connector connection detection circuit. • Abnormal quick charge connector connection detection circuit.	Perform self-diagnosis of PDM (Power Delivery Module).
		Fail-safe of VCM prohibits READY.	EV control system error.	Perform self-diagnosis of VCM.
		VCM recognizes that Li-ion battery remaining energy is low.	Li-ion battery remaining energy is low.	Charge Li-ion battery.
			Abnormal LBC.	Perform self-diagnosis of LBC.
		VCM recognizes that steering lock is not released.	Abnormal steering lock mechanism.	Check steering lock system.
	The READY to drive indicator lamp does not turn ON despite READY state.		• Abnormal combination meter. • Abnormal LED. • Abnormal VCM.	Perform ACTIVE TEST of VCM to check the READY to drive indicator lamp. Refer to EVC-73, "CONSULT Function".

Unable to Travel

INFOID:0000000008747277

Symptom			Possible cause	Action
Unable to travel.	Drive force is not generated.	VCM recognizes that the accelerator pedal is not depressed.	Abnormal accelerator pedal position sensor.	EVC-222, "Diagnosis Procedure"
		VCM recognizes that brake pedal is depressed.	• Abnormal stop lamp switch. • Abnormal stop lamp switch signal line.	EVC-212, "Diagnosis Procedure"
		An output limit request signal of TCS/VDC/ABS is receiced.	TCS/VDC/ABS system error.	Perform self-diagnosis of ABS actuator and electric unit (control unit).
		Traction motor inverter requests the output limit.	Traction motor system error.	Check the “POWER LIMIT CAUSE” in DATA MONITOR item of VCM.
		LBC requests the output limit.	LBC system error.	
		Fail-safe of VCM prohibits READY.	EV control system error.	Perform self-diagnosis of VCM.
		Motor output is not conveyed to drive wheels.	Abnormal reduction gear.	Check reduction gear.
	Braking force is generated.	Brake applied.	Brake dragging.	Check for brake dragging.
		A brake signal is input to ABS actuator and electric unit (control unit).	Abnormal stop lamp switch signal line.	Check the signal line between stop lamp switch and ABS actuator and electric unit (control unit).
		Parking lock is ON.	• Abnormal electric shift control module. • Abnormal parking actuator.	Perform self-diagnosis of Electric shift control module.

Low Electrical Consumption

INFOID:0000000008747278

Symptom			Possible cause	Action
Low electrical consumption	Traction motor requires a large amount of power.	Running resistance of tires is high.	Low tire pressure.	Adjust tire pressure.
			Tire size is not of standard size.	Install standard-size tires.
		Parking brake is applied.	• Abnormal electric parking brake control module. • Abnormal parking brake actuator.	Perform self-diagnosis of Electric parking brake control module.
		Parking brake is applied.	Brake dragging.	Check reduction dragging.
		Sliding resistance of reduction gear is high.	Abnormal reduction gear.	Check reduction gear.
	Air conditioner requires a large amount of power.	Electric compressor requires a large amount of power.	The set temperature is low.	Adjust the set temperature.
			Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
		PTC heater requires a large amount of power.	The set temperature is high.	Adjust the set temperature.
			Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
	Auxiliaries requires a large amount of power.		High-capacity auxiliaries is connected.	Check vehicle condition.
	Low efficient Li-ion battery.		Incorrect service plug connection.	Check installation condition of the service plug.
	Lower energy storage, compared to meter indication.	Battery charge level at full charge is low.	Low Li-ion battery cell capacity.	Perform inspection according to the diagnosis procedure of DTC P33E6 of EV battery control system. Refer to EVB-160, "Diagnosis Procedure".
			Li-ion battery charged with its temperature low.	Charge Li-ion battery with its room-temperature condition.
	Available driving range becomes shorter.		Abnormal Li-ion battery.	Perform EV battery control system diagnosis by symptom. Refer to EVB-192, "Diagnosis Procedure".
			Low Li-ion battery cell capacity.	Perform inspection according to the diagnosis procedure of DTC P33E6 of EV battery control system. Refer to EVB-160, "Diagnosis Procedure".

