SECTION HBB HYBRID BATTERY SYSTEM HBB

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SERVICE DATA AND SPECIFICATIONS (SDS)

< PRECAUTION > PRECAUTION PRECAUTIONS

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

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the "SRS AIR BAG" and "SEAT BELT" of this Service Manual.

WARNING:

Always observe the following items for preventing accidental activation.

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision that would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see "SRS AIR BAG".
- Never use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

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

WARNING:

Always observe the following items for preventing accidental activation.

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

Precaution Necessary for Steering Wheel Rotation after 12V Battery Disconnect

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For vehicle with steering lock unit, if the 12V battery is disconnected or discharged, the steering wheel will lock and cannot be turned.

If turning the steering wheel is required with the 12V battery disconnected or discharged, follow the operation procedure below before starting the repair operation.

OPERATION PROCEDURE

- Connect both 12V battery cables. NOTE: Supply power using jumper cables if 12V battery is discharged.
- Turn the ignition switch to ACC position. (At this time, the steering lock will be released.)
- 3. Disconnect both 12V battery cables. The steering lock will remain released with both 12V battery cables disconnected and the steering wheel can be turned.
- 4. Perform the necessary repair operation.
- 5. When the repair work is completed, re-connect both 12V battery cables. With the brake pedal released, turn the ignition switch from ACC position to ON position, then to LOCK position. (The steering wheel will lock when the ignition switch is turned to LOCK position.)
- 6. Perform All DTC Reading using CONSULT and delete DTC. NOTE:

Multiple DTCs are detected when 12V battery cable is disconnected while ignition switch is in ACC position.

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Precaution for Procedure without Cowl Top Cover

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 Xenon Headlamp Service

WARNING:

Comply with the following warnings to prevent any serious accident.

- Disconnect the 12V battery cable (negative terminal) or the power supply fuse before installing, removing, or touching the xenon headlamp (bulb included). The xenon headlamp contains high-voltage generated parts.
- Never work with wet hands.
- Check the xenon headlamp ON-OFF status after assembling it to the vehicle. Never turn the xenon headlamp ON in other conditions. Connect the power supply to the vehicle-side connector. (Turning it ON outside the lamp case may cause fire or visual impairments.)
- Never touch the bulb glass immediately after turning it OFF. It is extremely hot.

CAUTION:

Comply with the following cautions to prevent any error and malfunction.

- Install the xenon bulb securely. (Insufficient bulb socket installation may melt the bulb, the connector, the housing, etc. by high-voltage leakage or corona discharge.)
- Never perform HID circuit inspection with a tester.
- Never touch the xenon bulb glass with hands. Never put oil and grease on it.
- Dispose of the used xenon bulb after packing it in thick vinyl without breaking it.
- Never wipe out dirt and contamination with organic solvent (thinner, gasoline, etc.).

High Voltage Precautions

INFOID-00000008140885

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- 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. CAUTION:

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

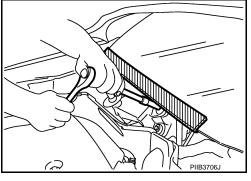
HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

HBB-6

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PRECAUTIONS

< PRECAUTION >

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

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

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

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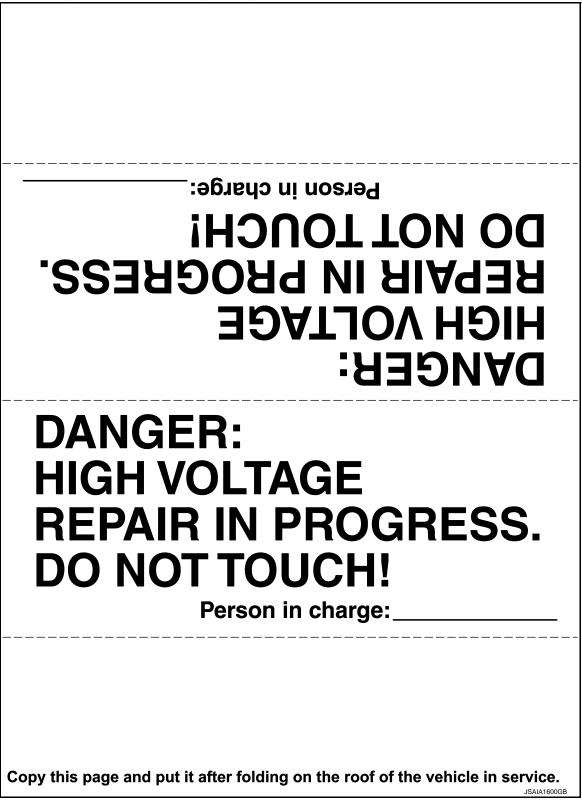
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To call the attention of other workers, indicate "High voltage work in progress. Do not touch!" on vehicles where work is being performed on the high voltage systems.



< PREPARATION > PREPARATION PREPARATION

Special Service Tools

Tool na Tool nu (Kent-Moo	Description	
Module charge balancer — (J-50346)	JPCIA0070ZZ	Module voltage adjustment
ommercial Service Tools		INFOID:000000084782.
Tool na	me	Description
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	W MCIA0149ZZ	Removing and installing high voltage components
Leather gloves [Use leather gloves that can fasten the wrist tight]	JPCIA0066ZZ	 Removing and installing high voltage components Protect insulated gloves
Insulated safety shoes	JPCIA0011ZZ	Removing and installing high voltage components
Safety glasses [ANSI Z87.1]		 Removing and installing high voltage components To protect eye from the spatter on the work to electric line

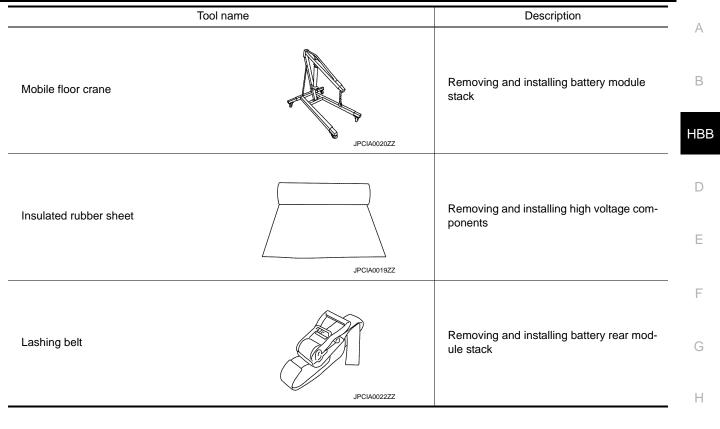
PREPARATION

< PREPARATION >

Т	Description	
Insulated helmet	JPCIA0013ZZ	Removing and installing high voltage components
Insulation resistance tester (Multi tester)	JPCIA0014ZZ	Measuring insulation resistance, voltage, and resistance
Insulated hand tools	JPCIA0067ZZ	Removing and installing high voltage components
Insulated torque wrench	JPCIA0068ZZ	Removing and installing high voltage components
Carabineer [small]	JPCIA0016ZZ	Removing and installing battery module stack NOTE: D: 8.0 mm (0.31 in) L: 74.0 mm (2.91 in) S: 10.0 mm (0.39 in) W: 22.5 mm (0.89 in)
Belt slinger	JPCIA0021ZZ	Removing and installing battery module stack Length: 1.0 m (3.281 ft)
Insulated cover sheet	JPCIA0018ZZ	Removing and installing high voltage components

PREPARATION

< PREPARATION >



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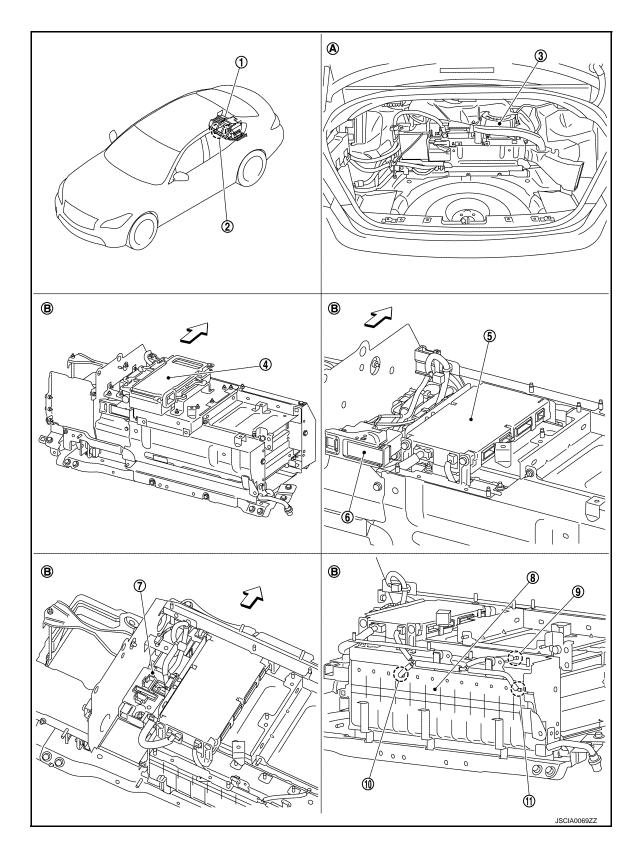
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SYSTEM DESCRIPTION COMPONENT PARTS

Component Parts Location



A. Trunk room

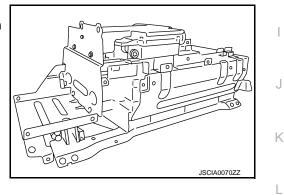
B. Inside Li-ion battery

: Vehicle front

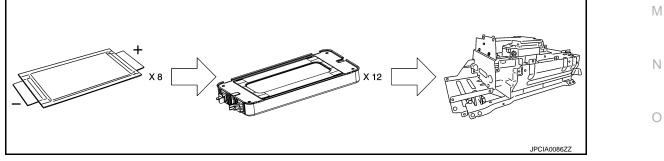
No.	Component	Function	В
1	Li-ion battery	Refer to HBB-13, "Li-ion Battery".	
2.	HPCM Receives various information which is transmitted from eac control unit, and controls the vehicle comprehensively. Shuts off the main relay when a malfunction is detected in t battery. Refer to <u>HBC-15, "HPCM"</u> for detailed installation location.		HBE
3.	Battery cooling fan	Refer to <u>HBB-16, "Battery Cooling Fan"</u> .	
4.	DC/DC converter	Refer to HBC-15, "DC/DC Converter".	
5.	Li-ion battery controller (LBC)	Refer to HBB-14, "Li-ion Battery Controller".	E
6.	Service plug	Refer to <u>HBB-16, "Service Plug"</u> .	
7.	Battery junction box	Refer to HBB-16, "Battery Junction Box".	F
8. Module Refer to <u>HBB-14, "Module"</u> .		Refer to <u>HBB-14, "Module"</u> .	I
9.	Battery temperature sensor 3 (Intake)		
10.	Battery temperature sensor 1 (Module 9)	Refer to HBB-15, "Battery Temperature Sensor".	G
11.	Battery temperature sensor 2 (Module 1)		

Li-ion Battery

- The Li-ion battery (battery pack) is installed inside the trunk room.
- The Li-ion battery controller, DC/DC converter, and battery junction box are installed on the battery pack.



• 8 cells are connected in series to create one module. 12 of these modules are arranged in series to compose the battery pack.



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Li-ion Battery Controller

- The Li-ion battery controller (LBC) is installed inside the battery pack.
- The LBC is the core of battery control. It detects the battery pack voltage and current, temperature inside the battery and intake temperature, and the voltage of each cell to determine the SOC (state of charge). It also calculates the allowable input/output values, and transmits the calculation data to the HPCM (Hybrid power train control module). The HPCM controls the vehicle according to the battery status.



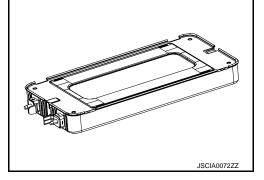
- 1. Li-ion battery state check
 - SOC (state of charge)
 - Possible output power value
 - Possible input power value
 - Temperature
- 2. Optimization of cell voltage deviation
- 3. Prevention of overvoltage and overcurrent
- 4. Prevention of overheat
- 5. Detection of decrease in insulation resistance of high-voltage circuit

Module

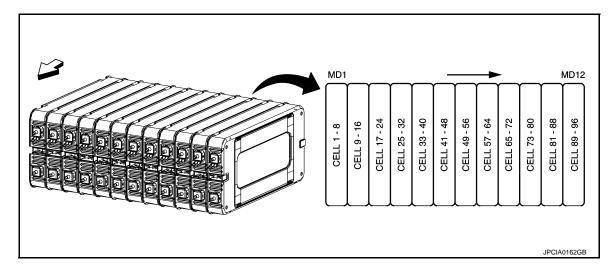
- Each module contains 8 laminated cells joined together.
- The Li-ion battery contains 12 modules.
- There are two kinds of modules, according to the location of positive and negative terminals.

Positive terminal	:
Negative terminal	:





MODULE LAYOUT



: Vehicle front

JSCIA0071ZZ

COMPONENT PARTS

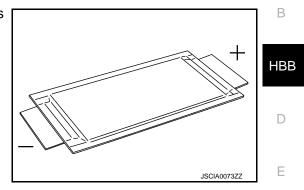
< SYSTEM DESCRIPTION >

NOTE:

Module 1 (MD1) has the highest electrical potential, and module 12 (MD12) has the lowest electrical potential.

CELL

The cells that are used have a thin laminated structure that provides excellent cooling performance.



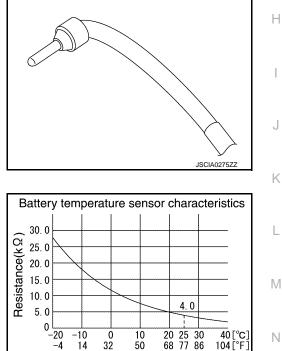
The Features of laminated cell

- Large surface area with excellent cooling performance reduces heat load to the battery and improves batterylife.
- The light and thin structure increases the flexibility in layout.

Battery Temperature Sensor

• The battery temperature sensors are installed inside the battery pack. They measure the temperature inside the battery pack and the intake temperature.

• The sensor uses a thermistor with a resistance value that varies according to changes in temperature. The electrical resistance of the thermistor decreases as the temperature increases.



Temperature

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JPCIA0295GE

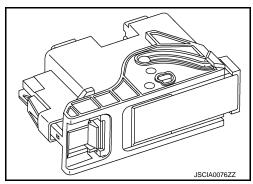
Battery Junction Box

- The battery junction box is installed onto the bottom of the battery pack.
- The battery junction box contains the system main relays for supply of DC electrical power from the Li-ion battery, as well as the current sensor which measures the DC current.
- A system main relay is installed on both the positive side and negative side. They supply DC power to the high-voltage components. They also supply DC power to the Li-ion battery during motor regeneration and charging.
- When a system malfunction occurs, the system main relays immediately turn OFF based on the command from the HPCM (Hybrid Power-train Control Module), shutting off the Li-ion battery in order to ensure safety.

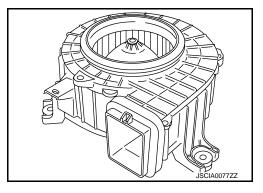
Service Plug

- A service plug is installed on the high-voltage battery in order to securely shut off the high-voltage circuit during inspection and servicing of high-voltage components.
- When the service plug cover is opened, the service plug can be removed.
- Be sure to use insulated protective gear when removing and installing the service plug.

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Battery Cooling Fan

The battery fan is installed on the top of the Li-ion battery underneath the rear parcel shelf (left side) inside the trunk room.

Specifications

	Fan	Туре		Sirroco fan	
Blower unit	Fan	Outside diameter \times width	[mm (in)]	φ150 (5.91) × 64.5 (2.54)	
	Motor Power consumption	Туре		Brushless motor	
		Power consumption	(W)	235	
		Motor drive signal duty ratio	(%)	16 – 91	

Warning Label

Warning label is affix on each component parts below.

After replacing a part, check that the part is affixed with a label. If the label is not affixed, be sure to affix the label to the original position.

HIGH VOLTAGE WARNING

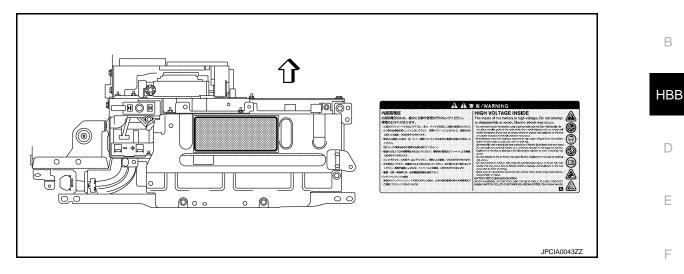
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

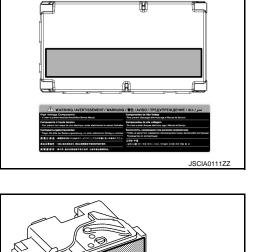
Li-ion Battery

The label is affixed on the rear of Li-ion battery.

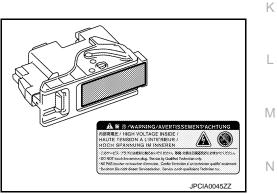


∠ : Vehicle upper

Li-ion Battery Controller The label is affixed on the main body of controller.



Service Plug-The label is affixed on service plug.



EXCEPT HIGH VOLTAGE WARNING

Li-ion Battery Gas Discharge Tube

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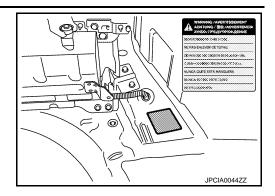
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COMPONENT PARTS

< SYSTEM DESCRIPTION >

The label is affixed on trunk room right side.



SYSTEM

< SYSTEM DESCRIPTION >

SYSTEM

System Description



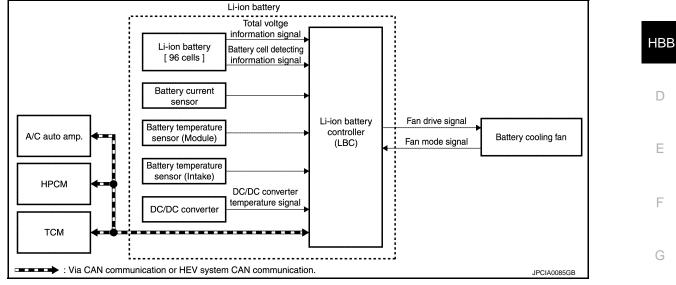
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SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL ITEM

Input signal item

Transmit unit		Signal name	Description	
НРСМ		Total power signal	The engine and traction motor output is received from the HPCM.	
		High voltage harness connec- tor detecting signal	The connection detection signal of the high voltage connector and service plug is received from the HPCM.	
A/C auto amp.		A/C intake door status signal	The A/C intake door status signal is received from the A/C auto amp.	
	HEV system CAN	A/C blower motor speed sig- nal	The A/C blower motor speed signal is received from the A/C auto amp.	
		In-vehicle temperature signal	The in-vehicle temperature signal is received from the A/C auto amp.	
ТСМ		Output shaft revolution signal	Output shaft revolution signal is received from TCM.	
Traction motor inverter		Motor speed signal	Motor speed signal is received from traction motor inverter.	
		Motor output torque signal	Motor output torque signal is received from traction motor in- verter.	

Output signal item

Ν



Receive unit		Signal name	Description	
		Li-ion battery temperature sig- nal	The Li-ion battery temperature signal is transmitted to HPCM.	
		Li-ion battery state of charge signal	The LI-ion battery state of charge signal is transmitted to HPCM.	
		Li-ion battery voltage signal	The Li-ion battery voltage signal is transmitted to HPCM.	
НРСМ		Li-ion battery current signal	The Li-ion battery current signal is transmitted to HPCM.	
	HEV system CAN	Charge control electricity sig- nal	The chargeable electric power signal is transmitted to HPCM.	
		Discharge control electricity signal	The dischargeable electric power signal is transmitted to HPCM.	
		DC/DC converter cooling mode signal	Cooling fan mode request signal from the DC/DC converter is transmitted to HPCM.	
A/C auto amp.		A/C outlet request signal	A/C outlet request signal of the A/C system is transmitted to HPCM.	

DESCRIPTION

The Li-ion battery controller (LBC) constantly monitors the conditions inside the battery, and transmits the battery charge status (SOC), the electrical power that can be input and output in the vehicle, and other information via HEV system CAN communication.

Vehicle information from each unit is received via HEV system CAN communication.

The Li-ion battery controller performs the following control.

- The battery status is monitored constantly, and the available charge/discharge power is transferred to the HPCM (Hybrid Powertrain Control Module) so that battery malfunctions (overvoltage, over-discharge, or overheating) may not occur.
- The battery malfunctioning status (overvoltage, over-discharge, or overheating) is immediately detected when it occurs. The system main relay cut-off request is transmitted to HPCM, and the charge/discharge line is shut off.
- The battery is maintained in optimal conditions according to the cell capacity adjustment function so that a decrease in the battery charge/discharge capability, which may be caused by cell capacity fluctuation, can be prevented.
- The insulation resistance status is detected according to the detection function for isolation resistance drop between high voltage and low voltage. The status is transmitted to the HPCM so that the vehicle may not be started in a malfunctioning status.

ON BAT OFF ON IGN OFF ON LBC* Shutdown operation OFF *:Li-ion battery controller After IGN ON,LBC ON After IGN OFF, After Shutdown operation. Start Shutdown operation LBC OFF JPCIA0087GB After IGN OFF, LBC does not stop immediately, and instead starts a shutdown operation.

Li-ion Battery Operating Stop Condition

The shutdown time varies according to the battery capacity adjustment time that is performed in order to eliminate voltage differences between the cells.

BATTERY PROTECTION

SYSTEM

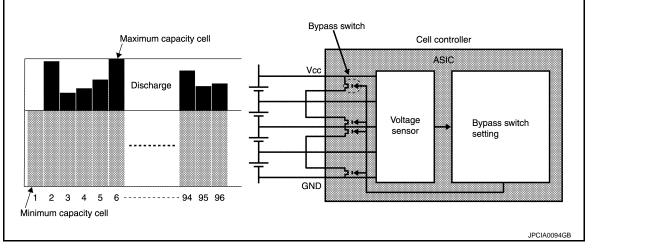
< SYSTEM DESCRIPTION >

The Li-ion battery has a voltage range capable of charge/discharge. If charged/discharged exceeding the range, excessive low capacity or malfunction may be caused. To prevent this, the Li-ion battery controller detects voltage of each cell and requests the control of charging/discharging energy to HPCM so that the cell voltage stays within the voltage range.

Control item	Control	Operating condition		
Overvoltage/overcurrent protec-	Charging energy control	Gradual control of charging energy as the cell voltage ap- proaches the upper limit of the voltage capable of charging.		
tion	System main relay cut	Cell voltage exceeds the voltage judged as overvoltage and maintains the voltage for more than the specified time.		
	Discharging energy control	Gradual control of discharging energy as the cell voltage ap- proaches the lower limit of the voltage capable of discharging.		
Over discharge protection	System main relay cut	Cell voltage exceeds the voltage judged as over discharge and maintains the voltage for more than the specified time.		
Excessive temperature rise pro	Charging/discharging energy control	Gradual control of charging/discharging energy as a Li-ion bat- tery temperature approaches the upper limit of the temperature capable of use.		
tection	System main relay cut	Li-ion battery temperature exceeds the temperature judged as excessive temperature rise and maintains the temperature for more than the specified time.		

CELL CAPACITY ADJUSTMENT METHOD

During cell capacity adjustment, the capacity of each cell is estimated based on the no-load voltage when the system starts, and the capacities are adjusted so that they are all at the target level. The voltage of each cell is detected inside the Li-ion battery controller. The bypass switches are then turned ON to discharge the cells that have excess capacity. In this way, capacity adjustment by the Li-ion battery controller allows the capacity of all cells to be fully utilized.



Battery Cooling Control

INFOID:000000008140898

DESCRIPTION

Cooling of the Li-ion battery is performed by delivering cooled air from the passenger compartment into the trunk room.

The air from the passenger compartment cools the Li-ion battery, maintaining a suitable battery temperature and improving the lifetime of the Li-ion battery.

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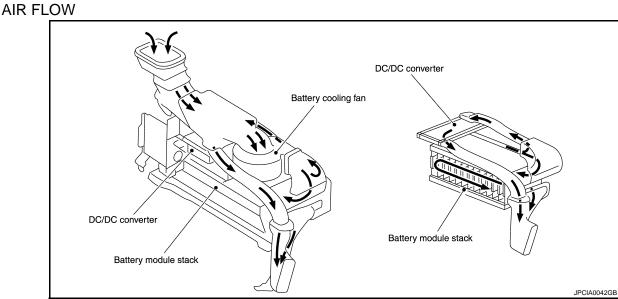
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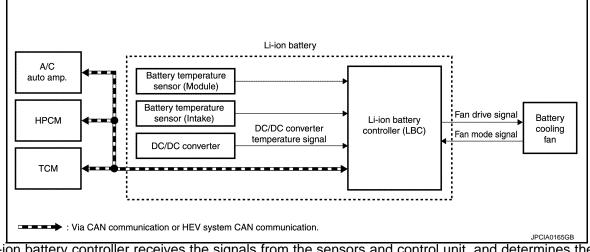
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The air from the passenger compartment passes from the rear parcel shelf through a duct and is sent to the battery cooling fan. The air is then divided for 2 systems (battery module stack and DC/DC converter) to cool the entire battery pack.

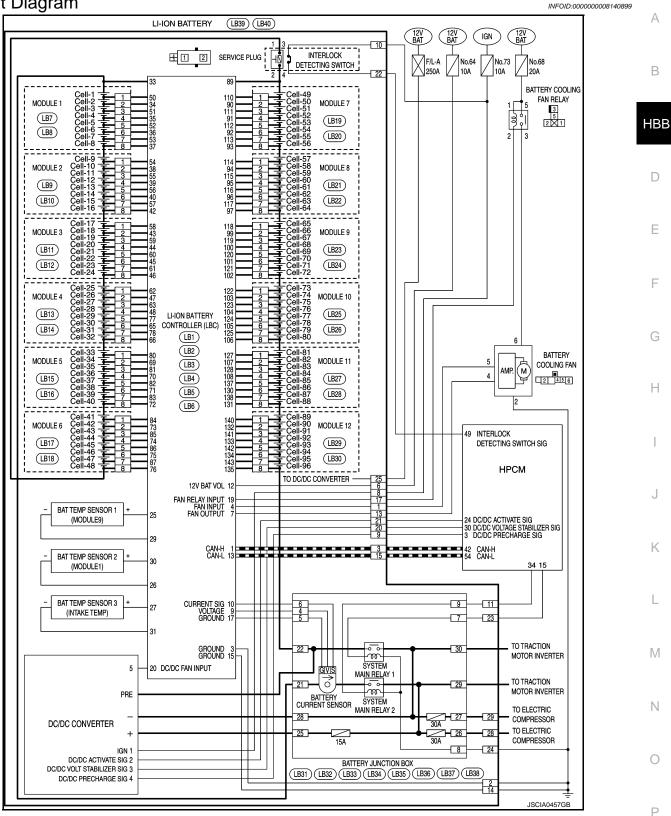




The Li-ion battery controller receives the signals from the sensors and control unit, and determines the target airflow. Based on this target airflow, the Li-ion battery controller changes the duty value of the cooling fan drive signal, allowing stepless control of the airflow.

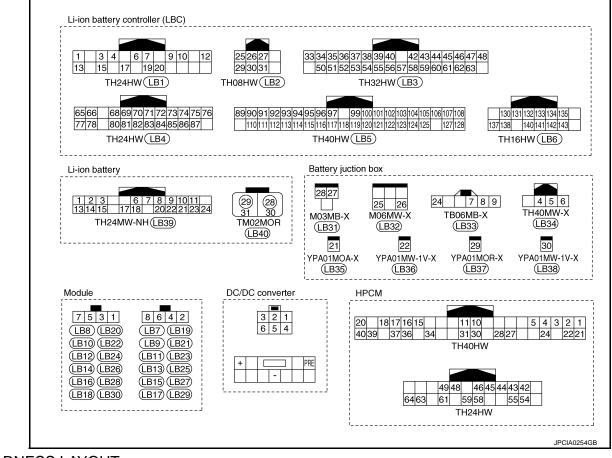
The target fan speed is determined by calculating the vehicle noise state according to the output shaft revolution signal, total power signal, and A/C blower fan speed, based on the temperature signals from the battery temperature sensors, intake temperature sensor, and DC/DC converter.

Circuit Diagram



SYSTEM

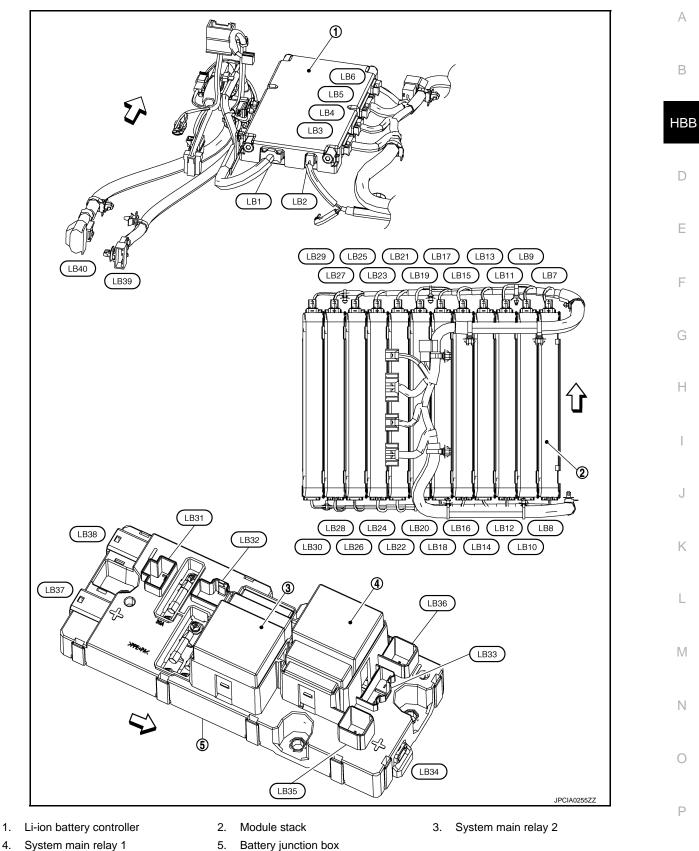
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HARNESS LAYOUT

SYSTEM

< SYSTEM DESCRIPTION >



 \triangleleft : Vehicle front

Battery junction box

HANDLING PRECAUTION

Hybrid Battery System

INFOID:000000008140900

PRECAUTIONS FOR STORAGE OF THE LI-ION BATTERY

- 1. Apply insulating tape to the service plug and high-voltage harness connector, and protect the terminals so that nothing contacts them.
- 2. Store in a well-ventilated location that is not exposed to direct sunlight. (Storing outdoors or unprotected is prohibited.)
- 3. Never set directly on the floor.
- 4. Lay an anti-static rubber sheet underneath the battery.
- 5. Never invert the battery.
- 6. Never stack batteries.
- 7. Cover with an anti-static cover sheet.
- 8. Put a caution display stating "CAUTION! HIGH VOLTAGE" on the insulated cover sheet.
- 9. Put identification display showing the name of person in charge on the insulated cover sheet.
- 10. Never allow water to contact the battery.
- 11. Prevent other objects from falling onto the battery.

ON BOARD DIAGNOSTIC (OBD) SYSTEM

< SYSTEM DESCRIPTION >

ON BOARD DIAGNOSTIC (OBD) SYSTEM

Diagnosis Description

This system is an on board diagnostic system that records exhaust emission-related diagnostic information and detects a sensors/actuator-related malfunction. A malfunction is indicated by the malfunction indicator lamp (MIL) and stored in control module memory as a DTC. The diagnostic information can be obtained with the diagnostic tool (GST: Generic Scan Tool).

GST (Generic Scan Tool)

When GST is connected with a data link connector equipped on the vehicle side, it will communicate with the control module equipped in the vehicle and then enable various kinds of diagnostic tests. Refer to GI-58. "CONSULT/GST Data Link Connector (DLC) Circuit".

NOTE:

Service \$0A is not applied for regions where it is not mandated.

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DIAGNOSIS SYSTEM (LBC) DIAGNOSIS DESCRIPTION

DIAGNOSIS DESCRIPTION : 1 Trip Detection Diagnosis and 2 Trip Detection Diagnosis

INFOID:000000008140903

When a malfunction is detected for the first time in two trip detection logic, 1st trip DTC and 1st trip freeze frame data are stored in the Li-ion battery controller (LBC) memory. The MIL does not illuminate at this stage. There are diagnoses that illuminate the hybrid system warning lamp and others that do not illuminate them. <1st trip>

If the same malfunction is detected again during the next drive, the DTC and freeze frame data are stored in the LBC memory, and the MIL, hybrid system warning lamp illuminates. The MIL illuminates at the same time when the DTC is stored. <2nd trip>

The "trip" in the "two trip detection logic" means a driving mode in which self-diagnosis is performed during vehicle operation.

Some diagnoses of the two trip detection logic may illuminate the MIL, the hybrid system warning lamp and others may not.

When a malfunction is detected for the first time in one trip detection logic, the DTC and Freeze Frame data are stored in the LBC memory. There are diagnoses that illuminate the MIL, the hybrid system warning lamp and others that do not illuminate them.

^{×:} Applicable —: Not applicable

	1st trip DTC		DTC		MIL	
Item	1st trip	2nd trip	1st trip	2nd trip	1st trip	2nd trip
	displaying	displaying	displaying	displaying	Illuminate	Illuminate
One trip detection diagnosis (Refer to <u>HBB-39, "DTC Index"</u> .)	_	—	×	—	×	—
Two trip detection diagnosis (Refer to <u>HBB-39, "DTC Index"</u> .)	×	—	—	×	—	×

DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:00000008140904

DTC AND 1ST TRIP DTC

The following shows 2nd trip detection diagnosis that illuminates the MIL.

The 1st trip DTC number is the same as the DTC number.

If a malfunction is detected during the 1st trip, the 1st trip DTC is saved in the Li-ion battery controller (LBC) memory. At this time, the MIL does not illuminate. Some of the diagnoses illuminate the hybrid system warning lamp and other diagnoses do not illuminate them.

If the same malfunction is not detected in the 2nd trip (meeting the required driving pattern), the 1st trip DTC is cleared from the LBC memory. If the same malfunction is detected in the 2nd trip, both the 1st trip DTC and DTC are saved in the LBC memory and the MIL, the hybrid system warning lamp illuminate.

The procedure for erasing the DTC and the 1st trip DTC from LBC memory is described in "How to Erase DTC and 1st Trip DTC" in HBB-32, "CONSULT Function".

Refer to <u>HBB-39, "DTC Index"</u> for the malfunctions for which the 1st trip DTC is displayed.

1st trip DTC is specified in Service \$07 of SAE J1979/ISO 15031-5.

When a 1st trip DTC is detected, check, print out or write down and erase (1st trip) DTC and Freeze Frame data as specified in Work Flow procedure Step 2, refer to HBB-44, "Work Flow".

Then perform DTC Confirmation Procedure or Component Function Check to try to duplicate the malfunction. If the malfunction is duplicated, the item requires repair.

FREEZE FRAME DATA AND 1ST TRIP FREEZE FRAME DATA

LBC stores the Li-ion battery status, such as voltage, current, temperature, and SOC (state of charge) at malfunction detection.

Data which are stored in the LBC memory, along with the 1st trip DTC, are called 1st trip freeze frame data. The data, stored together with the DTC data, are called freeze frame data and displayed on CONSULT or GST. The 1st trip freeze frame data can only be displayed on the CONSULT screen.

LBC can store three sets of freeze frame data (one set for MIL-illuminating DTC and two sets for non-MIL-illuminating DTC). 1st trip freeze frame data is stored in the LBC memory along with the 1st trip DTC.

For MIL-illuminating DTC, there is no priority for 1st trip freeze frame data and it is updated each time a different 1st trip DTC is detected. However, once freeze frame data (2nd trip detection/MIL on) is stored in the LBC

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< SYSTEM DESCRIPTION >

memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the LBC.

For non-MIL-illuminating DTC, the freeze frame data of the 1st trip DTC has no priority. Every time another 1st trip DTC is detected after two freeze frame data of the 1st trip DTC are stored, the older freeze frame data is updated. However, once freeze frame data (2nd trip detection/MIL on) is stored in the LBC memory, 1st trip freeze frame data is no longer stored. Remember, only one set of freeze frame data can be stored in the LBC. The LBC has the following priorities to update the data.

Priority	Item		
1	Freeze frame data		
2 1st trip DTC freeze frame data			

Both 1st trip freeze frame data and freeze frame data (along with the DTC) are cleared when the LBC memory is erased. For the procedure for erasing the LBC memory, refer to "How to Erase DTC and 1st Trip DTC" of <u>HBB-32, "CONSULT Function"</u>.

DIAGNOSIS DESCRIPTION : Counter System

RELATIONSHIP BETWEEN MIL, 1ST TRIP DTC, DTC, AND DETECTABLE ITEMS

- When a malfunction is detected for the first time, the 1st trip DTC and the 1st trip freeze frame data are stored in the Li-ion battery controller (LBC) memory.
- When the same malfunction is detected in two consecutive trips, the DTC and the freeze frame data are G stored in the LBC memory, and the MIL will come on.
- The DTC and the freeze frame data will be stored until the vehicle is driven 40 times (driving pattern A). The "TIME" in "SELF-DIAGNOSTIC RESULTS" mode of CONSULT will count the number of times the vehicle is driven without the malfunction of the DTC.
- The 1st trip DTC is not displayed when the self-diagnosis results is OK for the 2nd trip.

COUNTER SYSTEM CHART

Items	Driving pattern	Trip
MIL (turns OFF)	В	3
DTC, freeze frame data (no display)	А	40
1st trip DTC (clear)	В	1
1st trip freeze frame data (clear)	В	1

DIAGNOSIS DESCRIPTION : Driving Pattern

CAUTION:

Always drive at a safe speed.

DRIVING PATTERN A

Driving pattern A means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature rises by 20°C (32°F) or more after starting the engine.
- Engine coolant temperature reaches 70°C (158°F) or more.
- The ignition switch is turned from ON to OFF.

NOTE:

- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern A.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving
 pattern A.

DRIVING PATTERN B

Driving pattern B means a trip satisfying the following conditions.

- Engine speed reaches 400 rpm or more.
- Engine coolant temperature reaches 70°C (158°F) or more.
- Vehicle speed of 70 120 km/h (44 75 MPH) is maintained for 60 seconds or more under the control of closed loop.

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- Vehicle speed of 30 60 km/h (19 37 MPH) is maintained for 10 seconds or more under the control of closed loop.
- After experiencing the closed loop control with the hybrid system started (READY or engine started), vehicle speed of 4 km/h (2 MPH) or less and the status without stepping on the accelerator pedal are maintained for 12 seconds or more.
- The state of driving at 10 km/h (7 MPH) or more reaches 10 minutes or more in total.
- The status with the hybrid system started (READY or engine started) is maintained for 22 minutes or more. **NOTE:**
- Drive the vehicle at a constant velocity.
- When the same malfunction is detected regardless of driving conditions, reset the counter of driving pattern B.
- When the above conditions are satisfied without detecting the same malfunction, reset the counter of driving pattern B.

DIAGNOSIS DESCRIPTION : Hybrid System Warning Lamp

 When a control module related to the hybrid system detects a DTC, the lamp activation request signal is transmitted to HPCM via CAN communication.

HPCM decides the order of priority (lamp ON or blinking) for the signals sent from the control modules related to the hybrid system and the DTC stored in the HPCM, and transmits the hybrid system warning lamp activation signal to the combination meter via CAN communication.

Based on the signal from HPCM, the combination meter causes the hybrid system warning lamp to turn ON or blink, notifying the driver that a malfunction is detected.

• Control modules which record DTC that cause the hybrid system L warning lamp to turn ON or blink.

(The control module which stores the DTC is different for each DTC.)

- HPCM
- ECM
- TCM
- Traction motor inverter
- Li-ion battery controller

1. When the ignition switch is turned ON, the hybrid system warning lamp turns ON. **NOTE:**

If the hybrid system warning lamp does not turn ON, inspect the warning lamp system circuit. <u>HBC-330.</u> <u>"Component Function Check"</u>.

2. When the vehicle is READY, the hybrid system warning lamp turns OFF. **NOTE:**

If the hybrid system warning lamp turns ON or flashes continuously, this means a DTC related to the hybrid system is detected. Execute self-diagnosis, and perform inspection or repair.

DIAGNOSIS DESCRIPTION : Permanent Diagnostic Trouble Code (Permanent DTC)

Permanent DTC is defined in SAE J1979/ISO 15031-5 Service \$0A.

Control module stores a DTC issuing a command of turning on MIL as a permanent DTC and keeps storing the DTC as a permanent DTC until control module judges that there is no presence of malfunction.

Permanent DTCs cannot be erased by using the erase function of CONSULT or Generic Scan Tool (GST) and by disconnecting the 12V battery to shut off power to control module. This prevents a vehicle from passing the use inspection without repairing a malfunctioning part.

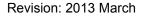
When not passing the use inspection due to more than one permanent DTC, permanent DTCs should be erased, referring to this manual.

NOTE:

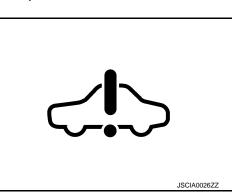
- The important items in state emission inspection are that MIL is not ON, SRT test items are set, and permanent DTCs are not included.
- Permanent DTCs do not apply for regions that permanent DTCs are not regulated by law.

PERMANENT DTC SET TIMING

The setting timing of permanent DTC is stored in control module with the lighting of MIL when a DTC is confirmed.



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< SYSTEM DESCRIPTION >

DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)

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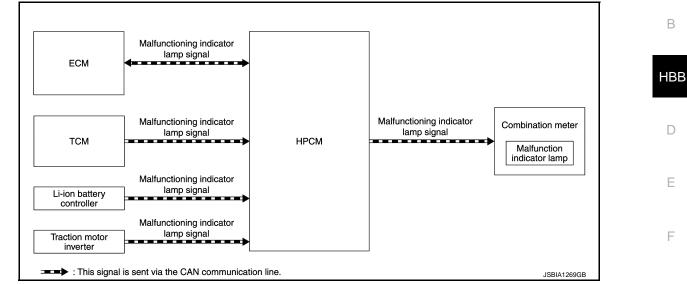
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SYSTEM DIAGRAM



SYSTEM DESCRIPTION

- If the emission-related control module detects emission-related DTC, illuminating or blinking of the MIL notifies the driver that a malfunction is detected.
- When the Li-ion battery controller, traction motor inverter or TCM* detects emission-related DTC, a malfunctioning indicator lamp signal to is sent HPCM via CAN communication.