Power Switch Does Not Turn OFF

INFOID:0000000008747279

Symptom			Possible cause	Action
Power switch does not turn OFF.	VCM recognizes that the power switch is not OFF.	Power is continuously supplied to the power ON power supply terminal of VCM.	Short circuit between the power ON power supply circuit of VCM and power.	Check the power ON power supply circuit.
			Abnormal IPDM E/R.	Perform self-diagnosis of IPDM E/R.
			Abnormal BCM.	Perform self-diagnosis of BCM.
			Abnormal power switch.	PCS-73, "Component Function Check"
	Immediate charging switch signal is continuously received.		• Abnormal immediate charging switch signal circuit. • Abnormal immediate charging switch.	EVC-393, "Diagnosis Procedure"

No Regeneration

INFOID:0000000008747280

Symptom			Possible cause	Action
No regeneration	The amount of regeneration is limited.	Drive motor inverter limits output.	Fail-safe of traction motor inverter.	TMS-25, "Fail-safe"
			The temperature of traction motor or traction motor inverter is high.	Check the “POWER LIMIT CAUSE” in the DATA MONITOR item of VCM.
		LBC limits output.	Fail-safe of LBC.	EVB-40, "Fail-safe"
			Damaged bus bar (connecting part of Li-ion battery module).	Check bus bar.
			Degradation in Li-ion battery temperature sensor characteristics.	Check the “POWER LIMIT CAUSE” in the DATA MONITOR item of VCM.
			The temperature of Li-ion battery is too high/low.	
			Li-ion battery is fully charged.	Normal operation.
		ABS actuator and electric unit (control unit) limits output.	ABS operates.	Normal operation.
		Electrically-driven intelligent brake unit limits output.	Fail-safe of electrically-driven intelligent brake unit.	BR-41, "Fail-Safe"
	The regeneration prohibit conditions are satisfied.	ABS actuator and electric unit (control unit) limits output.	VDC operates.	Normal operation.
		—	Vehicle speed is 14 km/h (9 MPH) or less.	Normal operation.
		—	Accelerator pedal is depressed.	Normal operation.
		—	Under full braking.	Normal operation.
	The amount of target regeneration changes.	Driving mode is changed.	• ECO mode or B mode are canceled. • Range changes to N.	Normal operation.
		—	Brake applied during sharp turn.	Normal operation.
		—	Slip detected during ECO mode.	Normal operation.

Decelerating Force Changes

INFOID:0000000008747281

Symptom			Possible cause	Action
Deceleration G changes.	The amount of regeneration is limited.	Traction motor inverter limits output.	Fail-safe of traction motor inverter.	TMS-25, "Fail-safe"
			The temperature of traction motor or traction motor inverter is high.	Check the “POWER LIMIT CAUSE” in the DATA MONITOR of VCM.
		LBC limits output.	Fail-safe of LBC.	EVB-40, "Fail-safe".
			Damaged bus bar (connecting part of Li-ion battery module).	Check bus bar.
			Degradation in Li-ion battery temperature	Check the “POWER LIMIT CAUSE” in the DATA MONITOR of VCM.
			The temperature of Li-ion battery is too high/low.	
			Li-ion battery is fully charged.	Normal operation.
	The amount of target regeneration changes.	Selector lever range position is changed.	Range changes from D to ECO (or B) or from ECO (or B) to D.	Normal operation.
		—	Accelerator pedal is depressed.	Normal operation.