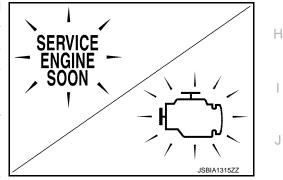
If TCM detects emission-related DTC, it sends a malfunctioning indicator lamp signal to ECM via HPCM (gateway) in CAN communication.

- *: If DTC related to hybrid is detected, a signal is sent.
- HPCM sends a malfunctioning indicator lamp signal from Li-ion battery controller, traction motor inverter and TCM and a malfunctioning indicator lamp signal with emission-related DTC stored in HPCM to ECM.
- ECM compares malfunctioning indicator lamp signal from TCM and HPCM with emission-related DTC stored in ECM, and determines whether to illuminate or blink the MIL. ECM sends a malfunctioning indicator lamp signal to HPCM in CAN communication.
- HPCM sends a malfunctioning indicator lamp signal (illuminating or blinking) from ECM to the combination meter via CAN communication.
- The MIL in the combination meter illuminates or blinks based on the malfunctioning indicator lamp signal from HPCM.
- Control module that memorizes DTC for illuminating or blinking of the MIL (The control module memorized for each DTC varies.)
- ECM
- TCM
- HPCM
- Li-ion battery controller
- Traction motor inverter
- 1. The MIL illuminates when ignition switch is turned ON. **NOTE:**

When the MIL does not illuminate, check the circuit of the MIL. Refer to EC-422, "Component Function Physical Check".

2. The MIL turns off when the ignition switch is set to READY. **NOTE:**

When the MIL continues to illuminate or blink, emission-related DTC is detected. Perform total self-diagnosis and inspect or repair the unit.



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CONSULT Function

INFOID:000000008140910

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with Li-ion battery controller (LBC).

Item	Function
Work Support	Allows system settings to be changed or adjusted.
ECU Identification	Allows the LBC part No. to be displayed.
Self-diagnosis Result	Allows the self-diagnosis results judged by the LBC to be displayed and erased*.
Data Monitor	Allows the LBC input/output data to be displayed and recorded.
Active Test	Allows the system functions to be forcibly stopped or started by CONSULT.

*: The following diagnostic information is cleared when the LBC memory is erased.

Diagnostic trouble codes

• 1st trip diagnostic trouble codes

Freeze frame data

• 1st trip freeze frame data

Work Support

Work item	Condition
Save battery information data	Allows the battery information stored in the LBC to be saved.
Write battery information data	Allows the battery information read by CONSULT from LBC to be written to the LBC.
Clear battery information	Allows the battery information stored in the LBC to be cleared.

ECU IDENTIFICATION

Part number of LBC can be checked.

SELF-DIAGNOSIS RESULT

Self Diagnostic Item

Regarding items of DTC, refer to HBB-39, "DTC Index".

How to Read DTC and 1st Trip DTC

DTCs and 1st trip DTCs related to the malfunction are displayed in "Self-diag results".

- When LBC detects a 1st trip DTC, "1t" is displayed for "TIME".
- When LBC has detected a current DTC, "0" is displayed for "TIME".
- If "TIME" is neither "0" nor "1t", the DTC occurred in the past and LBC shows the number of times the vehicle has been driven since the last detection of the DTC.

How to Erase DTC and 1st Trip DTC

NOTE:

If the ignition switch stays ON after repair work, be sure to turn ignition switch OFF once. Wait at least 10 seconds and then turn it ON (engine stopped) again.

- 1. Select "HV BAT" with CONSULT.
- 2. Select "SELF-DIAG RESULTS".
- 3. Touch "ERASE". (DTC in LBC will be erased.)

FREEZE FRAME DATA (FFD)

The following vehicle status is recorded when DTC is detected and is displayed on CONSULT.

Monitored item	Unit	Description
DTC	—	Displays the DTC which caused FFD memory
BATT ELECTRIC CURRENT	А	Displays the current value detected by the current sensor.
INPUT POSSIBLE POWER	kW	Displays the power which can be input to the Li-ion battery.
OUTPUT POSSIBLE POWER	kW	Displays the power which can be output from the Li-ion battery.
12V BATTERY VOLTAGE	mV	Displays the 12V power voltage.

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Monitored item	Unit	Description
IR SEN SHORT PULSE AMPLITUDE	mV	Displays the difference between the maximum voltage and minimum voltage in the voltage amplitude for insulation resistance drop detection.
SOC	%	Displays the charge status of the Li-ion battery.
SERVICE PLUG INTERLOCK	OPEN/ CLOSE	Displays the service plug connected/disconnected status.
CELL VOLTAGE 01 – 96	mV	Displays the voltage of each cell.
TOTAL BATTERY VOLTAGE	V	Displays the total voltage of the Li-ion battery.
TEMPERATURE COUNTER	_	Displays the cumulative battery stress value based on the average battery temperature.
LIFE MAX BAT TEMP	degC	Displays the maximum battery temperature that is reached.
LOW TEMP START COUNTER	count	Displays the cumulative number of trips for low-temperature starts.
VEHICLE RUNNING CONTROL NG COUNTER	count	Displays the cumulative number of trips for irregularities in vehicle driving control.
LIFE MINIMUM STATE OF CHARGE	%	Displays the lowest SOC (charge status) that occurs during the course of use.
OVER DISCHARGE NG COUNTER	count	Displays the cumulative number of trips for over-discharge malfunction de- tection.
LIFE MINIMUM TOTAL VOLTAGE	V	Displays the lowest cumulative voltage that occurs during the course of use.
BATTERY CALCULATION CALL TIME COUNTER	count	Displays the cumulative time during which battery stress is calculated.
BATTERY CALCULATION CALL COUNTER	count	Displays the cumulative number of trips for battery stress calculation.
BATTERY TEMPERTURE 1	degC	Displays the temperature calculated using the signal voltage from battery temperature sensor 1 (Module 9).
BATTERY TEMPERTURE 2	degC	Displays the temperature calculated using the signal voltage from battery temperature sensor 2 (Module 1).
BATTERY TEMPERTURE 3	degC	Displays the temperature calculated using the signal voltage from the bat- tery temperature sensor 3 (Intake air).

DATA MONITOR

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	Unit	Description
BATT ELECTRIC CURRENT	А	Displays the current value detected by the current sensor.
INPUT POSSIBLE POWER	kW	Displays the power which can be input to the Li-ion battery.
OUTPUT POSSIBLE POWER	kW	Displays the power which can be output from the Li-ion battery.
12V BATTERY VOLTAGE	mV	Displays the 12V power voltage.
IR SEN SHORT PULSE	mV	Displays the difference between the maximum voltage and minimum voltage in the voltage amplitude for insulation resistance drop detection.
SOC	%	Displays the charge status of the Li-ion battery.
SERVICE PLUG INTERLOCK	OPEN/ CLOSE	Displays the service plug connected/disconnected status.
CELL VOLTAGE 01 – 96	mV	Displays the voltage of each cell.
TOTAL BATTERY VOLTAGE	V	Displays the total voltage of the Li-ion battery.
MAXIMUM CELL VOLTAGE	mV	Displays the current highest cell voltage.
MINIMUM CELL VOLTAGE	mV	Displays the current lowest cell voltage.
FAIL STATUS	NO ACT/ RLY Off	Displays the vehicle fail-safe status.

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Monitored item	Unit	Description
LBC MODE STATUS	NORMAL/ TRQ Off/ BALESS/ BLANK	Displays the fail-safe status of the Li-ion battery controller (LBC).
BATTERY TEMPERTURE 1	degC	Displays the temperature calculated using the signal voltage from battery temperature sensor 1 (Module 9).
BATTERY TEMPERTURE 2	degC	Displays the temperature calculated using the signal voltage from battery temperature sensor 2 (Module 1).
BATTERY TEMPERTURE 3	degC	Displays the temperature calculated using the signal voltage from the bat- tery temperature sensor 3 (Intake air).
AD VALUE OF AVCC VOLTAGE	mV	Displays the analog power voltage.
HIGH TEMP COUNTER	count	Displays the cumulative total time during which the battery temperature is high.
BATTERY CAL CALL COUNT	count	Displays the total number of trips when battery stress calculation is called.
BATT CAL CALL TIME COUNT	count	Displays the total time when battery stress calculation is called.
LOW TEMP START COUNTER	count	Displays the total number of trips for low-temperature starts.
LIFE MAX BATT TEMP	degC	Displays the recorded maximum battery temperature.
LIFE MINIMUM SOC	%	Displays the recorded minimum SOC (charge status).
LIFE MIN TOTAL VOLT	V	Displays the recorded total voltage.
OVER DISCHARGE NG COUNT	count	Displays the total number of trips for over-discharge malfunction detection.
BAT HIGH TEMP NG COUNT 1	count	Displays the total number of trips for battery high temperature malfunction detection.
VHCL RUN CONT NG COUNT	count	Displays the total number of trips for vehicle driving control malfunction de- tection.
TEMPERATURE COUNTER	count	Displays the cumulative temperature stress coefficient based on the aver- age battery temperature.
TOTAL/V OVR VOL COUNT	count	Displays the cumulative number of trips for total voltage overvoltage mal- function detection.
TOTAL/V OVR DISCHG COUNT	count	Displays the cumulative number of trips for total voltage over-discharge mal- function detection.
CELL/V OVR VOLT COUNT	count	Displays the cumulative number of trips for cell voltage overvoltage malfunc- tion detection.
CELL/V OVR DISCHG COUNT	count	Displays the cumulative number of trips for cell voltage over-discharge mal- function detection.
BAT HIGH TEMP NG COUNT 2	count	Displays the weighted average value of the internal resistance used for bat- tery age calculation.

ACTIVE TEST

Item	Description
HV BATTERY COOLING FANAllows the duty value of the battery cooling fan to be changed to a and allows the fan to be forcibly stopped and started.	

ECU DIAGNOSIS INFORMATION HYBRID BATTERY SYSTEM

Reference Value

VALUES ON THE DIAGNOSIS TOOL

NOTE:

• Specification data are reference values.

٠	The following table includes information (items) inapplicable to this vehicle. For information (items) applica-
	ble to this vehicle, refer to CONSULT display items.

CONSULT MONITOR ITEM

Monitor Item	Condition		Values/Status
BATT ELECTRIC CURRENT	Ignition switch: ON		–250 – 150 A
NPUT POSSIBLE POWER	READY		0 – 27 kW
OUTPUT POSSIBLE POWER	READY		0 – 60 kW
12V BATTERY VOLTAGE	Ignition switch: ON		9 – 16 V
IR SEN SHORT PULSE	Ignition switch: ON		_
SOC	Ignition switch: ON		30 – 80 %
SERVICE PLUG INTERLOCK	Ignition switch: ON	Service plug is connected	CLOSE
SERVICE FLOG INTEREOCK		Service plug is not connected	OPEN
CELL VOLTAGE 01	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 02	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 03	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 04	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 05	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 06	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 07	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 08	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 09	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 10	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 11	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 12	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 13	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 14	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 15	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 16	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 17	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 18	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 19	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 20	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 21	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 22	Ignition switch: ON	Ignition switch: ON	
CELL VOLTAGE 23	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 24	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 25	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 26	Ignition switch: ON		1,560 – 4,265 mV
CELL VOLTAGE 27	Ignition switch: ON		1,560 – 4,265 mV

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HBB

D

HYBRID BATTERY SYSTEM

< ECU DIAGNOSIS INFORMATION >

Monitor Item	Condition	Values/Status
CELL VOLTAGE 28	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 29	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 30	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 31	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 32	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 33	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 34	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 35	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 36	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 37	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 38	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 39	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 40	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 41	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 42	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 43	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 44	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 45	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 46	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 47	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 48	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 49	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 50	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 51	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 52	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 53	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 54	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 55	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 56	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 57	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 58	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 59	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 60	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 61	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 62	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 63	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 64	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 65	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 66	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 67	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 68	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 69	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 70	Ignition switch: ON	1,560 – 4,265 mV
CELL VOLTAGE 71	Ignition switch: ON	1,560 – 4,265 mV

< ECU DIAGNOSIS INFORMATION >

Monitor Item		Condition	Values/Status	
CELL VOLTAGE 72	Ignition switch: ON		1,560 – 4,265 mV	А
CELL VOLTAGE 73	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 74	Ignition switch: ON		1,560 – 4,265 mV	В
CELL VOLTAGE 75	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 76	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 77	Ignition switch: ON		1,560 – 4,265 mV	HBE
CELL VOLTAGE 78	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 79	Ignition switch: ON		1,560 – 4,265 mV	D
CELL VOLTAGE 80	Ignition switch: ON		1,560 – 4,265 mV	D
CELL VOLTAGE 81	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 82	Ignition switch: ON		1,560 – 4,265 mV	Ε
CELL VOLTAGE 83	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 84	Ignition switch: ON		1,560 – 4,265 mV	_
CELL VOLTAGE 85	Ignition switch: ON		1,560 – 4,265 mV	F
CELL VOLTAGE 86	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 87	Ignition switch: ON		1,560 – 4,265 mV	G
CELL VOLTAGE 88	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 89	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 90	Ignition switch: ON		1,560 – 4,265 mV	Н
CELL VOLTAGE 91	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 92	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 93	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 94	Ignition switch: ON		1,560 – 4,265 mV	
CELL VOLTAGE 95	Ignition switch: ON		1,560 – 4,265 mV	J
CELL VOLTAGE 96	Ignition switch: ON		1,560 – 4,265 mV	
TOTAL BATTERY VOLTAGE	Ignition switch: ON		150 – 412 V	Κ
MAXIMUM CELL VOLTAGE	READY		1,560 – 4,265 mV	
MINIMUM CELL VOLTAGE	READY		1,560 – 4,265 mV	
	Ignition switch: ON, or	Fail-safe: System main relay OFF	RLY Off	L
FAIL STATUS	READY	Fail-safe: System main relay ON	NO ACT	
		System normal operation	NORMAL	Μ
	Ignition switch: ON, or	Fail-safe: Motor torque OFF	TRQ Off	1 V 1
LBC MODE STATUS	READY	Fail-safe: Battery less	BALESS	
		Fail-safe: Normal vehicle behavior	BLANK	Ν
BATTERY TEMPERATURE 1	Ignition switch: ON	-	(-40) - (+70) degC	
BATTERY TEMPERATURE 2	Ignition switch: ON		(-40) - (+70) degC	\circ
BATTERY TEMPERATURE 3	Ignition switch: ON		(-40) - (+70) degC	0
AD VALUE OF AVCC VOLTAGE	Ignition switch: ON		2,000 mV	
HIGH TEMP COUNTER	Ignition switch: ON		Depends on the environ- ment	Ρ
BATTERY CAL CALL COUNT	Ignition switch: ON		Depends on the environ- ment	
BATT CAL CALL COUNT	Ignition switch: ON		Depends on the environ- ment	
LOW TEMP START COUNTER	Ignition switch: ON		Depends on the environ- ment	

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< ECU DIAGNOSIS INFORMATION >

Monitor Item	Condition	Values/Status
LIFE MAX BATT TEMP	Ignition switch: ON	(-40) - (+70) degC
LIFE MINIMUM SOC	Ignition switch: ON	30 – 80 %
LIFE MIN TOTAL VOLTAGE	Ignition switch: ON	150 – 412 V
OVER DISCHARGE NG COUNT	Ignition switch: ON	Depends on the environ- ment
BAT HIGH TEMP NG COUNT 1	Ignition switch: ON	Depends on the environ- ment
VHCL RUN CONT NG COUNT	Ignition switch: ON	Depends on the environ- ment
TEMPERATURE COUNTER	Ignition switch: ON	Depends on the environ- ment
TOTAL/V OVR VOL COUNT	Ignition switch: ON	Depends on the environ- ment
TOTAL/V OVR DISCHG COUNT	Ignition switch: ON	Depends on the environ- ment
CELL/V OVR VOLT COUNTER	Ignition switch: ON	Depends on the environ- ment
CELL/V OVR DISCHG COUNT	Ignition switch: ON	Depends on the environ- ment
BAT HIGH TEMP NG COUNT 2	Ignition switch: ON	Depends on the environ- ment

Fail-safe

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When detecting a malfunction in Li-ion battery, the Li-ion battery controller (LBC) issues a request to HPCM (Hybrid power train control module) for limiting or stopping the output from the Li-ion batter so that the system can be protected.

Fail-safe	Description	Symptom	HPCM-de- tected DTC
SYSTEM MAIN RELAY OFF	The system main relay is turned OFF.	The engine cannot be started.Illuminate hybrid system warning lamp.	P3182
BATTERY LESS	After engine start, the system main relay is turned OFF, and the vehicle is driven only by the driving force of the engine. The trac- tion motor torque becomes limited.	 Driving force decreases. Possible to travel by 12V battery remaining quantity. Illuminate hybrid system warning lamp. 	P3181
MOTOR TORQUE OFF	The vehicle travels under the condition that the traction motor torque and the in- put/output power to the Li-ion battery are limited.	 Only auxiliary part can be recharged. Idling stop is prohibited. Driving force decreases Possible to travel by fuel remaining quantity. Illuminate hybrid system warning lamp 	P317F
—	The hybrid system warning lamp turns ON.	Illuminate hybrid system warning lamp	P3180

DTC Inspection Priority Chart

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

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< ECU DIAGNOSIS INFORMATION >

Priority	DTC	Detection items
	P0A09, P0A10	DC/DC converter
	P0A84, P0A85	Battery cooling fan
	P0A9D, P0A9D, P0AAE, P0AAF, P0AC7, P0AC8	Battery temperature sensorIntake air temperature sensor
	P0AA9, P0AAA	On-board isolation resistance monitoring system
	P0AC0, P0AC1, P0AC2	Battery current sensor
	P3061	Over charge/discharge voltage
1	P30D0	State of charge rationality
	P30EF	Internal resistance
	P30F5	Total voltage sensor
	P30FE	12V battery voltage
	P31A5, P31A7, P33E0, P33E1, P33E2, P33F0, P33F1	Communication error
	P3374	Cell over discharge
	U0100, U0101, U0110, U0293, U1000	CAN communication
	P0A1F	Li-ion battery controller
	P0A7E	Battery high temperature
	P0A7F	Maximum to minimum difference of the battery cell voltage
	P0AA7	On-board isolation resistance monitoring system
	P0ABF	Battery current sensor
	P0C6E	Battery temperature sensor
2	P3030, P3030 – P3048	Communication function in Li-ion battery controller
Ζ	P30F1	Regeneration control
	P30F2	Discharge control
	P30F4, P30F6	Total voltage sensor
	P30FC	Over current
	P30FD	Total voltage monitor switch
	P3300	Total voltage over
	P3373	Total voltage over discharge
	P3062	Bypass switch
	P3049 – P3060	Li-ion battery controller A/D circuit
3	P308B – P30A2	Cell voltage
	P30F3	Communication function in Li-ion battery controller
	P3301	Cell over voltage

DTC Index

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Ο DTC^{*1} Permanent Items Hybrid system MIL*3 Trip Reference (CONSULT screen terms) warning lamp DTC group^{*4} CONSULT*2 Ρ P0A09 DC/DC CONVERTER 1 <u>HBB-55</u> — ____ _ P0A10 DC/DC CONVERTER 1 HBB-57 ____ ____ _ P0A1F BATTERY ENERGY CONTROL MODULE ON ON HBB-59 1 В P0A7E HYBRID BAT PACK OVER TEMP 1 ON В ON <u>HBB-61</u> P0A7F 2 CELL CONTROLLER ON В ON HBB-62 P0A84 HYBRID BAT PACK COOLING FAN 1 1 ____ ____ ____ HBB-64

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< ECU DIAGNOSIS INFORMATION >

DTC ^{*1}	Items	Trip	MIL ^{*3}	Permanent	Hybrid system	Reference
CONSULT*2	(CONSULT screen terms)	пр	MIL °	DTC group ^{*4}	warning lamp	Reference
P0A85	HYBRID BAT PACK COOLING FAN 1	1			_	<u>HBB-69</u>
P0A9D	HYBRID BAT TEMP SENSOR A	1	ON	В	ON	<u>HBB-70</u>
P0A9E	HYBRID BAT TEMP SENSOR A	1	ON	В	ON	<u>HBB-72</u>
P0AA7	HYBRID BAT VOLTAGE ISOLATION SEN	1	_	—	—	<u>HBB-74</u>
P0AA9	HYBRID BAT VOLTAGE ISOLATION SEN	1	_	—	—	<u>HBB-75</u>
POAAA	HYBRID BAT VOLTAGE ISOLATION SEN	1	_	—	—	<u>HBB-76</u>
POAAE	HYBRID BAT PACK AIR TEMP SEN A	1	_	—	ON	<u>HBB-77</u>
P0AAF	HYBRID BAT PACK AIR TEMP SEN A	1	—	—	ON	<u>HBB-79</u>
P0ABF	HYBRID BAT PACK CURRENT SEN	2	ON	В	ON	<u>HBB-81</u>
P0AC0	HYBRID BAT PACK CURRENT SEN	1	ON	В	ON	HBB-83
P0AC1	HYBRID BAT PACK CURRENT SEN	1	ON	В	ON	HBB-85
P0AC2	HYBRID BAT PACK CURRENT SEN	1	ON	В	ON	<u>HBB-87</u>
P0AC7	HYBRID BAT TEMP SENSOR B	1	ON	В	ON	<u>HBB-89</u>
P0AC8	HYBRID BAT TEMP SENSOR B	1	ON	В	ON	<u>HBB-91</u>
P0C6E	HYBRID BAT TEMP SENSOR A/B	2	ON	В	ON	HBB-93
P3030	CELL CONT LIN	1	ON	В	ON	<u>HBB-95</u>
P3031	CELL CONT ASIC1	1	ON	В	ON	<u>HBB-99</u>
P3032	CELL CONT ASIC2	1	ON	В	ON	<u>HBB-99</u>
P3033	CELL CONT ASIC3	1	ON	В	ON	<u>HBB-99</u>
P3034	CELL CONT ASIC4	1	ON	В	ON	<u>HBB-99</u>
P3035	CELL CONT ASIC5	1	ON	В	ON	<u>HBB-99</u>
P3036	CELL CONT ASIC6	1	ON	В	ON	<u>HBB-99</u>
P3037	CELL CONT ASIC7	1	ON	В	ON	<u>HBB-99</u>
P3038	CELL CONT ASIC8	1	ON	В	ON	<u>HBB-99</u>
P3039	CELL CONT ASIC9	1	ON	В	ON	<u>HBB-99</u>
P303A	CELL CONT ASIC10	1	ON	В	ON	<u>HBB-99</u>
P303B	CELL CONT ASIC11	1	ON	В	ON	<u>HBB-99</u>
P303C	CELL CONT ASIC12	1	ON	В	ON	<u>HBB-99</u>
P303D	CELL CONT ASIC13	1	ON	В	ON	<u>HBB-100</u>
P303E	CELL CONT ASIC14	1	ON	В	ON	<u>HBB-100</u>
P303F	CELL CONT ASIC15	1	ON	В	ON	<u>HBB-100</u>
P3040	CELL CONT ASIC16	1	ON	В	ON	<u>HBB-100</u>
P3041	CELL CONT ASIC17	1	ON	В	ON	<u>HBB-100</u>
P3042	CELL CONT ASIC18	1	ON	В	ON	<u>HBB-100</u>
P3043	CELL CONT ASIC19	1	ON	В	ON	<u>HBB-100</u>
P3044	CELL CONT ASIC20	1	ON	В	ON	HBB-100
P3045	CELL CONT ASIC21	1	ON	В	ON	<u>HBB-100</u>
P3046	CELL CONT ASIC22	1	ON	В	ON	<u>HBB-100</u>
P3047	CELL CONT ASIC23	1	ON	В	ON	<u>HBB-100</u>
P3048	CELL CONT ASIC24	1	ON	В	ON	<u>HBB-100</u>
P3049	CELL CONT ASIC1 VOLT	1	ON	В	ON	<u>HBB-101</u>
P304A	CELL CONT ASIC2 VOLT	1	ON	В	ON	<u>HBB-101</u>
P304B	CELL CONT ASIC3 VOLT	1	ON	В	ON	<u>HBB-101</u>

< ECU DIAGNOSIS INFORMATION >

DTC ^{*1}	Items (CONSULT screen terms)	Trip	MIL ^{*3}	Permanent DTC group ^{*4}	Hybrid system warning lamp	Reference	А
CONSULT*2							
P304C	CELL CONT ASIC4 VOLT	1	ON	В	ON	<u>HBB-101</u>	
P304D	CELL CONT ASIC5 VOLT	1	ON	В	ON	<u>HBB-101</u>	В
P304E	CELL CONT ASIC6 VOLT	1	ON	В	ON	<u>HBB-101</u>	
P304F	CELL CONT ASIC7 VOLT	1	ON	В	ON	<u>HBB-101</u>	HBB
P3050	CELL CONT ASIC8 VOLT	1	ON	В	ON	<u>HBB-101</u>	
P3051	CELL CONT ASIC9 VOLT	1	ON	В	ON	<u>HBB-101</u>	
P3052	CELL CONT ASIC10 VOLT	1	ON	В	ON	<u>HBB-101</u>	D
P3053	CELL CONT ASIC11 VOLT	1	ON	В	ON	<u>HBB-101</u>	
P3054	CELL CONT ASIC12 VOLT	1	ON	В	ON	<u>HBB-101</u>	Е
P3055	CELL CONT ASIC13 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P3056	CELL CONT ASIC14 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P3057	CELL CONT ASIC15 VOLT	1	ON	В	ON	<u>HBB-105</u>	F
P3058	CELL CONT ASIC16 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P3059	CELL CONT ASIC17 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P305A	CELL CONT ASIC18 VOLT	1	ON	В	ON	<u>HBB-105</u>	G
P305B	CELL CONT ASIC19 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P305C	CELL CONT ASIC20 VOLT	1	ON	В	ON	<u>HBB-105</u>	Н
P305D	CELL CONT ASIC21 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P305E	CELL CONT ASIC22 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P305F	CELL CONT ASIC23 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P3060	CELL CONT ASIC24 VOLT	1	ON	В	ON	<u>HBB-105</u>	
P3061	CELL BATTERY VOLT	1	ON	В	ON	<u>HBB-109</u>	J
P3062	BYPASS SW	1	—	—	ON	<u>HBB-110</u>	
P308B	CELL CONT ASIC1 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P308C	CELL CONT ASIC2 OPEN	1	ON	В	ON	<u>HBB-111</u>	K
P308D	CELL CONT ASIC3 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P308E	CELL CONT ASIC4 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P308F	CELL CONT ASIC5 OPEN	1	ON	В	ON	<u>HBB-111</u>	L
P3090	CELL CONT ASIC6 OPEN	1	ON	В	ON	HBB-111	
P3091	CELL CONT ASIC7 OPEN	1	ON	В	ON	<u>HBB-111</u>	M
P3092	CELL CONT ASIC8 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P3093	CELL CONT ASIC9 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P3094	CELL CONT ASIC10 OPEN	1	ON	В	ON	<u>HBB-111</u>	N
P3095	CELL CONT ASIC11 OPEN	1	ON	В	ON	<u>HBB-111</u>	
P3096	CELL CONT ASIC12 OPEN	1	ON	В	ON	<u>HBB-111</u>	0
P3097	CELL CONT ASIC13 OPEN	1	ON	В	ON	<u>HBB-114</u>	0
P3098	CELL CONT ASIC14 OPEN	1	ON	В	ON	<u>HBB-114</u>	-
P3099	CELL CONT ASIC15 OPEN	1	ON	В	ON	<u>HBB-114</u>	Ρ
P309A	CELL CONT ASIC16 OPEN	1	ON	В	ON	HBB-114	
P309B	CELL CONT ASIC17 OPEN	1	ON	В	ON	HBB-114	
P309C	CELL CONT ASIC18 OPEN	1	ON	В	ON	<u>HBB-114</u>	
P309D	CELL CONT ASIC19 OPEN	1	ON	В	ON	<u>HBB-114</u>	-
P309E	CELL CONT ASIC20 OPEN	1	ON	В	ON	HBB-114	

Revision: 2013 March

DTC^{*1} Permanent Items Hybrid system MIL*3 Trip Reference (CONSULT screen terms) DTC group^{*4} warning lamp CONSULT*2 P309F CELL CONT ASIC21 OPEN ON 1 ON В HBB-114 P30A0 CELL CONT ASIC22 OPEN 1 ON В ON HBB-114 P30A1 CELL CONT ASIC23 OPEN ON В ON 1 HBB-114 P30A2 CELL CONT ASIC24 OPEN 1 ON В ON HBB-114 P30D0 SOC RATIONALITY 2 ON В HBB-117 P30EF INTERNAL RESISTANCE 2 ON В ON HBB-118 P30F1 **REGENERATION CONTROL** 1 ON HBB-122 P30F2 DISCHARGE CONTROL HBB-123 1 ON ____ ____ TOTAL VOLT SENSOR P30F3 ON 1 ON в **HBB-124** P30F4 TOTAL VOLT SENSOR 1 ON В ON HBB-125 P30F5 TOTAL VOLT SENSOR 2 ON В ON HBB-126 P30F6 TOTAL VOLT SENSOR 1 ON В ON HBB-127 P30FC OVER CURRENT 1 ON В ON HBB-129 P30FD TOTAL VOLTAGE MONITOR SWITCH 1 ON ____ ____ HBB-130 P30FE **12V BATTERY VOLTAGE** ON 1 HBB-131 P31A5 CAN ERROR HPCM ON В ON 1 HBB-134 P31A7 CAN ERROR INV/MC 1 ON В ON HBB-135 P3300 TOTAL VOLTAGE OVER 1 ON В ON HBB-136 P3301 CELL VOLTAGE OVER 1 ON в ON **HBB-138** P3373 TOTAL VOLTAGE OVER DISCHARGE 1 ON В ON HBB-152 P3374 CELL VOLTAGE OVER DISCHARGE 1 ON В ON HBB-154 P33E0 DLC DIAGNOSIS HPCM 1 ON HBB-168 P33E1 DLC DIAGNOSIS ECM 1 ON HBB-169 ____ ____ P33E2 DLC DIAGNOSIS TCM 1 ON HBB-170 P33F0 DLC DIAGNOSIS TCM 1 ON HBB-171 _ P33F1 DLC DIAGNOSIS TCM 1 ON HBB-172 U0100 LOST COMM ECM 1 ON В ON HBB-173 U0101 LOST COMM TCM 1 ON HBB-175 U0110 LOST COMM INV/MC 1 ON В ON <u>HBB-177</u> U0293 LOST COMM HPCM 1 ON в ON HBB-179 CAN COMM CIRCUIT U1000 1 ON HBB-181 ____ ____

< ECU DIAGNOSIS INFORMATION >

*1: 1st trip DTC No. is the same as DTC No.

*2: These numbers are prescribed by SAE J2012/ISO 15031-6.

*3: Refer to EC-52, "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)".

*4: Refer to HBB-54, "Description".

Index of HPCM-detected DTC

INFOID:000000008140915

When a DTC in the following table is detected by Li-ion battery controller (LBC), HPCM also detects a DTC.

< ECU DIAGNOSIS INFORMATION >

DTC	DTC of HPCM	_
P0A1F, P0A7F, P0ABF, P0AC0, P0AC1, P0AC2, P0C6E, P3030, P3031, P3032, P3033, P3034, P3035, P3036, P3037, P3038, P3039, P303A, P303B, P303C, P303D, P303E, P303F, P3040, P3041, P3042, P3043, P3044, P3045, P3046, P3047, P3048, P3049, P304A, P304B, P304C, P304D, P.304E, P304F, P3050, P3051, P3052, P3053, P3054, P3055, P3056, P3057, P3058, P3059, P305A, P305B, P305C, P305D, P305E, P305F, P3060, P308B, P308C, P308D, P308E, P308F, P3090, P3091, P3092, P3093, P3094, P3095, P3096, P3097, P3098, P3099, P309A, P309B, P309C, P309D, P309E, P309F, P30A0, P30A1, P30A2, P30F3, P30F4, P30F5, P30F6, P31A5, P31A7, U0110	P317F	B
P0AF, P0A82, P0A84, P0A85, P0A9D, P0A9E, P0AAE, P0AAF, P0AC7, P0AC8, P3061, P3062, P30EF, P30FD, P33E0, P33E1, P33E2, P33F0, P33F1, U0100, U0101	P3180	HBB
P0A7E, P3030, P3031, P3032, P3033, P3034, P3035, P3036, P3037, P3038, P3039, P303A, P303B, P303C, P303D, P303E, P303F, P3040, P3041, P3042, P3043, P3044, P3045, P3046, P3047, P3048, P3049, P304A, P304B, P304C, P304D, P304E, P304F, P3050, P3051, P3052, P3053, P3054, P3055, P3056, P3057, P3058, P3059, P305A, P305B, P305C, P305D, P305E, P305F, P3060, P308B, P308C, P308D, P308E, P308F, P3090, P3091, P3092, P3093, P3094, P3095, P3096, P3097, P3098, P3099, P309A, P309B, P309C, P309D, P309F, P30A0, P30A1, P30A2, P30F1, P30F2, P30FC, P30FE, P31A5, P3300, P3301, P3373, P3374	P3181	D
P0A1F, P0A7E, P30FE, P3300, P3301, P3373, P3374	P3182	

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< BASIC INSPECTION >

BASIC INSPECTION DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000008140916

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to <u>HBB-45</u>, "<u>Diagnostic Work Sheet</u>" and interview the customer to obtain the malfunction information (conditions and environment when the malfunction occurred) as much as possible when the customer brings in the vehicle.

>> GO TO 2.

2. CHECK DTC AND FFD

- 1. Before checking the malfunction, check whether any DTC exists on the "All DTC Reading" screen.
- 2. If DTC exists, perform the following operations.
- Record the DTC and freeze frame data. (Print out using CONSULT and affix to the Work Order Sheet.)
- Erase the "HV BAT" DTC. (Refer to "How to Erase DTC and 1st Trip DTC" in <u>HBB-32. "CONSULT Func-</u> tion".)
- Turn ignition switch OFF.
- Check the relationship between the cause that is clarified with DTC and the malfunction information described by the customer.

3. Check the relevant information including STI, etc.

Do malfunction information and DTC exist?

YES >> GO TO 4.

NO >> GO TO 3.

3.REPRODUCE MALFUNCTION SYMPTOM

Check the vehicle for malfunctions other than the malfunction indicator lamp (MIL) reported by the customer, the hybrid system warning lamp.

Check if the behavior results from fail-safe operation. (Refer to HBB-38, "Fail-safe".)

When a malfunction symptom is reproduced, the question sheet is effective.

Inspect the relation of the symptoms and the condition when the symptoms occur.

YES >> GO TO 5.

NO >> Check <u>GI-49</u>, "Intermittent Incident".

4.PERFORM "DTC CONFIRMATION PROCEDURE"

Perform "DTC Confirmation Procedure" of the appropriate DTC to check if DTC is detected again. When multiple DTCs are detected, refer to <u>HBB-38. "DTC Inspection Priority Chart"</u> and then determine the order for performing the diagnosis.

NOTE:

If no DTC is detected, refer to the freeze frame data.

YES >> GO TO 5.

NO >> Check <u>GI-49. "Intermittent Incident"</u>.

 $\mathbf{5.}$ DETECT MALFUNCTIONING PARTS WITH THE "DIAGNOSIS PROCEDURE".

Perform the inspection of the corresponding system according to "Diagnosis Procedure". **NOTE:**

The hybrid battery system "Diagnosis Procedure" mainly consists of a check for an open circuit. The circuit check in the diagnosis procedure also requires the check for a short circuit. Refer to <u>GI-52</u>, "<u>Circuit Inspection</u>" for details.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

After repairing or replacing, reconnect the parts and connectors that are disconnected in "Diagnosis Procedure", and then erase the DTC if one is present. (Refer to "How to Erase DTC and 1st Trip DTC" in <u>HBB-32</u>, <u>"CONSULT Function"</u>.)

>> GO TO 7.

7.FINAL CHECK

Perform the "DTC Confirmation Procedure" or "Component Parts Function Inspection" to make sure that the repair is correctly performed.

Check that malfunctions are not reproduced when obtaining the malfunction information from the customer, referring to the symptom inspection result in step 3.

>> Before delivering the vehicle to the customer, make sure that DTC is erased. (Refer to "DTC at 1st trip and method to read DTC" in <u>HBB-32</u>, "CONSULT Function".)

Diagnostic Work Sheet

DESCRIPTION

There are many operating conditions that may cause a malfunction of the hybrid system parts. By understanding those conditions properly, a quick and exact diagnosis can be achieved.

In general, customers have their own criteria for a problem. Therefore, it is important to understand the symptom and status well enough by asking the customer about his/her concerns carefully. Use the diagnosis sheet to systemize all information related to malfunction diagnosis.

In some cases, multiple conditions that appear simultaneously may activate the hybrid system warning lamp, which causes a DTC to be detected.

EXAMPLE OF QUESTION SHEET

			Q	uestion sheet		
Customer's		MR/MS	Registra- tion number		Initial year registration	Year Month Day
name		WIR/WIS	Vehicle type		Chassis No.	
Storage date		Year Month Day	Engine		Mileage	km
Symptom		□Abnormal no □Fixed shift p	Idling stop do bise, gear nois osition □Poor	es not occur. □Po e □Shock □Vibrati	cle not READY □Poor startir or driving control □Overheat ion (judder) □Slipping □Poo bes not shift. □Shifting is hea other	ting or shifting
	Details of problem					
	Noise de- scription					
Date of malfu	Inction	□>From when	n car is new □	Recent (approx. da	te: , km)	
Frequency of	occurrence	□Always □Or	nce only ⊡Oco	asionally (times	; in past) □Other ()
road □Flat r		□Not applicab road □Flat roa □Turning (righ	ad		□Mountain road (ascending)	/descending) □Rough
Engine speed		□Not applicat	able □Cold □During warm-up □Warm □Other ()			
Engine opeoe	Climate con- ditions					
Climate con-		□Not applicat	le			

Revision: 2013 March

KEY POINTS

 WHAT
 Vehicle & engine model

 WHEN
 Date, Frequencies

 WHERE
 Road conditions

 HOW
 Operating conditions, Weather conditions, Symptoms

INFOID:000000008140917

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

		Question sheet
	Temperature	_□Hot □Warm □Cool □Cold □Temp. (approx. °C)
	Relative hu- midity	□ High □ Medium □ Low
Selector leve	r position	Image: Constraint of the state of the s
Condition of shift lever opera- tion		$ \begin{array}{c c c c c c c c c c c c c c c c c c c $
Driving pattern		□Not applicable □At engine start □Idling □ Stopped, D position □Starting from stop □Accelerating □Constant-speed driving □Decelerating □Just before stopping □Just after stopping □Engine stopped □ A/C ON □ P/S turned □Engine driving □Motor driving □Shifting () → () □Cruise control ON □ ECO mode ON □ SPORT mode ON □ SNOW mode ON □Other ()
		ENG speed: rpm DVehicle speed: km/h DTH position:
When is malfunction correct- ed?		□Is not corrected. □While idling □While engine is running □During motor driving □When ignition is turned OFF □When shift lever is operated □When clutch pedal is operated □Other ()
Other condition	ons	
Customer co	mments	

SAVE BATTERY INFORMATION DATA

< BASIC INSPECTION > SAVE BATTERY INFORMATION DATA А Description INFOID:000000008140918 This function enables the saving of data stored in Li-ion battery controller (LBC) into CONSULT. В Work Procedure INFOID:000000008140919 1.PERFORM SAVE BATTERY INFORMATION DATA HBB (P)With CONSULT ĭ. Turn ignition switch ON. D Select "WORK SUPPORT" mode of "HV BAT". 2. 3. Select "SAVE BATTERY INFORMATION DATA". 4. Save the LBC internal information. Ε >> END F Н J Κ L Μ Ν Ο Ρ

WRITE BATTERY INFORMATION DATA

< BASIC INSPECTION >

WRITE BATTERY INFORMATION DATA

Description

This function enables the writing of Li-ion battery (LBC) data saved in CONSULT into a new LBC.

Work Procedure

INFOID:000000008140921

INFOID:000000008140920

1.PERFORM WRITE BATTERY INFORMATION DATA

() With CONSULT

- 1. Turn ignition switch ON.
- 2. Select "WORK SUPPORT" mode of "HV BAT".
- 3. Select "WRITE BATTERY INFORMATION DATA".
- 4. Write LBC data saved in CONSULT into a new LBC.

>> END

CLEAR BATTERY INFORMATION

< BASIC INSPECTION >				
CLEAR BATTERY INFORMATION	А			
Description INFOID.00000008140922				
This function enables the erasing of the data stored in Li-ion battery controller (LBC).	В			
Work Procedure	1			
1.PERFORM CLEAR BATTERY INFORMATION	HBB			
 With CONSULT 1. Turn ignition switch ON. 2. Select "WORK SUPPORT" mode of "HV BAT". 3. Select "CLEAR BATTERY INFORMATION". 4. Clear the LBC internal information. 	D			
>> END				
	F			
	G			
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	Ρ			

MODULE CHARGE BALANCE

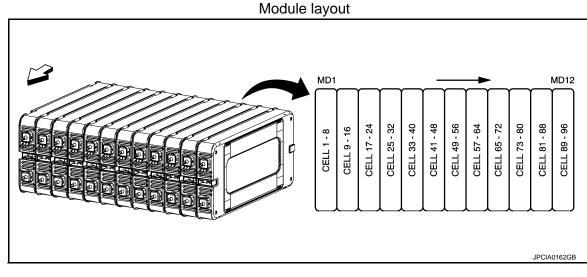
< BASIC INSPECTION >

MODULE CHARGE BALANCE

Description

INFOID:000000008140924

 If a malfunction, such as abnormal voltage, occurs in a Li-ion battery cell, replace the module including a malfunctioning cell.



MD: Module

• To replace module, select the minimum module voltage among normal modules as an adjustment voltage and adjust all 12 modules to the adjustment voltage.

MODULE REPLACEMENT CONDITIONS

Only one module can be replaced with a new one. If any of the following conditions apply, replace all of the 12 modules with new ones.

- · More than 17 months from the date of manufacture of Li-ion battery
- More than one module needs to be replaced with new ones
- There is a single module replacement history.

NOTE:

Single module replacement is possible if the same module needs to be replaced for the second and subsequent times.

NOTE:

For the date of manufacture of Li-ion battery, check its module serial number label. For the position of module serial number label, refer to <u>HBB-208</u>, <u>"MODULE STACK : Inspection"</u>.

Work Procedure

INFOID:000000008140925

SINGLE MODULE REPLACEMENT PROCEDURE

CAUTION:

Even when replacing only one module, voltage adjustment must be performed for all of the other 11 modules.