Normal Charge Does Not Start

INFOID:0000000008747282

Symptom			Possible cause	Action
Normal charge does not start.	Normal charge start conditions are not satisfied.	VCM recognizes that the selector lever is in a range other than P range.	Electric shift system error.	Perform self-diagnosis of Electric shift control module.
		—	Power switch is not OFF.	Normal operation.
		—	VCM receives a charge stop request signal from PDM (Power Delivery Module).	Check to see if charge stop conditions are satisfied. Refer to EVC-53, "LI-ION BATTERY CHARGE CONTROL : Normal Charge Control".
		VCM recognizes that quick charge connector and normal charge connector are connected simultaneously.	Abnormal connection detection circuit of quick charge port.	Check quick charge port.
			Abnormal PDM (Power Delivery Module).	Perform self-diagnosis of PDM (Power Delivery Module).
		VCM prohibits charging.	Fail-safe of VCM.	EVC-97, "Fail-Safe"
		VCM recognizes that normal charge connector is not connected.	Abnormal connection detection circuit of normal charge port.	Check normal charge port.
			Abnormal PDM (Power Delivery Module).	Perform self-diagnosis of PDM (Power Delivery Module).
		VCM recognizes that a PWM signal is not received from EVSE.	AC power, no input. (Disconnect from outlet)	Check outlet.
			AC power, no input. (Blackout)	Check AC power.
			EVSE does not transmit a PWM signal.	Perform self-diagnosis of PDM (Power Delivery Module).
			Abnormal PDM (Power Delivery Module).	
		—	Timer charge is set.	• Cancel timer charge setting. • Turn ON the immediate charging switch.
	Judged as fully-charged.	—	Li-ion battery is fully charged.	Normal operation.

Symptom		Possible cause	Action
Normal charge does not start.	EVSE does not activate.	EVSE detects electric leakage	• Plug EVSE alone into an outlet (AC source) and check that the **"Fault"** lamp on EVSE does **not blink**. If the lamp blinks, replace EVSE. • Check that no electric leakage exists between EVSE control box and PDM (Power Delivery Module) or in the PDM (Power Delivery Module) itself.
		EVSE has a malfunction	Plug EVSE alone into an outlet (AC source) and check that the **"Fault"** lamp of EVSE does **not turn ON**. If the lamp turns ON, replace EVSE.
		EVSE not energized	Plug EVSE alone into an outlet (AC source) and check that the **"Ready"** lamp of EVSE **turns ON**. If the lamp does not turn ON, replace EVSE.
		EVSE communication line has a malfunction	Plug EVSE alone into an outlet (AC source) and check that the **"Fault"** lamp on EVSE does **not blink**. If the lamp blinks, replace EVSE.

Timer Charge and Remote Charge Does Not Start

INFOID:0000000008747283

Symptom			Possible cause	Action
Timer charge or remote charge does not start.	The timer charge start conditions are not satisfied.	—	Timer charge is not set.	Set timer charge.
	The remote charge start conditions are not satisfied.	Remote charge request is not sent to the Information Center (Nissan CARWINGS Data Center).	The request is sent from an out of service area.	Send a remote charge request in a service area.
		Remote charge request is not sent from the Information Center (Nissan CARWINGS Data Center).	The vehicle is located an out of service area.	Send a remote charge request in a service area.

Immediate Charge Does Not Start

INFOID:0000000008747284

Symptom			Possible cause	Action
Immediate charge does not start.	Immediate charge start condition are not satisfied.	—	Timer charge is set.	Turn ON the immediate charging switch.
		The operation of immediate charging switch does not start immediate charge.	Power switch is ON.	Turn power switch OFF.
			A lapse of more than 15 minutes to connect the charge connector after operating the immediate charging switch.	Connect charge connector within 15 minutes after operating the immediate charging switch.
			• Abnormal immediate charging switch. • Abnormal immediate charging switch signal circuit.	EVC-393, "Diagnosis Procedure"

Normal Charge Is Not Completed

INFOID:0000000008747285

Symptom		Possible cause	Action
Normal charge is not completed.	Normal charge is not completed despite full charge.	Abnormal LBC.	Perform self-diagnosis of LBC.
	Timer charge is not completed.	Timer charge end time is not set.	Set timer charge end time.