1.CHECK ADJUSTMENT VOLTAGE VALUE

- 1. Measure voltage of all modules (12), using a circuit tester.
- 2. Use the minimum module voltage for the voltage adjustment value.
 - CAUTION:
 - If the measured minimum module voltage is less than 28.0 V, use 28.0 V for the adjustment voltage.
 - Adjustment voltage must be in 100 mV. (Drop all digits less than 100.)
 Example: 28.825 V (MINIMUM MODULE VOLTAGE) = 28.800 V (Adjustment voltage value)

Adjustment : MINIMUM MODULE VOLTAGE voltage value (If MINIMUM VOLTAGE VALUE is less than 28.0 V, use 28.0 V.)

HBB-50

MODULE CHARGE BALANCE

< BASIC INSPECTION >

>> GO TO 2. A
2.CHECK MODULE VOLTAGE
 CAUTION: This operation must be performed in an ambient temperature of 0 to 40°C. For details on the module charge balancer operation, refer to the adjuster operation manual. Set the new module to the module charge balancer. Measure module voltage and compare it with "adjustment voltage value" confirmed in STEP1.
Module voltage is lower than adjustment voltage value>>GO TO 4. Module voltage is higher than adjustment voltage value>>GO TO 3.
3.DISCHARGE OF MODULE VOLTAGE
 CAUTION: This operation must be performed in an ambient temperature of 0 to 40°C. For details on the module charge balancer operation, refer to the adjuster operation manual. Discharge the module to 26.0 V using module charge balancer.
Discharge voltage : 26.0 V
G
>> GO TO 4. 4. MODULE VOLTAGE ADJUSTMENT
 This operation must be performed in an ambient temperature of 0 to 40°C. For details on the module charge balancer operation, refer to the adjuster operation manual. 1. Enter the "adjustment voltage value" in the module charge balancer.
Adjustment : MINIMUM MODULE VOLTAGE voltage value (If MINIMUM VOLTAGE VALUE is less than 28.0 V, use 28.0 V.)
2. Start the voltage adjustment.
>> After module voltage adjustment, GO TO 5.
5. CHECK CELL VOLTAGE
 After adjusting the voltage, install the module to the vehicle. Select "DATA MONITOR" mode.
 Check the difference between "MAXIMUM CELL VOLTAGE" and "MINIMUM CELL VOLTAGE" to see that the difference is within the specified value.
Standard : 100 mV or less
CAUTION: If the difference between the maximum cell voltage and the minimum cell voltage is more than 100 mV, DTC is detected. Be sure to check that the difference is 100 mV or less.
>> END
12-MODULE REPLACEMENT PROCEDURE
1.INSPECTION BEFORE REPLACEMENT
Check the date of production of all the new modules to see that they are 1-month-old or less. CAUTION:
Never use modules older than one year.
NOTE: The manufacturing date is stamped on the side of module.

< BASIC INSPECTION >

YY. MM. DD Y = Year M = Month D = Date

Example: 10. 11. 02 = November 2, 2010

Is the production date within 1 month?

YES >> Voltage adjustment is not necessary. Assemble and install module to vehicle. Refer to <u>HBB-202.</u> <u>"MODULE STACK : Disassembly and Assembly"</u>.

NO >> GO TO 2.

2. CHECK CELL VOLTAGE DIFFERENCE AMONG MODULES

1. Measure cell voltage of each module, using a module charge balancer. **NOTE:**

Record measured cell voltage.

2. Identify the difference between the maximum voltage and the minimum voltage in the same module, according to the measured cell voltage of each module.

Standard : 100 mV or less

CAUTION:

Never use module of which cell voltage in the same module is more than 100 mV.

Is the voltage difference 100 mV or less?

YES >> GO TO 3.

NO >> After replacing applicable module, GO TO 3.

3.CHECK CELL VOLTAGE DIFFERENCE AMONG MODULES

Check all the cell voltages (96 cells) measured at Step 2 to see the voltage difference between the maximum and the minimum.

Standard : 100 mV or less

Is the voltage difference 100 mV or less?

YES >> Voltage adjustment is not necessary. Assemble and install module to vehicle. Refer to <u>HBB-202</u>, <u>"MODULE STACK : Disassembly and Assembly"</u>.

NO >> GO TO 4.

4.CHECK ADJUSTMENT VOLTAGE VALUE

1. Check all the cell voltages measured at Step 2 to identify the module of which voltage is minimum. **NOTE:**

CELL VOLTAGE \times 8 = MODULE VOLTAGE

- 2. Use the minimum module voltage for the adjustment voltage value of module voltage. CAUTION:
 - If the measured minimum module voltage is less than 28.0 V, use 28.0 V for the adjustment voltage.
 - Adjustment voltage must be in 100 mV. (Drop all digits less than 100.) Example: 28.825 V (MINIMUM MODULE VOLTAGE) = 28.800 V (Adjustment voltage value)

Adjustment : MINIMUM MODULE VOLTAGE voltage value (If MINIMUM VOLTAGE VALUE is less than 28.0 V, use 28.0 V.)

>> GO TO 5.

5. CHECK MODULE VOLTAGE

CAUTION:

- This operation must be performed in an ambient temperature of 0 to 40°C.
- For details on the module charge balancer operation, refer to the adjuster operation manual.
- 1. Set the new module to the module charge balancer.
- 2. Measure module voltage and compare it with "adjustment voltage value" confirmed in STEP1.

MODULE CHARGE BALANCE

< BASIC INSPECTION >	
Module voltage is lower than adjustment voltage value>>GO TO 7. Module voltage is higher than adjustment voltage value>>GO TO 6.	А
6. DISCHARGE OF MODULE VOLTAGE	
 CAUTION: This operation must be performed in an ambient temperature of 0 to 40°C. For details on the module charge balancer operation, refer to the adjuster operation manual. Discharge the module to 26.0 V using module charge balancer. 	B
Discharge voltage : 26.0 V	_
>> GO TO 7.	D
7.MODULE VOLTAGE ADJUSTMENT	
 CAUTION: This operation must be performed in an ambient temperature of 0 to 40°C. For details on the module charge balancer operation, refer to the adjuster operation manual. 1. Enter the "adjustment voltage value" in the module charge balancer. 	E
Adjustment : MINIMUM MODULE VOLTAGE	
voltage value (If MINIMUM VOLTAGE VALUE is less than 28.0 V, use 28.0 V.)	G
2. Start the voltage adjustment.	9
>> After module voltage adjustment, GO TO 8.	Н
8. CHECK CELL VOLTAGE	11
 With CONSULT After adjusting the voltage, install the module to the vehicle. 	I
 Select "DATA MONITOR" mode. Check the difference between "MAXIMUM CELL VOLTAGE" and "MINIMUM CELL VOLTAGE" to see that the difference is within the specified value. 	J
Standard : 100 mV or less	
CAUTION:	Κ
If the difference between the maximum cell voltage and the minimum cell voltage is more than 100 mV, DTC is detected. Be sure to check that the difference is 100 mV or less.	L
>> END	
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	0
	Ρ
	E.

< BASIC INSPECTION >

HOW TO ERASE PERMANENT DTC

Description

INFOID:000000008140926

Permanent DTC can be erased by driving each driving pattern.

ECM recognizes each driving pattern; it transmits signals to each control module when the driving is complete. Each control module erases permanent DTC based on those signals. For details, refer to <u>EC-123</u>, "<u>Description</u>".

DTC/CIRCUIT DIAGNOSIS P0A09 DC/DC CONVERTER

DTC Logic

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	HBE
P0A09	DC/DC CONVERTER	When the frequency of a monitor signal received from DC/DC converter remains less than 100 Hz at least for 2.0 seconds.	 DC/DC CONVERTER Li-ion battery controller HPCM Harness or connector 	D
	NEIRMATION PROCE			

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0A09 detected?

- YES >> Refer to HBB-55, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

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

• Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the "P2519" is detected in "Self Diagnostic Result" of "EV/HEV".

Is P2519 detected?

YES >> Perform hybrid control system diagnosis procedure. Refer to <u>HBC-233, "Diagnosis Procedure"</u>. P NO >> GO TO 2.

2.CHECK FUSE

- 1. Turn ignition switch is OFF.
- Pull out 10A fuse (No.73) and check that the fuse is not fusing. NOTE: Refer to PG-43, "Fuse and Fusible Link Arrangement" for fuse layout.

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INFOID:000000008140928

INFOID:000000008140927

P0A09 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 3.

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

3.CHECK 12V BATTERY CHARGING OUTPUT CIRCUIT-1

Check connection status Li-ion battery (DC/DC converter) harness connector and Battery terminal with fusible link harness connector.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Recover the connection status.

4.CHECK 12V BATTERY CHARGING OUTPUT CIRCUIT-2

Check continuity between Li-ion battery (DC/DC converter) harness connector and Battery terminal with fusible link harness connector.

	battery converter)	-	rminal with le link	Continuity
Connector	Terminal	Connector	Terminal	
B304	25	B301	6	Existed

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair harness or connector.

5.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 6.

6.CHECK DC/DC CONVERTER HARNESS CIRCUIT

 Check continuity between Li-ion battery controller harness connector and DC/DC converter harness connector.

Li-ion batte	ry controller	DC/DC converter		Continuity
Connector	Terminal	Connector	Terminal	Continuity
LB1	20		5	Existed

2. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair harness or connector.

7.CHECK LI-ION BATTERY CONTROLLER

Check continuity between Li-ion battery controller harness connector.

	Continuity					
Connector	Connector Terminal Connector Terminal					
LB1	20	LB1	17	Existed		

Is the inspection result normal?

YES >> Replace DC/DC converter [Refer to <u>HBB-197</u>, "DC/DC CONVERTER : Disassembly and Assembly"] and Li-ion battery controller [Refer to <u>HBB-200</u>, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly"].

NO >> Replace Li-ion battery controller. Refer to <u>HBB-200</u>, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".

HBB-56

P0A10 DC/DC CONVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A10 DC/DC CONVERTER

DTC Logic

INFOID:000000008140929

DTC DETECTION LOGIC

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DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A10	DC/DC CONVERTER	When the frequency of a monitor signal received from DC/DC converter remains more than 900 Hz at least for 2.0 seconds.	 DC/DC converter Li-ion battery controller The mixing of noise into DC/DC converter fan input signal line.
тс сс	NFIRMATION PRO	CEDURE	
.PERF	ORM DTC CONFIRM	ATION PROCEDURE	
) WITH	CONSULT		
		d wait at least 10 seconds. sult" mode of "HV BAT" using CONSULT.	
	detected?		
	>> Refer to <u>HBB-57, "</u>		
-	>> INSPECTION END		
Jagno	sis Procedure		INFOID:00000008140930
ARNIN	G:		
dled ir		, or similar accidents if the high voltage con o follow the correct work procedures when	
dled ir mainte Be sur inspec Be sur does n Be sur beginn Clearly touch t ilar iter Refer t	ncorrectly. Be sure to enance. e to remove the service tion or maintenance e to put the removed not accidentally connect to wear insulating p ing work on the high v identify the persons the vehicle. When no m to prevent other per o <u>HBB-6, "High Volta</u> N:	o follow the correct work procedures when vice plug in order to shut off the high voltage of high voltage system harnesses and parts service plug in your pocket and carry it wit ect it while work is in progress. protective gear consisting of glove, shoes an voltage system. a responsible for high voltage work and ensu- t working, cover high voltage parts with an i ersons from contacting them. <u>ge Precautions</u> ".	n performing inspection and ge circuits before performing h you so that another person nd glasses/face shield before ure that other persons do not nsulating cover sheet or sim-
dled ir mainte Be sur inspec Be sur does n Be sur beginn Clearly touch ilar ite Refer t CAUTIO There is service j	ncorrectly. Be sure to mance. e to remove the service tion or maintenance e to put the removed of accidentally connect of accidentally connect to wear insulating p ing work on the high videntify the persons the vehicle. When no m to prevent other per o <u>HBB-6, "High Volta</u> N: the possibility of a m olug is removed. The	o follow the correct work procedures when vice plug in order to shut off the high voltage of high voltage system harnesses and parts service plug in your pocket and carry it wit ect it while work is in progress. protective gear consisting of glove, shoes an voltage system. s responsible for high voltage work and ensu t working, cover high voltage parts with an i ersons from contacting them.	n performing inspection and ge circuits before performing h you so that another person nd glasses/face shield before ure that other persons do not nsulating cover sheet or sim-
dled ir mainte Be sur inspec Be sur does n Be sur beginn Clearly touch t ilar iter Refer t CAUTIO There is service p	ncorrectly. Be sure to e to remove the service tion or maintenance e to put the removed of accidentally connect of accidentally connect to wear insulating p ing work on the high videntify the persons the vehicle. When no m to prevent other per o <u>HBB-6, "High Volta</u> N: the possibility of a m	o follow the correct work procedures when vice plug in order to shut off the high voltage of high voltage system harnesses and parts service plug in your pocket and carry it wit ect it while work is in progress. protective gear consisting of glove, shoes an voltage system. s responsible for high voltage work and ensu- t working, cover high voltage parts with an i ersons from contacting them. <u>ge Precautions</u> ".	n performing inspection and ge circuits before performing h you so that another person nd glasses/face shield before ure that other persons do not nsulating cover sheet or sim-
dled ir mainte Be sur inspec Be sur does n Be sur beginn Clearly touch f ilar iter Refer t CAUTIO There is service p so in the .PREC	to rectly. Be sure to e to remove the service of an ance. e to remove the service of a content of the removed of accidentally connected of accidentally connected of the vehicle. When no m to prevent other period of HBB-6, "High Volta N: the possibility of a m olug is removed. The e Service Manual. CONDITIONING	o follow the correct work procedures when vice plug in order to shut off the high voltage of high voltage system harnesses and parts service plug in your pocket and carry it wit ect it while work is in progress. protective gear consisting of glove, shoes an voltage system. s responsible for high voltage work and ensu- t working, cover high voltage parts with an i ersons from contacting them. <u>ge Precautions</u> ".	n performing inspection and ge circuits before performing h you so that another person and glasses/face shield before ure that other persons do not nsulating cover sheet or sim- ed to READY status while the status unless instructed to do
dled ir mainte Be sur inspec Be sur does n Be sur beginn Clearly touch f ilar iter Refer t CAUTIO There is service p to in the .PREC	to rectly. Be sure to e to remove the service of an ance. e to remove the service of a content of the removed of accidentally connected of accidentally connected of the vehicle. When no m to prevent other period of HBB-6, "High Volta N: the possibility of a m olug is removed. The e Service Manual. CONDITIONING	o follow the correct work procedures when vice plug in order to shut off the high voltage of high voltage system harnesses and parts service plug in your pocket and carry it wit ect it while work is in progress. protective gear consisting of glove, shoes an voltage system. s responsible for high voltage work and ensu- t working, cover high voltage parts with an i ersons from contacting them. <u>ge Precautions</u> ". nalfunction occurring if the vehicle is change refore do not change the vehicle to READY s	n performing inspection and ge circuits before performing h you so that another person and glasses/face shield before ure that other persons do not nsulating cover sheet or sim- ed to READY status while the status unless instructed to do

DC/DC	converter	Li-ion batte	Li-ion battery controller	
Connector	Connector Terminal		Terminal	Continuity
_	5	LB1	20	Existed

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> Replace DC/DC converter [Refer to <u>HBB-197</u>, "DC/DC CONVERTER : Disassembly and Assembly"] and Li-ion battery controller [Refer to <u>HBB-200</u>, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly"].
- NO >> Repair harness or connector.

P0A1F BATTERY ENERGY CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

P0A1F BATTERY ENERGY CONTROL MODULE

DTC Logic

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INFOID:000000008140931

DTC DETECTION LOGIC

DTC	Trouble diag	nosis name		DTC d	etecting condition		Possible causes
P0A1F	BATTERY ENE TROL MODUL		When a mal battery cont		detected in the fun ronic circuit.	nction of Li-ion	Li-ion battery controller
TC CO	NFIRMATIO	N PROCE	DURE				
.PERF	ORM DTC CO	ONFIRMAT	ION PROC	EDURE			
. Turn . Selec <u>s P0A1F</u>	detected?	ostic Result	" mode of '	"HV BAT	nds. " using CONSU	LT.	
	>> Refer to <u>H</u> >> INSPECTI		agnosis Pro	<u>ocedure"</u> .			
Jiagnos	sis Proced	ure					INFOID:000000008140932
.CHFC	K LI-ION BAT				R SUPPLY		
)WITH (. Selec	CONSULT xt "DATA MON	NTOR" mod	de of "HV B	BAT" usin		llowing conc	litions.
						5	
-	nitor item	Conditi	ons	Voltage	(V)		
AD VALUE	E OF AVCC	Conditi		Voltage	<u> </u>		
AD VALUE /OLTAGE the insp YES	OF AVCC Dection result >> GO TO 2. >> Replace L	Ignition swi normal?	tch: ON	1.9- 2.	1	-ION BATTI	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES	OF AVCC Dection result >> GO TO 2. >> Replace L	Ignition swi normal? i-ion batter	tch: ON	1.9- 2.	1	-ION BATTI	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES	OF AVCC Dection result >> GO TO 2. >> Replace L sembly an ONDITIONIN	Ignition swi normal? i-ion batter	tch: ON	1.9- 2.	1	-ION BATTI	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE The insp YES NO PREC ARNING	 OF AVCC Dection result Section To 2. Replace L sembly an ONDITIONIN G: high voltage 	Ignition swi normal? -ion batter d Assembly G circuit. Re	tch: ON y controller <u>'''</u> . fer to <u>GI-3</u>	1.9- 2. r. Refer t	1	h Voltage".	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES NO PREC ARNING hut off I emove I	 OF AVCC Dection result Section result Section result Replace L Sembly an ONDITIONIN G: high voltage Li-ion battery. SGO TO 3. 	Ignition swi normal? d Assembly G circuit. Re Refer to <u>H</u>	tch: ON y controller <u>"</u> . fer to <u>GI-3</u> BB-188, "R	1.9- 2. r. Refer t	1 o <u>HBB-200. "LI</u> to Cut Off Hig	h Voltage".	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES NO PREC ARNIN hut off l emove l	 OF AVCC Dection result SGO TO 2. Replace L sembly an ONDITIONIN G: high voltage Li-ion battery. SGO TO 3. K CURRENT 	Ignition swi normal? -ion batter d Assembly G circuit. Re Refer to <u>H</u> SENSOR (tch: ON y controller <u>"</u> . fer to <u>GI-3</u> BB-188, "R CIRCUIT-1	1.9- 2. r. Refer t	1 o <u>HBB-200, "LI</u> to Cut Off Hig and Installation"	h Voltage".	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES NO PREC ARNIN hut off l emove l CHEC	 OF AVCC Dection result SGO TO 2. Replace L sembly an ONDITIONIN G: high voltage i-ion battery. SGO TO 3. K CURRENT Donnect battery 	Ignition swi normal? -ion batter d Assembly G circuit. Re Refer to HI SENSOR (junction bo	tch: ON y controller <u>-</u> fer to <u>GI-3</u> <u>BB-188, "R</u> CIRCUIT-1 px harness	1.9- 2. r. Refer t 0. "How Removal a connecte	1 o <u>HBB-200, "LI</u> to Cut Off Hig and Installation"	<u>h Voltage"</u> .	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES NO PREC ARNIN hut off l emove l CHEC	 OF AVCC Dection result Section result Section result Replace L Sembly an ONDITIONIN G: high voltage Li-ion battery. SGO TO 3. K CURRENT Destruct battery k continuity b 	Ignition swi normal? -ion batter d Assembly G circuit. Re Refer to HI SENSOR (junction bo	tch: ON y controller <u></u>	1.9- 2. r. Refer t 0. "How Removal a connecte	o <u>HBB-200,</u> "LI to Cut Off Hig and Installation" or. arness connecto	<u>h Voltage"</u> .	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE the insp YES PREC ARNIN hut off I emove I CHEC Disco	 OF AVCC Dection result Section result Section result Replace L Sembly an ONDITIONIN G: high voltage Li-ion battery. SGO TO 3. K CURRENT Dection continuity b Batter 	Ignition swi normal? -ion batter d Assembly G circuit. Re Refer to HI SENSOR (junction bo etween bat	tch: ON y controller <u></u>	1.9- 2. r. Refer t 0. "How Removal a connecte	o <u>HBB-200,</u> "LI to Cut Off Hig and Installation"	<u>h Voltage"</u> .	ERY CONTROLLER : Disas-
AD VALUE VOLTAGE THE insp YES NO PREC ARNIN hut off l emove l CHEC Disco	 OF AVCC Dection result S GO TO 2. Replace L sembly an ONDITIONIN G: high voltage Li-ion battery. S GO TO 3. K CURRENT Donnect battery k continuity b Batter 	Ignition swi normal? -ion batter d Assembly G circuit. Re Refer to HI SENSOR (junction bo etween bat	tch: ON y controller <u>-</u> fer to <u>GI-3</u> BB-188, "R CIRCUIT-1 DX harness tery junctio	1.9-2. r. Refer t 30, "How temoval a connecto on box Ha	o <u>HBB-200,</u> "LI to Cut Off Hig and Installation" or. arness connecto	<u>h Voltage"</u> .	ERY CONTROLLER : Disas-

YES >> GO TO 4.

NO >> Replace battery junction box. Refer to <u>HBB-198</u>, "BATTERY JUNCTION BOX : Disassembly and <u>Assembly"</u>.

P0A1F BATTERY ENERGY CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

4.CHECK CURRENT SENSOR CIRCUIT-2

- 1. Disconnect Li-ion battery controller harness connector.
- 2. Check continuity between Li-ion battery controller harness connector and battery junction box harness connector.

Li-ion batte	Li-ion battery controller		Battery junction box	
Connector	Terminal	Connector	Terminal	Continuity
	9		4	Existed
LB1	10	LB34	6	Existed
	17		5	Existed

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".
- NO >> Repair harness or connector.

P0A7E HYBRID BATTERY PACK OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

P0A7E HYBRID BATTERY PACK OVER TEMPERATURE

DTC Logic

INFOID:000000008140933

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A7E	HYBRID BATTERY PACK OVER TEMPERATURE	When the temperature of either battery temperature sen- sor 1 or 2 remains 70°C (158°F) or higher for 5.0 sec- onds.	 Battery malfunction External heating Overcharge Overdischarge Traction motor inverter HPCM
отс со	NFIRMATION PROCE	DURE	
1.PERF	ORM DTC CONFIRMAT	ION PROCEDURE	
1. Sele	CONSULT ct "DATA MONITOR" mod e the vehicle, according to	de of "HV BAT" using CONSULT. o driving pattern B.	
D	riving pattern B : <u>HBB-</u>	29. "DIAGNOSIS DESCRIPTION : Driving Pattern"	
YES	<u>detected?</u> >> Refer to <u>HBB-61, "Dia</u> >> INSPECTION END	agnosis Procedure".	
Diagno	sis Procedure		INFOID:00000008140934
1.PERF	ORM SELF-DIAGNOSIS	OF LI-ION BATTERY CONTROLLER	
1. Sele		t" mode of "HV BAT" using CONSULT. ted in "Self Diagnostic Result".	
YES	<u>E detected?</u> >> Perform diagnosis pro >> GO TO 2.	ocedure of "P0C6E". Refer to <u>HBB-93, "Diagnos</u>	sis Procedure".
2.perf	ORM ALL DTC READING	G	
1. Perfo 2. Cheo	v	ith CONSULT. t" of "EV/HEV" or "MOTOR CONTROL".	
<u>Is DTC d</u> YES		each system. Replace Li-ion battery (battery r	ack) after reparing malfunc-
	tioning parts.	each system. Replace Liton Dattery (Dattery F	acity after repairing mailunc

P0A7F HYBRID BATTERY PACK DETERIORATION

< DTC/CIRCUIT DIAGNOSIS >

P0A7F HYBRID BATTERY PACK DETERIORATION

DTC Logic

INFOID:000000008140935

DTC DETECTION LOGIC

NOTE:

- If DTC "P0A7F" is displayed with DTC "P3062", first perform the trouble diagnosis for DTC "P3062".
- If DTC "P0A7F" is displayed with DTC "P30FD", first perform the trouble diagnosis for DTC "P30FD".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A7F	HYBRID BATTERY PACK DETERIORATION	When turning the ignition switch ON under unloaded condition, the difference between the maximum and minimum values of cell voltage is beyond the tolerance (200 mV) of cell variations.	 Li-ion battery controller (By- pass switch) Module

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Check "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0A7F detected?

YES >> Refer to <u>HBB-62</u>, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM DATA MONITOR

WITH CONSULT

Turn ignition switch ON.

CAUTION:

- Never bring into READY.
- 2. Check "CELL VOLTAGE 01- 96" of "DATA MONITOR" mode.
- 3. Identify a cell voltage which is \pm 100 mV or more higher than the mean voltage of all the cells.

Is abnormal cell identified?

- YES-1 >> When a single cell is abnormal, GO TO 2.
- YES-2 >> When multiple cells are abnormal, check the module layout. If two or more modules are abnormal, replace all of the 12 modules. Refer to <u>HBB-202</u>, <u>"MODULE STACK : Disassembly and Assembly</u>.

2. CHECK THE HISTORY OF REPLACEMENT-1

Check the latest replacement history of the module or battery pack assembly.

Is there a history of part replacement?

- YES-1 >> When there is a history of replacing all of the 12 modules, GO TO 3.
- YES-2 >> When there is a history of replacing single module, replace all of the 12 modules. However, when replacing a module replaced in the past, it is possible to replace it as a single module replacement if the Li-ion battery is within 17 months from the manufacturing date.
- YES-3 >> When there is a history of battery pack assembly replacement, GO TO 4.

NO >> GO TO 4.

3.CHECK THE HISTORY OF REPLACEMENT-2

Check the module manufacturing date recorded during the replacement of all the 12 modules.

Is it more than 17 months from the date of manufacture?

YES >> Replace all of the 12 modules. Refer to <u>HBB-202</u>, "MODULE STACK : Disassembly and Assembly".

NO >> Replace a module including abnormal cell. Refer to <u>HBB-195</u>, "Exploded View".

4.CHECK THE DATE OF MANUFACTURE OF LI-ION BATTERY

INFOID:000000008140936

P0A7F HYBRID BATTERY PACK DETERIORATION

< DTC/CIRCUIT DIAGNOSIS >

Check the battery pack assembly manufacturing date included in the module serial number label. For the label location, refer to <u>HBB-208, "MODULE STACK : Inspection"</u>.

Is it more than 17 months from the date of manufacture?

- YES >> Replace all of the 12 modules. Refer to <u>HBB-202, "MODULE STACK : Disassembly and Assembly</u>".
- NO >> Replace a module including abnormal cell. Refer to <u>HBB-195</u>, "Exploded View".

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P0A84 HYBRID BAT PACK COOLING FAN 1

< DTC/CIRCUIT DIAGNOSIS >

P0A84 HYBRID BAT PACK COOLING FAN 1

DTC Logic

INFOID:000000008140937

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A84	HYBRID BAT PACK COOL- ING FAN 1	When fan speed remains less than the target speed for the specified period of time or more.	 Battery cooling fan Battery cooling fan relay Li-ion battery controller Harness or connector (Be- tween Battery cooling fan and Li-ion battery controller)

DTC CONFIRMATION PROCEDURE

1.CHECK BATTERY COOLING FAN FUNCTION

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Record DTC and Freeze frame data.
- 3. Erase DTC.
- 4. Perform "HV BATTERY COOLING FAN" with the "ACTIVE TEST" mode and wait at least 30 seconds.
- 5. Select "Self Diagnostic Result" mode of "HV BAT".
- 6. Check DTC.

Is P0A84 detected?

YES >> Refer to <u>HBB-64, "Diagnosis Procedure"</u>. NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008140938

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1. CHECK BATTERY COOLING FAN OPERATION

(I) WITH CONSULT

- 1. Turn ignition switch ON.
- 2. Perform "HV BATTERY COOLING FAN" with the "ACTIVE TEST" mode.

IS the battery cooling fan activated?

YES >> GO TO 2.

NO >> GO TO 5.

2.CHECK BATTERY COOLING FAN MOTOR INPUT SIGNAL CIRCUIT-1

P0A84 HYBRID BAT PACK COOLING FAN 1

< DTC/CIRCUIT DIAGNOSIS >

- 1. Turn ignition switch OFF.
- Check continuity between battery cooling fan motor harness connector and Li-ion battery harness connector.

Battery cool	Battery cooling fan motor		Li-ion battery	
Connector	Terminal	Connector	Connector Terminal	
B49	5	B283	1	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair harness or connector.

3. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 4.

4.CHECK BATTERY COOLING FAN MOTOR INPUT SIGNAL CIRCUIT-2

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

	Li-ion	battery	Li-ion batte	Continuity	
-	Connector	Terminal	Connector	Terminal	Continuity
	LB39	1	LB1	4	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES	>> Replace Li-ion battery controller. Refer to HBB-200, "LI-ION BATTERY CONTROLLER : Disas-	
	sembly and Assembly".	K
NO	>> Repair harness or connector.	

5.CHECK FUSE

1. Turn ignition switch OFF.	L
2. Pull out 20A fuse (No.68) and check that the fuse is not fusing.	
NOTE:	
Refer to PG-43, "Fuse and Fusible Link Arrangement" for fuse layout.	M
Is the inspection result normal?	TVI
YES >> GO TO 6.	
NO >> Replace the fuse after repairing the applicable circuit.	N
6. CHECK BATTERY COOLING FAN POWER SUPPLY CIRCUIT-1	14
1 Disconnect battery cooling fan barness connector	

1. Disconnect battery cooling fan harness connector.

2. Turn ignition switch ON.

3. Check voltage between battery cooling fan harness connector and ground.

(1	+)	(_)	Voltage	
Battery c	ooling fan	(-)		
Connector	Terminal	Ground	Battery voltage	
B49	B49 6		Ballery vollage	
1 41 1 41	14 10			

Is the inspection result normal?

YES >> GO TO 7. NO >> GO TO 12. В

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< DTC/CIRCUIT DIAGNOSIS >

7. CHECK BATTERY COOLING FAN GROUND CIRCUIT

- 1. Disconnect Li-ion battery harness connector.
- 2. Check continuity between Li-ion battery harness connector and battery cooling fan harness connector.

Li-ion	battery	Battery c	Battery cooling fan		
Connector	Terminal	Connector	Terminal	Continuity	
LB39	1	B49	5	Existed	

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair harness or connector.

8.CHECK LI-ION BATTERY CONTROLLER OUTPUT SIGNAL-1

WITH CONSULT

Turn ignition switch ON.

2. Perform "HV BATTERY COOLING FAN" in "ACTIVE TEST" mode.

3. Check voltage between battery cooling fan harness connector and ground.

((+) Battery cooling fan		Condition	Voltage	
Battery c			Condition	voltage	
Connector	Terminal	Ground	ACTIVE TEST: Hi	Approx. 12 V	
B49	4	Gloand	ACTIVE TEST. TH	Approx. 12 V	

Is the inspection result normal?

YES >> Replace battery cooling fan. Refer to HBB-186, "Removal and Installation".

NO >> GO TO 9.

9.CHECK LI-ION BATTERY CONTROLLER OUTPUT SIGNAL-2

WITH CONSULT

- Turn ignition switch ON.
- 2. Perform "HV BATTERY COOLING FAN" in "ACTIVE TEST" mode.
- 3. Check voltage between Li-ion battery harness connector and ground.

(+) Li-ion battery		(-)	Condition	Voltage
		(-)	Condition	voltage
Connector	Terminal	Ground	ACTIVE TEST: Hi	Approx. 12 V
B283	13	Cround	ACTIVE TEST. TH	

Is the inspection result normal?

YES >> Repair harness or connector.

NO >> GO TO 10.

10.preconditioning

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 11.

11. CHECK OUTPUT SIGNAL CIRCUIT

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

P0A84 HYBRID BAT PACK COOLING FAN 1

< DTC/CIRCUIT DIAGNOSIS >

Li-ion batter	ry controller	Li-ion b	pattery		_	А
Connector	Terminal	Connector	Terminal	Continuity		
LB1	7	B283	13	Existed	—	
3. Also che	ck harness f	or short to gro	und.		-	В
Is the inspect YES >> F NO >> F	ion result no Replace Li-ic <u>embly and A</u> Repair harne	ormal? on battery cont	roller. Refer or.		0. "LI-ION BATTERY CONTROLLER : Disas-	HB
1. Remove	battery cool	ng fan relay.			onnector and ground.	E
	(+)		()	Veltage	
Ba	ttery cooling fa	n relay	- (-	-,	Voltage	F
Connect	or	Terminal				Г
B284		1	Gro	und	Battery voltage	
D204		5				(
13. CHECK Check battery s the inspect	BATTERY (y cooling far	•				ŀ
NO >> F 14.CHECK	Replace Batt BATTERY (ery cooling far	I RELAY GR		CUIT-1 nector and Li-ion battery harness connector.	,
	ulty between	Dattery Coolin	ig lan relay i		needor and Erion battery namess connector.	
Battery cool	ing fan relay	Li-ion b	oattery	Continuity	_	
Connector	Terminal	Connector	Terminal	Continuity		I
B284	2	B283	17	Existed	_	
	GO TO 15. Repair harne	ss or connecto	or.			ľ
WARNING: Shut off high	n voltage ci				f High Voltage". ation".	(
>> (GO TO 16.					
16. CHECK	BATTERY	COOLING FAN	I RELAY GR	ROUND CIR	CUIT-2	F
		tery controller veen battery c			connector and Li-ion battery harness connec-	

 Check continuity between battery cooling fan relay harness connector and Li-ion battery harness connector.

P0A84 HYBRID BAT PACK COOLING FAN 1

< DTC/CIRCUIT DIAGNOSIS >

Li-ion batte	ry controller	Li-ion	battery	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
LB39	17	LB1	19	Existed	

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

NO >> Repair harness or connector.

P0A85 HYBRID BAT PACK COOLING FAN 1

< DTC/CIRCUIT DIAGNOSIS >

P0A85 HYBRID BAT PACK COOLING FAN 1

DTC Logic

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INFOID:000000008140939

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A85	HYBRID BAT PACK COOL- ING FAN 1	When fan speed remains more than the target speed for the specified period of time or more.	 Battery cooling fan Li-ion battery controller The mixing of noise into signal line
	NFIRMATION PROCE		
	ORM DTC CONFIRMAT		
Sele		de of "HV BAT" using CONSULT.	
	-		
	riving pattern B : <u>HBB-2</u>	29. "DIAGNOSIS DESCRIPTION : Driving Pattern"	
ΈS	>> Refer to <u>HBB-69, "Dia</u> >> INSPECTION END	agnosis Procedure".	
	sis Procedure		INFOID:000000008140
-			
en thi	s DTC is detected, replac	ce battery cooling fan [Refer to HBB-186 "Rem	oval and Installation"] and I
en thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rem</u> e	oval and Installation"] and L
battei	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rem</u>	oval and Installation"] and L
battei	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
en thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	<u>oval and Installation"</u>] and l
battei	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	oval and Installation"] and I
batter	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	<u>oval and Installation"</u>] and I
	ry controller [Refer to <u>HB</u>	<u>B-200, "LI-ION BATTERY CONTROLLER : Disa</u>	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	<u>oval and Installation"</u>] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rema</u>	<u>oval and Installation"</u>] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rema</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Dis	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Dis	assembly and Assembly"].
nen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Remo</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Disa	assembly and Assembly"].
hen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rema</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Dis	assembly and Assembly"].
hen thi	s DTC is detected, replac	ce battery cooling fan [Refer to <u>HBB-186, "Rema</u>	oval and Installation"] and I
	ry controller [Refer to <u>HB</u>	B-200, "LI-ION BATTERY CONTROLLER : Dis	assembly and Assembly"].

P0A9D HYBRID BATTERY TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0A9D HYBRID BATTERY TEMPERATURE SENSOR A

DTC Logic

INFOID:000000008140941

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A9D	HYBRID BATTERY TEM- PERATURE SENSOR A	When a voltage input value of the battery temperature sensor to the Li-ion battery controller remains extremely low for 2 seconds or more.	 Battery temperature sensor 1 Li-ion battery controller Harness short

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0A9D detected?

- YES >> Refer to HBB-70, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008140942

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 2.

2. CHECK BATTERY TEMPERATURE SENSOR 1

Check battery temperature sensor. Refer to <u>HBB-71, "Component Inspection"</u>.

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".
- NO >> Replace battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".

P0A9D HYBRID BATTERY TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

INFOID:000000008140943

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1.CHECK BATTERY TEMPERATURE SENSOR 1

- 1. Remove battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".
- 2. Check resistance between battery temperature sensor 1 terminals.

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".

P0A9E HYBRID BATTERY TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0A9E HYBRID BATTERY TEMPERATURE SENSOR A

DTC Logic

INFOID:000000008140944

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0A9E	HYBRID BATTERY TEMPERATURE SEN- SOR A	When a voltage input value of the battery temperature sensor to the Li-ion battery controller remains extremely high for 2 seconds or more.	Battery temperature sensor 1Harness openLi-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0A9E detected?

- YES >> Refer to <u>HBB-72, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008140945

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to HBB-6, "High Voltage Precautions".

CAUTION:

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

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 2.

2. CHECK CONNECTION STATUS OF LI-ION BATTERY CONTROLLER HARNESS CONNECTOR

Check connection status of Li-ion battery controller harness connector.

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair the connection of harness.

3.CHECK BATTERY TEMPERATURE SENSOR 1

Refer to HBB-73, "Component Inspection".

P0A9E HYBRID BATTERY TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> A <u>sembly and Assembly"</u>.
- NO >> Replace battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".

Component Inspection

INFOID:000000008140946

1.CHECK BATTERY TEMPERATURE SENSOR 1

- 1. Remove battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.
- 2. Check resistance between battery temperature sensor 1 terminals.

Terminals	Con	dition	Resistance (k Ω)
		10°C (50°F)	Approx. 7.4
25 and 29	Temperature	25°C (77°F)	Approx. 4.0
		40°C (104°F)	Approx. 2.3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.

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P0AA7 HYBRID BATTERY VOLTAGE ISOLATION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0AA7 HYBRID BATTERY VOLTAGE ISOLATION SENSOR

DTC Logic

INFOID:000000008140947

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0AA7	HYBRID BATTERY VOLT- AGE ISOLATION SENSOR	When there is no amplitude fluctuation in signal voltage of the insulation resistance loss monitoring system.	Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT".

Is P0AA7 detected?

- YES >> Refer to <u>HBB-74</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS-1

WITH CONSULT

- 1. Perform "All DTC Reading".
- 2. Check if the DTC is detected in "Self Diagnostic Result".

Is DTC detected except for P0AA7?

- YES-1 >> When detected simultaneously with DTC of "MOTOR CONTROL", perform the diagnosis procedure of the traction motor system. Refer to <u>TMS-31</u>, "<u>DTC Index</u>".
- YES-2 >> When detected simultaneously with "P0AA9", replace Li-ion battery controller. Refer to <u>HBB-200</u>. <u>"LI-ION BATTERY CONTROLLER : Disassembly and Assembly"</u>.
- YES-3 >> When detected simultaneously with "P0AA6", GO TO 2.
- NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.

2. PERFORM SELF-DIAGNOSIS-2

(I) WITH CONSULT

- 1. Erase DTC of "EV/HEV" and "HV BAT".
- 2. Turn ignition switch OFF.
- 3. Turn ignition switch ON and wait at least 1 minutes.
- 4. Perform "All DTC Reading".
- 5. Check DTC.

Is P0AA9 detected simultaneously with P0AA7?

- YES >> When detected simultaneously with "P0AA9", replace Li-ion battery controller. Refer to <u>HBB-200</u>, <u>"LI-ION BATTERY CONTROLLER : Disassembly and Assembly"</u>.
- NO >> Perform the diagnosis procedure of "P0AA6". Refer to <u>HBB-75, "Diagnosis Procedure"</u>.

INFOID:000000008140948

P0AA9 HYBRID BAT VOLTAGE ISOLATION SEN

< DTC/CIRCUIT DIAGNOSIS >

P0AA9 HYBRID BAT VOLTAGE ISOLATION SEN

DTC Logic

INFOID:000000008140949

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0AA9	HYBRID BAT VOLTAGE ISOLATION SEN	When the signal voltage of the insulation resistance loss monitoring system is too low.	Li-ion battery controller
C CO	NFIRMATION PROCE	DURE	
PERF	ORM DTC CONFIRMAT	ION PROCEDURE	
Turn		vait at least 10 seconds. t" mode of "HV BAT" using CONSULT.	
ES >	<u>detected?</u> >> Refer to <u>HBB-75. "Dia</u> >> INSPECTION END	agnosis Procedure".	
agnos	sis Procedure		INFOID:0000000081405
	DTC is detected, replace assembly and Assembly	ce Li-ion battery controller. Refer to <u>HBB-200, "L</u>	I-ION BATTERY CONTROL
<u>R . Dis</u>	assembly and Assembly	<u>_</u> .	

P0AAA HYBRID BAT VOLTAGE ISOLATION SEN

< DTC/CIRCUIT DIAGNOSIS >

P0AAA HYBRID BAT VOLTAGE ISOLATION SEN

DTC Logic

INFOID:000000008140951

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P0AAA	HYBRID BAT VOLTAGE ISOLATION SEN	When the signal voltage of the insulation resistance loss monitoring system is too high.	Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(P)WITH CONSULT

- 1.
- Turn ignition switch ON and wait at least 10 seconds. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT. 2.

Is POAAA detected?

- YES >> Refer to HBB-76. "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008140952

When this DTC is detected, replace Li-ion battery controller. Refer to HBB-200, "LI-ION BATTERY CONTROL-LER : Disassembly and Assembly".

P0AAE HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0AAE HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

DTC Logic

INFOID:000000008140953

INFOID:000000008140954

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	-
P0AAE	HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A	When the voltage input value of the intake air tempera- ture sensor to the Li-ion battery controller remains ex- tremely low for 2 seconds or more.	 Battery temperature sensor 3 (Intake) Harness short Li-ion battery controller 	H

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(P)WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds. 1.
- Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT. 2.

Is POAAE detected?

- YES >> Refer to HBB-77, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Н Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance. Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts. Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system. Κ · 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. L • Refer to HBB-6, "High Voltage Precautions". CAUTION: There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do Μ so in the Service Manual. 1.PRECONDITIONING Ν WARNING: Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". Remove Li-ion battery. Refer to HBB-188, "Removal and Installation". >> GO TO 2. 2.CHECK BATTERY TEMPERATURE SENSOR 3 (INTAKE) P Refer to HBB-78, "Component Inspection". Is the inspection result normal?
- YES >> Replace Li-ion battery controller. Refer to HBB-200, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".
- NO >> Replace battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.