Quick Charge Does Not Start

INFOID:0000000008747286

Symptom			Possible cause	Action
Quick charge does not start.	Quick charge start conditions are not satisfied.	VCM recognizes that the selector lever is in a range other than P range.	Electric shift system error.	Perform self-diagnosis of electric shift control module.
		—	Power switch is not OFF.	Normal operation.
		—	VCM receives a charge stop request signal from PDM (Power Delivery Module).	Check that charging condition is normal.
		VCM recognizes that the quick charge connector and the normal charge connector are simultaneously connected.	Abnormal connection detection circuit of normal charge port.	Check normal charge port.
			Abnormal PDM (Power Delivery Module).	Perform self-diagnosis of PDM (Power Delivery Module).
		VCM prohibits charging.	Fail-safe of VCM.	EVC-97, "Fail-Safe"
		VCM recognizes that the quick charge connector is not connected.	Abnormal connection detection circuit of quick charge port.	Check quick charge port.
			Abnormal PDM (Power Delivery Module).	Perform self-diagnosis of PDM (Power Delivery Module).
	Quick charger does not permit quick charge.	Quick charger detects insulation resistance degradation in high voltage circuit.	Insulation resistance degradation between PDM (Power Delivery Module) and quick charger.	• Check PDM (Power Delivery Module). • Check high voltage harness. • Check quick charge port. • Check quick charger.

Quick Charge Is Not Completed

INFOID:0000000008747287

Symptom		Possible cause	Action
Quick charge is not completed.	Charging is not completed despite full charge.	Abnormal LBC.	Perform self-diagnosis of LBC.
	VCM does not receive a quick charge stop request signal.	Quick charger communication error.	Perform self-diagnosis of PDM (Power Delivery Module).

Full Charge Cannot Be Achieved

INFOID:0000000008747288

Symptom			Possible cause	Action
Full charge cannot be achieved.	—	—	The setting of the timer charge charging rate is 80%.	Set charging rate to 100%
			Implementation of quick charge under a low Li-ion battery level.	Perform quick charge again.
	Charge power is low or charging stops.	Power consumption is large during charge.	A/C power consumption is large.	Refer to EVC-415, "Low Electrical Consumption".
			Power consumption of auxiliaries is large.	
		Charge power is limited.	Charge Insulation Resistance Loss Protection Control is active.	Perform inspection according to the diagnosis procedure of DTC P3141. Refer to EVC-259, "DTC Logic".
	Target charge level differs from the meter indication.	Indication decreases after the completion of charge.	Temperature change in Li-ion battery.	Normal operation. **NOTE:** Charge level depends on Li-ion battery temperature. For meter indication method, refer to MWI-24, "LI-ION BATTERY AVAILABLE CHARGE GAUGE : System Description".
		Meter indication does not reach maximum.	LED malfunction	MWI-48, "On Board Diagnosis Function"
	Charge level is low.	Chargeable electricity is limited.	LBC limits chargeable electricity.	Check “POWER LIMIT CAUSE” of DATA MONITOR item in VCM.

Climate Ctrl. Timer Does Not Start

INFOID:0000000008747289

Symptom			Possible cause	Action
Climate Ctrl. Timer does not start.	Climate Ctrl. Timer start conditions are not satisfied.		Climate Ctrl. Timer is not set.	Set Climate Ctrl. Timer.
			Remote climate control is set.	Normal operation. **NOTE:** If Climate Ctrl. Timer and remote climate control are requested simultaneously, remote climate control is prioritized.
			EVSE is not connected.	Connect EVSE.
	A/C system does not start.	A/C auto amp. does not recognize Climate Ctrl. Timer.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
		—	Abnormal A/C system power supply.	HAC-180, "A/C AUTO AMP. : Diagnosis Procedure" (with heat pump) or HAC-348, "A/C AUTO AMP. : Diagnosis Procedure" (without heat pump)

Remote climate control Does Not Start

INFOID:0000000008747290

Symptom			Possible cause	Action
Remote climate control does not start.	Remote climate control start conditions are not satisfied.	—	Li-ion battery level is low.*	• Connect EVSE. • Charge Li-ion battery.
		A remote climate control request signal cannot be received.	Remote climate control request is sent in an out of service area.	Send remote climate control request again in a service area.
			The vehicle is located in out of service area.	
	A/C system does not start.	A/C auto amp. does not recognize remote climate control.	Abnormal A/C auto amp.	Perform self-diagnosis of A/C auto amp.
		—	Abnormal A/C system power.	HAC-180, "A/C AUTO AMP. : Diagnosis Procedure" (with heat pump) or HAC-348, "A/C AUTO AMP. : Diagnosis Procedure" (without heat pump)

*: Only during no AC power input.