P0AAE HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

INFOID:000000008140955

1.CHECK BATTERY TEMPERATURE SENSOR 3 (INTAKE)

- 1. Remove battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".
- 2. Check resistance between battery temperature sensor 3 (Intake) terminals.

Terminals	Con	dition	Resistance (k Ω)
		10°C (50°F)	Approx. 7.4
27 and 31	Temperature	25°C (77°F)	Approx. 4.0
		40°C (104°F)	Approx. 2.3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.

P0AAF HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

P0AAF HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

DTC Logic

INFOID:000000008140956

INFOID:000000008140957

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	-
P0AAF	HYBRID BATTERY PACK AIR TEMPERA- TURE SENSOR A	When the voltage input value of the intake air tempera- ture sensor to the Li-ion battery controller remains ex- tremely high for 2 seconds or more.	 Battery temperature sensor 3 (Intake) Harness open Li-ion battery controller 	HBE

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(P)WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds. 1.
- Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT. 2.

Is POAAF detected?

- >> Refer to HBB-79, "Diagnosis Procedure". YES
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

Н Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance. Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts. Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress. Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system. Κ · 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 HBB-6, "High Voltage Precautions". CAUTION: There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do Μ so in the Service Manual. 1.PRECONDITIONING Ν WARNING: Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". Remove Li-ion battery. Refer to HBB-188, "Removal and Installation". >> GO TO 2. $\mathbf{2}$. CHECK CONNECTION STATUS OF LI-ION BATTERY CONTROLLER HARNESS CONNECTOR P Check connection status of Li-ion battery controller harness connector. Is the inspection result normal? YES >> GO TO 3. NO >> Repair the connection of harness. ${f 3.}$ CHECK BATTERY TEMPERATURE SENSOR 3 (INTAKE)

Refer to HBB-73, "Component Inspection".

HBB-79

P0AAF HYBRID BATTERY PACK AIR TEMPERATURE SENSOR A

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".
- NO >> Replace battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".

Component Inspection

INFOID:000000008140958

1.CHECK BATTERY TEMPERATURE SENSOR 3 (INTAKE)

- 1. Remove battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.
- 2. Check resistance between battery temperature sensor 3 (Intake) terminals.

Terminals	Con	Resistance (k Ω)	
		10°C (50°F)	Approx. 7.4
27 and 31	Temperature	25°C (77°F)	Approx. 4.0
		40°C (104°F)	Approx. 2.3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.

P0ABF HYBRID BATTERY PACK CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

POABF HYBRID BATTERY PACK CURRENT SENSOR

DTC Logic

INFOID:000000008140959

DTC	Trouble diagnosis n	name	DTC	detecting condition	Possible causes
P0ABF	HYBRID BATTERY PACK CURRENT SE SOR	EN- curre	ent detected by th	nce between a battery input/output he Li-ion battery controller and a rative current detected by the drive	Current sensorTraction motor inverter
	FIRMATION PR	ROCEDU	RE		
.PERFC	RM DTC CONFIF	RMATION	PROCEDUR	E	
WITH C	ONSULT				
	gnition switch ON			conds. AT" using CONSULT.	
	detected?	Result Int		AT USING CONSULT.	
′ES >	> Refer to <u>HBB-81</u>		sis Procedure	<u>e"</u> .	
	> INSPECTION E	ND			
iagnos	is Procedure				INFOID:00000008140960
erform se	elf-diagnosis of the	e motor co	ontrol system	and the hybrid control system	n. Perform inspection, accord-
	diagnosis procedu	ire for app		-	
.PERFC	ORM SELF-DIAGN	IOSIS			
WITH C	ONSULT				
WITH C	ONSULT m "All DTC Readi	ing" with C	CONSULT.	c Result" of "EV/HEV" or "MC	OTOR CONTROL".
WITH C	ONSULT m "All DTC Readi t if the DTC is dete	ing" with C	CONSULT. Self Diagnostic	c Result" of "EV/HEV" or "MC	TOR CONTROL".
WITH C Perfor Check <u>DTC de</u> ⁄ES >	ONSULT m "All DTC Readi i f the DTC is dete tected? > Perform diagnos	ing" with C ected in "S	Self Diagnosti		OTOR CONTROL".
WITH C Perfor Check <u>DTC de</u> (ES > NO >	ONSULT m "All DTC Readi t if the DTC is dete tected? > Perform diagnos > GO TO 2.	ing" with C ected in "S	Self Diagnosti		OTOR CONTROL".
WITH C Perfor Check <u>DTC de</u> (ES > NO > .PRECC	ONSULT m "All DTC Readi t if the DTC is dete tected? > Perform diagnos > GO TO 2. DNDITIONING	ing" with C ected in "S	Self Diagnosti		OTOR CONTROL".
WITH C Perfor Check <u>DTC de</u> (ES > NO > PRECC	ONSULT m "All DTC Readi ; if the DTC is dete <u>tected?</u> > Perform diagnos > GO TO 2. DNDITIONING	ing" with C ected in "S sis proced	Self Diagnostio	able system.	
WITH C Perfor Check <u>DTC de</u> (ES > NO > .PRECC ARNING	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. DNDITIONING	ing" with C ected in "S sis proced uit. Refer	Self Diagnostic lure of applica to <u>GI-30, "Ho</u>		
WITH C Perfor Check <u>DTC de</u> (ES > NO > .PRECC ARNING Dut off h emove L	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. DNDITIONING tigh voltage circu i-ion battery. Refe	ing" with C ected in "S sis proced uit. Refer	Self Diagnostic lure of applica to <u>GI-30, "Ho</u>	able system. www.to Cut Off High Voltage".	
WITH C Perfor Check 2ES > 10 > .PRECC ARNING hut off h emove L	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. ONDITIONING : igh voltage circu i-ion battery. Refe	ing" with C ected in "S sis proced sis proced uit. Refer to <u>HBB-</u>	Self Diagnostic lure of applica to <u>GI-30, "Ho</u> 188. "Remova	able system. www.to Cut Off High Voltage".	
WITH C Perfor Check 2ES > 0 > .PRECC ARNING but off h emove L > .CHECk	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. DNDITIONING : igh voltage circu i-ion battery. Refe > GO TO 3.	ing" with C ected in "S sis proced uit. Refer or to <u>HBB-1</u> SOR HAR	Self Diagnostic lure of applica to <u>GI-30, "Ho</u> 188. "Remova	able system. ow to Cut Off High Voltage". al and Installation".	
WITH C Perfor Check 2ES > 0 > .PRECC ARNING but off h emove L .CHECk	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. DNDITIONING : igh voltage circu i-ion battery. Refe > GO TO 3. CURRENT SEN:	ing" with C ected in "S sis proced uit. Refer or to <u>HBB-1</u> SOR HAR tion box h	Self Diagnostic lure of applica to <u>GI-30, "Ho</u> 188. "Remova RNESS arness conne	able system. we to Cut Off High Voltage". al and Installation".	
WITH C Perfor Check DTC de (ES > NO > PRECC ARNING DISCOR Discor Check	ONSULT m "All DTC Readi tieteted? > Perform diagnos > GO TO 2. DNDITIONING tion battery. Refe > GO TO 3. CURRENT SEN CURRENT SEN continuity betwee	ing" with C ected in "S sis proced uit. Refer to HBB- SOR HAR tion box h y controlle en battery	Self Diagnostic lure of applica to <u>GI-30, "Ho</u> 188. "Remova RNESS arness conne er harness con	able system. we to Cut Off High Voltage". al and Installation". actor. nnector.	
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WITH C Perfor Check 2ES > 0 > PRECC ARNING Dut off h emove L > CHECk Discor Discor Check troller	ONSULT m "All DTC Readi tected? > Perform diagnos > GO TO 2. ONDITIONING : igh voltage circu i-ion battery. Refe > GO TO 3. CURRENT SEN nect battery junct nect Li-ion batter continuity betwee harness connecto	ing" with C ected in "S sis proced ait. Refer for to HBB- SOR HAR tion box hat by controlle en battery or.	Self Diagnostic lure of applica to <u>GI-30, "Ho</u> 188, "Remova RNESS arness conne er harness con junction box	able system. we to Cut Off High Voltage". al and Installation". actor. nnector.	
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Revision: 2013 March

YES >> GO TO 4.

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POABF HYBRID BATTERY PACK CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

NO >> Repair harness or connector.

4.CHECK CURRENT SENSOR

Refer to HBB-82, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace battery junction box (current sensor). Refer to <u>HBB-198, "BATTERY JUNCTION BOX :</u> <u>Disassembly and Assembly"</u>.

5. CHECK RESISTANCE OF LI-ION BATTERY CONTROLLER

Check resistance between Li-ion battery controller terminals.

	Resistance			
Connector	Connector Terminal Connector Terminal			
LB1	10	LB1	17	Approx. 4.7 k Ω

Is the inspection result normal?

YES >> Replace Li-ion battery controller [Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> sembly and Assembly"] and battery junction box [Refer to <u>HBB-198, "BATTERY JUNCTION BOX</u> : <u>Disassembly and Assembly"</u>].

NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

Component Inspection

INFOID:000000008140961

1.CHECK CURRENT SENSOR

Check resistance between battery junction box (current sensor) terminals.

В	Battery junction box (current sensor)				
Connector	Terminal	Connector	Terminal	Resistance	
LB34	4	LB34	5	1.0 kΩ- 10 MΩ	
LD34	6	LD04	5	1.0 K22- 10 10122	

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery junction box. Refer to <u>HBB-198</u>, "<u>BATTERY JUNCTION BOX</u> : <u>Disassembly and</u> <u>Assembly</u>".

P0AC0 HYBRID BATTERY PACK CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0AC0 HYBRID BATTERY PACK CURRENT SENSOR

DTC Logic

INFOID:000000008140962

INFOID:000000008140963

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	HBE
P0AC0	HYBRID BATTERY PACK CURRENT SENSOR	When a current sensor offset voltage learned at IGN ON is outside the range of 2.9 V- 3.1 V.	 Li-ion battery controller Current sensor Between Li-ion battery controller and current sensor harness System main relay stuck at ON 	D

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0AC0 detected?

- YES >> Refer to HBB-83, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the "P0AA0" or "P0AA1" is detected in "Self Diagnostic Result" of "EV/HEV".

Is DTC detected?

- YES >> Perform diagnosis procedure of hybrid control system. Refer to <u>HBC-71, "DTC Index"</u>. NO >> GO TO 2.
- 2. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>. А

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P0AC0 HYBRID BATTERY PACK CURRENT SENSOR

< DTC/CIRCUIT DIAGNOSIS >

>> GO TO 3.

3.CHECK CURRENT SENSOR HARNESS

- 1. Disconnect battery junction box harness connector.
- 2. Disconnect Li-ion battery controller harness connector.
- 3. Check continuity between battery junction box (current sensor) harness connector and Li-ion battery controller harness connector.

	Battery junction box (current sensor) Li-ion battery controller		Continuity	
Connector	Terminal	Connector	Terminal	
	4		9	
LB34	5	LB1	17	Existed
	6		10	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

4.CHECK CURRENT SENSOR

Refer to HBB-86, "Component Inspection".

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace battery junction box (current sensor). Refer to <u>HBB-198, "BATTERY JUNCTION BOX :</u> <u>Disassembly and Assembly"</u>.

5.CHECK RESISTANCE OF LI-ION BATTERY CONTROLLER

Check resistance between Li-ion battery controller terminals.

Li-ion battery controller				Resistance
Connector	Terminal	Connector	Terminal	Resistance
LB1	10	LB1	17	Approx. 4.7 kΩ

Is the inspection result normal?

YES >> Replace Li-ion battery controller [Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> sembly and Assembly"] and battery junction box [Refer to <u>HBB-198, "BATTERY JUNCTION BOX</u> : <u>Disassembly and Assembly"</u>].

NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.

Component Inspection

INFOID:000000008140964

1.CHECK CURRENT SENSOR

Check resistance between battery junction box (current sensor) terminals.

B	Battery junction box (current sensor) Resistance		Resistance	
Connector	Terminal	Connector	Terminal	Resistance
LB34	4	LB34	5	1.0 kΩ- 10 MΩ
LD34	6	2004	5	1.0 K22 10 10122

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery junction box. Refer to <u>HBB-198</u>, "<u>BATTERY JUNCTION BOX</u> : <u>Disassembly and</u> <u>Assembly</u>".

P0AC1 HYBRID BAT PACK CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

POAC1 HYBRID BAT PACK CURRENT SEN

DTC Logic

INFOID:000000008140965

INFOID:000000008140966

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	
			Li-ion battery controllerCurrent sensor	HBE
P0AC1	HYBRID BAT PACK CUR- RENT SEN	When a current sensor input voltage to the Li-ion battery controller remains extremely low for 2 seconds or more.	Between Li-ion battery con- troller and current sensor har- ness	D

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0AC1 detected?

- YES >> Refer to <u>HBB-85, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS N Image: Perform Self-Diagnosis Perform Self-Diagnosis Image: Perform Self-Diagnosis Perform Self Diagnosis Image: Perform Self Diagnosis Perform Self Diagnosis I

2.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 3.

P0AC1 HYBRID BAT PACK CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

$\overline{\mathbf{3.}}$ CHECK CURRENT SENSOR HARNESS

- 1. Disconnect battery junction box harness connector.
- 2. Disconnect Li-ion battery controller harness connector.
- 3. Check continuity between battery junction box (current sensor) harness connector and Li-ion battery controller harness connector.

	Battery junction box (current sensor)		ry controller	Continuity
Connector	Terminal	Connector	Terminal	
	4		9	
LB34	5	LB1	17	Existed
	6		10	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

4.CHECK CURRENT SENSOR

Refer to <u>HBB-86</u>, "Component Inspection".

Is the inspection result normal?

- YES >> GO TO 5.
- NO >> Replace battery junction box (current sensor). Refer to <u>HBB-198, "BATTERY JUNCTION BOX :</u> <u>Disassembly and Assembly"</u>.

5.CHECK RESISTANCE OF LI-ION BATTERY CONTROLLER

Check resistance between Li-ion battery controller terminals.

	Li-ion batte	ery controller		Resistance
Connector	Terminal	Connector	Terminal	Resistance
LB1	10	LB1	17	Approx. 4.7 kΩ

Is the inspection result normal?

YES >> Replace Li-ion battery controller [Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> sembly and Assembly"] and battery junction box [Refer to <u>HBB-198, "BATTERY JUNCTION BOX</u> : <u>Disassembly and Assembly"</u>].

NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.

Component Inspection

INFOID:000000008140967

1.CHECK CURRENT SENSOR

Check resistance between battery junction box (current sensor) terminals.

Battery junction box (current sensor)			or)	Resistance
Connector	Terminal	Connector	Terminal	Tresistance
LB34	4	LB34	5	1.0 kΩ- 10 MΩ
LD04	6	LD34	5	1.0 K22- 10 10122

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery junction box. Refer to <u>HBB-198</u>, "BATTERY JUNCTION BOX : Disassembly and <u>Assembly"</u>.

P0AC2 HYBRID BAT PACK CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

P0AC2 HYBRID BAT PACK CURRENT SEN

DTC Logic

INFOID:000000008140968

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INFOID:000000008140969

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	HBE
P0AC2	HYBRID BAT PACK CURRENT SEN	When a current sensor input voltage to the Li-ion battery controller remains extremely high for 2 seconds or more.	 Li-ion battery controller Current sensor Between Li-ion battery controller and current sensor harness 	D

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

1. Turn ignition switch ON and wait at least 10 seconds.

2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P0AC2 detected?

- YES >> Refer to HBB-87, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS N Image: Perform Self-Diagnosis Perform "All DTC Reading" with CONSULT. 1. Perform "All DTC Reading" with CONSULT. O 2. Check if the "P0AA0" or "P0AA1" are detected in "Self Diagnostic Result" of "EV/HEV". O Is DTC detected? YES >> Perform diagnosis procedure of hybrid control system. Refer to HBC-71. "DTC Index". P NO >> GO TO 2. P

2. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

P0AC2 HYBRID BAT PACK CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

3.CHECK CURRENT SENSOR HARNESS

- 1. Disconnect battery junction box harness connector.
- 2. Disconnect Li-ion battery controller harness connector.
- 3. Check continuity between battery junction box (current sensor) harness connector and Li-ion battery controller harness connector.

	Battery junction box (current sensor)		ry controller	Continuity
Connector	Terminal	Connector	Terminal	
	4		9	
LB34	5	LB1	17	Existed
	6		10	

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair harness or connector.

4.CHECK CURRENT SENSOR

Refer to <u>HBB-88, "Component Inspection"</u>.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Replace battery junction box (current sensor). Refer to <u>HBB-198, "BATTERY JUNCTION BOX :</u> <u>Disassembly and Assembly"</u>.

5.CHECK RESISTANCE OF LI-ION BATTERY CONTROLLER

Check resistance between Li-ion battery controller terminals.

	Li-ion batte	ery controller		Resistance
Connector	Terminal	Connector	Terminal	Resistance
LB1	10	LB1	17	Approx. 4.7 kΩ

Is the inspection result normal?

YES >> Replace Li-ion battery controller [Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> sembly and Assembly"] and battery junction box [Refer to <u>HBB-198, "BATTERY JUNCTION BOX</u> : <u>Disassembly and Assembly"</u>].

NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.

Component Inspection

INFOID:000000008140970

1.CHECK CURRENT SENSOR

Check resistance between battery junction box (current sensor) terminals.

Battery junction box (current sensor)			or)	Resistance
Connector	Terminal	Connector	Terminal	Resistance
LB34	4	LB34	5	1.0 kΩ- 10 MΩ
LD34	6	LD34	5	1.0 K22- 10 W122

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery junction box. Refer to <u>HBB-198</u>, "BATTERY JUNCTION BOX : Disassembly and <u>Assembly"</u>.

P0AC7 HYBRID BATTERY TEMPERATURE SENSOR B

< DTC/CIRCUIT DIAGNOSIS >

P0AC7 HYBRID BATTERY TEMPERATURE SENSOR B

DTC Logic

INFOID:000000008140971

DTC DETECTION LOGIC

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DTC	Trouble diagnosis name	DTC detecting condition	Possible causes		
P0AC7	HYBRID BATTERY TEM- PERATUR SENSOR B	sensor to the Lilion battery controller remains extremely 6 Retween Lilion battery control.			
гс со	NFIRMATION PROC	EDURE			
.PERF	ORM DTC CONFIRMA	TION PROCEDURE			
. Turn 2. Selee <u>s P0AC7</u> YES		wait at least 10 seconds. ult" mode of "HV BAT" using CONSULT. Diagnosis Procedure".			
Diagno	sis Procedure		INFOID:0000000814097		
VARNIN	G:				
tric she dled in mainte	ock, electric leakage, acorrectly. Be sure to nance.	d electric vehicles contain a high voltage bat or similar accidents if the high voltage com follow the correct work procedures when ice plug in order to shut off the high voltag	ponent and vehicle are han performing inspection and		
inspec Be sur does n	tion or maintenance on e to put the removed ot accidentally conne	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a	n you so that another persor		
inspec Be sur does n Be sur work o Clearly touch t ilar iter Refer t	tion or maintenance of e to put the removed ot accidentally conne e to wear insulating p n the high voltage system of identify the persons the vehicle. When not m to prevent other per o <u>HBB-6, "High Voltag</u>	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu working, cover high voltage parts with an ir rsons from contacting them.	n you so that another persor nd glasses before beginning ire that other persons do no		
inspec Be sur does n Be sur work o Clearly touch f ilar iter Refer t CAUTION There is service p so in the	tion or maintenance of e to put the removed ot accidentally conne e to wear insulating p n the high voltage syster identify the persons the vehicle. When not m to prevent other per o <u>HBB-6, "High Voltage</u> N: the possibility of a m	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu working, cover high voltage parts with an ir rsons from contacting them.	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the		
inspec Be sur does n Be sur work o Clearly touch t ilar iter Refer t CAUTION There is service p so in the 1.PREC	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p n the high voltage sys- videntify the persons the vehicle. When not m to prevent other per- o <u>HBB-6, "High Voltage</u> N: the possibility of a molug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an ir rsons from contacting them. <u>ge Precautions</u> ".	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		
inspec Be sur- does n Be sur- work o Clearly touch f ilar iter Refer t CAUTIOI There is service p so in the 1.PREC WARNIN Shut off Remove	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p in the high voltage sys- videntify the persons the vehicle. When not in to prevent other per- o <u>HBB-6</u> , " <u>High Voltage</u> N: the possibility of a molug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F Li-ion battery. Refer to	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ". alfunction occurring if the vehicle is change efore do not change the vehicle to READY s	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		
inspec Be sur does n Be sur work o Clearly touch 1 ilar iter Refer t CAUTION There is service p so in the .PREC WARNIN Shut off Remove	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p n the high voltage sys- videntify the persons the vehicle. When not m to prevent other per- o <u>HBB-6, "High Voltage</u> N: the possibility of a molug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ". alfunction occurring if the vehicle is change efore do not change the vehicle to READY s	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		
inspec Be sur- does n Be sur- work o Clearly touch f ilar iter Refer t CAUTION There is service p so in the 1.PREC WARNIN Shut off Remove	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p n the high voltage sys- r identify the persons the vehicle. When not m to prevent other per o <u>HBB-6, "High Voltage</u> N: the possibility of a m olug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F Li-ion battery. Refer to >> GO TO 2.	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ". alfunction occurring if the vehicle is change efore do not change the vehicle to READY s	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		
inspec Be sur- does n Be sur- work o Clearly touch f ilar iter Refer t CAUTION There is service p so in the 1.PREC WARNIN Shut off Remove	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p in the high voltage sys- videntify the persons the vehicle. When not m to prevent other per- o <u>HBB-6, "High Voltage</u> o <u>HBB-6, "High Voltage</u> N: the possibility of a m olug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F Li-ion battery. Refer to >> GO TO 2. CK BATTERY TEMPER HBB-90, "Component In pection result normal?	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ". alfunction occurring if the vehicle is change efore do not change the vehicle to READY s Refer to <u>GI-30, "How to Cut Off High Voltage"</u> HBB-188, "Removal and Installation". ATURE SENSOR 2 <u>hspection</u> ".	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		
inspec Be sur- does n Be sur- work o Clearly touch f ilar iter Refer t CAUTION There is service p so in the 1.PREC WARNIN Shut off Remove	tion or maintenance of e to put the removed ot accidentally conne- e to wear insulating p in the high voltage sys- videntify the persons the vehicle. When not m to prevent other per- o <u>HBB-6, "High Voltage</u> o <u>HBB-6, "High Voltage</u> N: the possibility of a m olug is removed. Ther e Service Manual. CONDITIONING G: high voltage circuit. F Li-ion battery. Refer to >> GO TO 2. CK BATTERY TEMPER HBB-90, "Component In pection result normal?	of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ". alfunction occurring if the vehicle is change efore do not change the vehicle to READY s Refer to <u>GI-30, "How to Cut Off High Voltage"</u> HBB-188, "Removal and Installation". ATURE SENSOR 2 <u>nspection</u> ". ery controller. Refer to <u>HBB-200, "LI-ION BAT</u> "	n you so that another person nd glasses before beginning are that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do		

NO >> Replace battery temperature sensor. Refer to <u>HBB-195, "Exploded View"</u>.