NORMAL OPERATING CONDITION

Description

INFOID:0000000008747291

CHARGE INSULATION RESISTANCE LOSS PROTECTION CONTROL

When the insulation resistance of the high voltage circuit decreases while charging due to a temporary cause, VCM limits the charging energy and waits until the insulation resistance state recovers. VCM restarts charging after the recovery of the insulation resistance status. If the situation is not improved after several repetitions of this control, VCM stops charging and detects DTC P3141.

NOTE:

If the insulation resistance status does not recover despite the limitation of charging energy under protection control, DTC P0AA6 is detected.

CHARGING CONNECTOR-CONNECTING PROTECTION CONTROL

When VCM detects a vehicle speed immediately after the charging connector is connected, the electrically-driven intelligent brake system is activated.

NOTE:

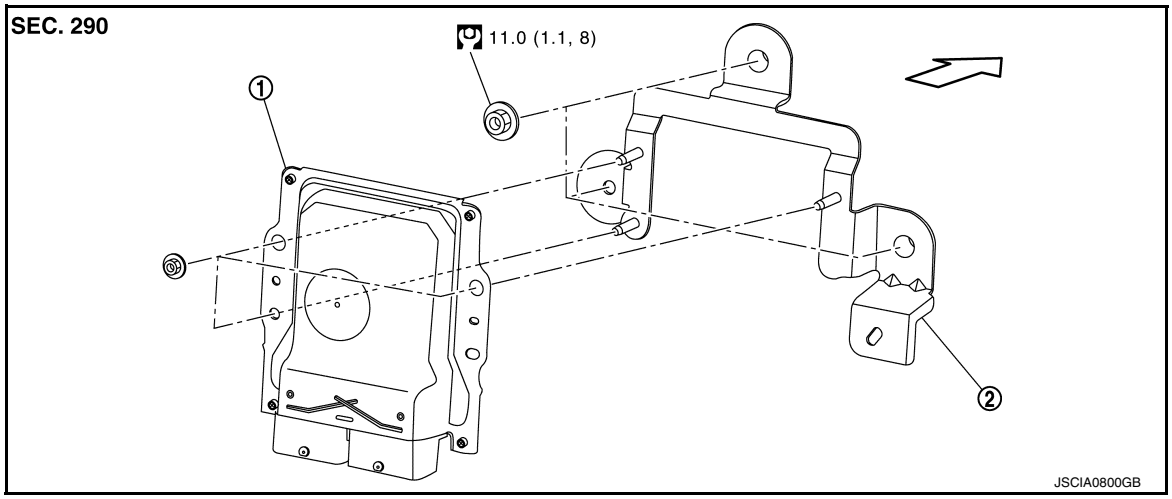
This control cannot stop the vehicle completely.

REMOVAL AND INSTALLATION

VCM

Exploded View

INFOID:0000000008747295



1. VCM
2. VCM bracket

⇦ Vehicle front

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000008747296

REMOVAL

CAUTION:

Before replacing VCM, perform “SAVE DATA FOR CPU REPLACE” in “WORK SUPPORT” of CONSULT to save the current VCM data in CONSULT. Refer to EVC-144, "Work Procedure".

1. Turn power switch OFF and wait at least 20 seconds.
2. Disconnect the 12V battery negative terminal. Refer to EVC-10, "Precautions for Removing of Battery Terminal".
3. Remove the glove box cover assembly. Refer to IP-16, "Exploded View".
4. Disconnect VCM harness connector.
5. Remove VCM mounting nuts.
6. Remove VCM.
7. Remove VCM bracket mounting nuts.
8. Remove VCM bracket.

INSTALLATION

Install in the reverse order of removal.

CAUTION:

Must be perform additional service when replacing VCM. Refer to EVC-144, "Work Procedure".