HBB-89

P0AC7 HYBRID BATTERY TEMPERATURE SENSOR B

< DTC/CIRCUIT DIAGNOSIS >

Component Inspection

INFOID:000000008140973

1.CHECK BATTERY TEMPERATURE SENSOR 2

- 1. Remove battery temperature sensor. Refer to <u>HBB-188, "Exploded View"</u>.
- 2. Check resistance between battery temperature sensor 2 terminals.

Terminals	Condition		Resistance(k Ω)
		10°C (50°F)	Approx. 7.4
30 and 26	Temperature	25°C (77°F)	Approx. 4.0
		40°C (104°F)	Approx. 2.3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-188, "Exploded View"</u>.

P0AC8 HYBRID BATTERY TEMPERATURE SENSOR B

< DTC/CIRCUIT DIAGNOSIS >

P0AC8 HYBRID BATTERY TEMPERATURE SENSOR B

DTC Logic

INFOID:000000008140974

DTC DETECTION LOGIC

А

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	
POAC8HYBRID BATTERY TEMPERATUR SEN- SOR BWhen the voltage input value of the battery temperature sensor to the Li-ion battery controller remains extremely high for 2 seconds or more.• Li-ion battery controller • Battery temperature sensor 2 • Between Li-ion battery control- ler and battery temperature sensor harness				
	NFIRMATION PROC	CEDURE		
.PERFC	ORM DTC CONFIRMA	TION PROCEDURE		
WITH C Turn i Selec <u>P0AC8</u> ⁄ES >	CONSULT gnition switch ON and t "Self Diagnostic Res <u>detected?</u> > Refer to <u>HBB-91, "[</u>	I wait at least 10 seconds. ult" mode of "HV BAT" using CONSULT. <u>Diagnosis Procedure"</u> .		
-				
Jiagnos	is Procedure		INFOID:0000000814097	
mainten Be sure	correctly. Be sure to ance. to remove the serv	o follow the correct work procedures when ice plug in order to shut off the high voltage	performing inspection and ge circuits before performing	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to CAUTION There is t service play	correctly. Be sure to ance. to remove the serv ion or maintenance of to put the removed of accidentally connect to wear insulating p the high voltage sy identify the persons to prevent other pe <u>HBB-6, "High Voltage</u> the possibility of a m	o follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- t working, cover high voltage parts with an in rsons from contacting them.	n performing inspection and pe circuits before performing h you so that another person nd glasses before beginning ure that other persons do no nsulating cover sheet or sim	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch the ilar item Refer to CAUTION There is the service play to in the PRECO	correctly. Be sure to ance. to remove the serv ion or maintenance of to put the removed of accidentally connect to wear insulating p the high voltage sy identify the persons to prevent other pe <u>HBB-6, "High Voltage</u> the possibility of a m lug is removed. Ther Service Manual.	o follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- tworking, cover high voltage parts with an in rsons from contacting them. <u>ge Precautions</u> ".	a performing inspection and pe circuits before performing h you so that another person nd glasses before beginning ure that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do	
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mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to CAUTION There is t service pl to in the .PRECC VARNINC Shut off h	correctly. Be sure to ance. to remove the serv on or maintenance of to put the removed to accidentally connect to wear insulating p the high voltage sy identify the persons to prevent other pe <u>HBB-6, "High Voltage</u> the possibility of a m lug is removed. Ther Service Manual. DNDITIONING	b follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- tworking, cover high voltage parts with an in rsons from contacting them. ge Precautions". halfunction occurring if the vehicle is change refore do not change the vehicle to READY s	a performing inspection and pe circuits before performing h you so that another person nd glasses before beginning ure that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to AUTION here is t ervice pl to in the .PRECC VARNING Shut off h Remove L	correctly. Be sure to ance. to remove the service on or maintenance of to put the removed of accidentally connect to wear insulating p the high voltage sy identify the persons to vehicle. When not to prevent other pe <u>HBB-6, "High Voltage</u> the possibility of a m lug is removed. Ther Service Manual. DNDITIONING Secure Manual. DNDITIONING Secure Secure to Secure Secure Secure to Secure Secure Secure to Secure Secure Secure to Secure Secure Secur	o follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. ge Precautions". alfunction occurring if the vehicle is change refore do not change the vehicle to READY s	h performing inspection and pe circuits before performing h you so that another person nd glasses before beginning ure that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to de	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to CAUTION There is t service pl to in the .PRECO VARNING Shut off h Remove L	correctly. Be sure to ance. to remove the servi- to romaintenance of to put the removed of accidentally connec- to wear insulating p the high voltage sy- identify the persons to vehicle. When not to prevent other per- HBB-6, "High Voltage to prevent other per- service Manual. DNDITIONING to pattery. Refer to SGO TO 2. CONNECTION STA	b follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- tworking, cover high voltage parts with an in rsons from contacting them. ge Precautions". halfunction occurring if the vehicle is change refore do not change the vehicle to READY s	h performing inspection and pe circuits before performing h you so that another persor nd glasses before beginning ure that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to CAUTION There is t ervice pl to in the .PRECO NARNING Shut off h Remove L	correctly. Be sure to ance. to remove the service on or maintenance of to put the removed of accidentally connect to wear insulating p the high voltage sy identify the persons to vehicle. When not to prevent other pe <u>HBB-6, "High Voltage</u> the possibility of a m lug is removed. Ther Service Manual. DNDITIONING Service Manual. Service Manual. Se	b follow the correct work procedures when ice plug in order to shut off the high voltage of high voltage system harnesses and parts. service plug in your pocket and carry it with ect it while work is in progress. protective gear consisting of glove, shoes a stem. responsible for high voltage work and ensu- working, cover high voltage parts with an in rsons from contacting them. ge Precautions". alfunction occurring if the vehicle is change refore do not change the vehicle to READY s Refer to <u>GI-30, "How to Cut Off High Voltage HBB-188, "Removal and Installation"</u> .	h performing inspection and pe circuits before performing h you so that another persor nd glasses before beginning ure that other persons do no nsulating cover sheet or sim ed to READY status while the tatus unless instructed to do	
mainten Be sure inspecti Be sure does no Be sure work on Clearly touch th ilar item Refer to CAUTION here is t ervice pl o in the .PRECO VARNING Shut off h Remove L CHECH Check cor s the insp YES >	correctly. Be sure to ance. to remove the serv ion or maintenance of to put the removed to could the removed to operate the high voltage sy identify the persons to vear insulating p the high voltage sy identify the persons to prevent other per <u>HBB-6, "High Voltage</u> the possibility of a m lug is removed. Ther Service Manual. DNDITIONING Contrological contents is a GO TO 2. CONNECTION STAC	b follow the correct work procedures when the follow the correct work procedures when the plug in order to shut off the high voltage of high voltage system harnesses and parts, service plug in your pocket and carry it with ect it while work is in progress. The protective gear consisting of glove, shoes a stem. Tesponsible for high voltage work and ensure working, cover high voltage parts with an introns from contacting them. The precautions of the vehicle is changed and not change the vehicle to READY service do not change the vehicle do not change the vehicle to READY service do not change the vehicle	e circuits before performing h you so that another person nd glasses before beginning ure that other persons do not nsulating cover sheet or sim- ed to READY status while the tatus unless instructed to do	

3. CHECK BATTERY TEMPERATURE SENSOR 2

P0AC8 HYBRID BATTERY TEMPERATURE SENSOR B

< DTC/CIRCUIT DIAGNOSIS >

Refer to HBB-73. "Component Inspection".

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".
- NO >> Replace battery temperature sensor. Refer to <u>HBB-195</u>, "Exploded View".

Component Inspection

INFOID:000000008140976

1.CHECK BATTERY TEMPERATURE SENSOR 2

- 1. Remove battery temperature sensor. Refer to <u>HBB-188, "Exploded View"</u>.
- 2. Check resistance between battery temperature sensor 2 terminals.

Terminals	Condition		Resistance(k Ω)
		10°C (50°F)	Approx. 7.4
30 and 26	Temperature	25°C (77°F)	Approx. 4.0
		40°C (104°F)	Approx. 2.3

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace battery temperature sensor. Refer to <u>HBB-188, "Exploded View"</u>.

P0C6E HYBRID BATTERY TEMPERATURE SENSOR A/B

< DTC/CIRCUIT DIAGNOSIS >

P0C6E HYBRID BATTERY TEMPERATURE SENSOR A/B

DTC Logic

INFOID:000000008140977

DTC DETECTION LOGIC

А

DTC	Trouble diagnosis	DTC detecting condition	Possible causes
DIC	name	DTC detecting condition	FUSSIBLE CAUSES
P0C6E	HYBRID BATTERY TEMPERATUR SEN- SOR A/B	When there is a considerable temperature difference between battery temperature sensor 1 and 2 remains extremely.	 Li-ion battery controller Battery temperature sensor Clogged battery cooling path Between Li-ion battery controller and battery temperature sensor harness
	NFIRMATION PRO	CEDURE IATION PROCEDURE	
		ATON FROCEDORE	
1. Turn		d wait at least 10 seconds.	
	0	sult" mode of "HV BAT" using CONSULT.	
	$\frac{\text{detected?}}{\text{Refer to HBB-03}}$	"Diagnosis Procedure".	
	>> INSPECTION ENI		
Diagnos	sis Procedure		INFOID:00000008140978
mainter Be sure	nance. e to remove the ser	to follow the correct work procedures wi vice plug in order to shut off the high vol of high voltage system harnesses and par	tage circuits before performing
 Be sure does no 	e to put the remove ot accidentally conr	d service plug in your pocket and carry it v lect it while work is in progress. protective gear consisting of glove, shoes	vith you so that another person
 Clearly touch the ilar iten 	he vehicle. When no	s responsible for high voltage work and er ot working, cover high voltage parts with a ersons from contacting them.	
CAUTION		age Precautions".	
service p	the possibility of a i	age Precautions". malfunction occurring if the vehicle is chai erefore do not change the vehicle to READ	
service p so in the	the possibility of a line is removed. The	malfunction occurring if the vehicle is char erefore do not change the vehicle to READ	
service p so in the 1.PERF(the possibility of a lug is removed. The Service Manual. DRM SELF-DIAGNO CONSULT tt "Self Diagnostic Re k if the "P0A9E" or "F	malfunction occurring if the vehicle is char erefore do not change the vehicle to READ	Y status unless instructed to do

- YES >> Perform diagnosis procedure of applicable system.
- NO >> GO TO 2.

2.CHECK LI-ION BATTERY COOLING PATH FOR CLOGGING

Check the cooling path of the Li-ion battery for clogging (e.g. air suction opening, duct).

Is the inspection result normal?

YES >> GO TO 3.

P0C6E HYBRID BATTERY TEMPERATURE SENSOR A/B

< DTC/CIRCUIT DIAGNOSIS >

NO >> Remove obstacles or replace clogged part.

3. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 4.

4.CHECK BATTERY TEMPERATURE SENSOR

1. Check battery temperature sensor 1. Refer to HBB-71, "Component Inspection".

2. Check battery temperature sensor 2. Refer to HBB-90, "Component Inspection".

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.

NO >> Replace battery temperature sensor 1 or 2. Refer to <u>HBB-195, "Exploded View"</u>.

< DTC/CIRCUIT DIAGNOSIS >

P3030 CELL CONTROLLER LIN

DTC Logic

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INFOID:000000008140979

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3030	CELL CONTROLLER LIN	When a malfunction occurs in the communication system of the Li-ion battery controller.	 Li-ion battery controller Cell overdischarge Between Li-ion battery controller and cell harness or connector
FC CON	IFIRMATION PROCED	DURE	
.PERFO	RM DTC CONFIRMATIC	ON PROCEDURE	
. Select <u>P3030 d</u> YES >:	gnition switch ON and wa "Self Diagnostic Result"	mode of "HV BAT" using CONSULT.	
	is Procedure		
-			INFOID:000000081-
.PERFO	RM SELF-DIAGNOSIS-	1	
NO >: PERFO WITH Co heck if th P3374 d	 Perform diagnosis proc GO TO 2. RM SELF-DIAGNOSIS-2 ONSULT e "P3374 " is detected in letected? 	edure of applicable DTC. 2 "Self Diagnostic Result" of "HV BAT" edure of "P3374 ". Refer to <u>HBB-154, "D</u>	iagnosis Procedure"
	> GO TO 3.	Addre of 1 3374 . Refer to <u>1100-134. D</u>	agnosis i locedure.
CHECK	CELL VOLTAGE		
<u>s the inspe</u> When "D <i>I</i> When "D <i>I</i>	96 CELL VOLTAGE" in " ection result normal? ATA MONITOR" works no ATA MONITOR" works bu <u>"MODULE STACK : Dis</u>	DATA MONITOR" mode. prmally>>GO TO 4. ut has a malfunction>>Replace applicable sassembly and Assembly". t work>>Replace Li-ion battery. Refer to	
.PRECO	NDITIONING		
	igh voltage circuit. Refe	er to <u>GI-30, "How to Cut Off High Voltag</u> B-188, "Removal and Installation".	<u>ge"</u> .

>> GO TO 5.

5. CHECK HARNESS

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between Li-ion battery controller harness connector and cell (module) harness connector.

Madula Na				Li-ion batter	y controller	Continuity
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 1		1		50	
	Cell 3	LB8	3	LB3	51	
	Cell 5		5		52	
Module 1	Cell 7		7		53	Existed
	Cell 2		2		34	
	Cell 4	LB7	4	LB3	35	
	Cell 6		6		36	
	Cell 8		8		37	
	Cell 9		1		54	
	Cell 11	LB10 -	3	LB3	55	
	Cell 13		5		56	
Module 2	Cell 15		7		57	Existed
	Cell 10	- LB9 -	2		38	LXISIEU
	Cell 12		4	183	39	
	Cell 14		6	LB3	40	
	Cell 16		8		42	
	Cell 17	LB12	1	LB3 -	58	Existed
	Cell 19		3		59	
	Cell 21		5		60	
Module 3	Cell 23		7		61	
Module 3	Cell 18		2		43	
	Cell 20		4		44	
	Cell 22	- LB11 -	6		45	
	Cell 24		8		46	
	Cell 25		1	L D 2	62	
	Cell 27	LB14	3	LB3	63	
	Cell 29	LD14	5	1.54	77	
Module 4	Cell 31		7	LB4	78	Eviated
Module 4	Cell 26		2	I D2	47	Existed
	Cell 28	LB13	4	LB3 -	48	
	Cell 30	LDIS	6	LB4	65	
	Cell 32		8	LD4	66	
	Cell 33		1		80	
	Cell 35	LB16	3	LB4	81	
	Cell 37		5		82	
Modulo 5	Cell 39		7		83	Evictor
Module 5	Cell 34		2		69	Existed
	Cell 36		4		70	
	Cell 38	- LB15 -	6	LB4	71	
	Cell 40	1	8		72	

< DTC/CIRCUIT DIAGNOSIS >

Madula Na		Mo	dule	Li-ion batte	ry controller	Continuity		
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 41		1		84			
	Cell 43		3		85	-		
	Cell 45	LB18	5	LB4	86	-		
	Cell 47	_	7	87 Exi				
Module 6	Cell 42		2		73	Existed		ŀ
	Cell 44	LB17	4		74			
	Cell 46		6	LB4	75	-		
	Cell 48	_	8		76	-		
	Cell 49		1		110		-	
	Cell 51 3 111	111						
	Cell 53	LB20	5	LB5	112			
	Cell 55	-	7		113			
Module 7	Cell 50		2		90	Existed		
	Cell 52		4		91	-		
	Cell 54	LB19	6	LB5	92	-		
	Cell 56	-	8	93				
	Cell 57		1		114	-	-	
	Cell 59		3		115			
	Cell 61	- LB22	5	LB5	116			
	Cell 63	_	7	-	117			
Module 8	Cell 58		2		94	Existed		
	Cell 60		4		95			
	Cell 62	LB21	6	LB5	96	-		
	Cell 64	_	8	-	97			
	Cell 65	LB24	1		118	-	-	
	Cell 67		3	LB5	119			
	Cell 69		5		120			
	Cell 71	_	7	-	121			
Module 9	Cell 66		2		99	Existed		
	Cell 68		4		100			
	Cell 70	LB23	6	LB5	101			
	Cell 72		8		102			
	Cell 73		1		122		-	
	Cell 75	- -	3		123			
	Cell 77	LB26	5	LB5	124			
	Cell 79		7		125			
Module 10	Cell 74		2		103	Existed		
	Cell 76		4		104			
	Cell 78	LB25	6	LB5	105			
	Cell 80	-	8		106	4		

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Mo	dule	Li-ion batte	ry controller	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal		
	Cell 81		1	– LB5	127		
	Cell 83	LB28	3		128		
Module 11	Cell 85	LD20	5	LB6	137		
	Cell 87		7	LDU	138	Existed	
	Cell 82		2	LB5	107	Existed	
	Cell 84	LB27 -	4	LDJ	108		
	Cell 86		6	LB6	130		
	Cell 88		8		131		
	Cell 89	LB30	1	LB6	140		
	Cell 91		3		141		
	Cell 93	LD30	5		142		
Module 12	Cell 95		7		143	Existed	
Module 12	Cell 90		2		132	Existed	
	Cell 92	LB29	4	LB6	133		
	Cell 94	LD29	6	LDU	134		
	Cell 96		8		135		

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

NO >> Repair harness or connector.

P3031 - P303C CELL CONTROLLER ASIC

< DTC/CIRCUIT DIAGNOSIS >

P3031 - P303C CELL CONTROLLER ASIC

DTC Logic

INFOID:000000008140981

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DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes			
P3031	CELL CONTROLLER ASIC1			HE		
P3032	CELL CONTROLLER ASIC2					
P3033	CELL CONTROLLER ASIC3			Г		
P3034	CELL CONTROLLER ASIC4					
P3035	CELL CONTROLLER ASIC5	Li-ion battery controller				
P3036	CELL CONTROLLER ASIC6	When a malfunction occurs in the communication	Cell overdischarge	E		
P3037	CELL CONTROLLER ASIC7	system of the Li-ion battery controller. Between Li-ion battery controlle and cell harness or connector				
P3038	CELL CONTROLLER ASIC8		and centramess of connector	-		
P3039	CELL CONTROLLER ASIC9			F		
P303A	CELL CONTROLLER ASIC10					
P303B	CELL CONTROLLER ASIC11					
P303C	CELL CONTROLLER ASIC12					
. Turr . Sele	CONSULT n ignition switch ON and wa ect "Self Diagnostic Result" <u>1-P303C detected?</u> >> Refer to <u>HBB-99, "Diag</u> >> INSPECTION END	mode of "HV BAT" using CONSULT.		,		
-	osis Procedure					
-			INFOID:00000008140982	ŀ		
.PERI	FORM SELF-DIAGNOSIS					
. Sele		mode of "HV BAT" using CONSULT. d in "Self Diagnostic Result" of "HV BAT".		L		
<u>8 P3030</u> YES NO		edure of "P3030". Refer to <u>HBB-95, "Diagn</u> controller. Refer to <u>HBB-200, "LI-ION BAT</u>		ľ		
	sembly and Assembly".			ľ		
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P303D - P3048 CELL CONTROLLER ASIC

< DTC/CIRCUIT DIAGNOSIS >

P303D - P3048 CELL CONTROLLER ASIC

DTC Logic

INFOID:000000008140983

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P303D	CELL CONTROLLER ASIC13		
P303E	CELL CONTROLLER ASIC14		
P303F	CELL CONTROLLER ASIC15		
P3040	CELL CONTROLLER ASIC16		
P3041	CELL CONTROLLER ASIC17	When a malfunction occurs in the communication system of the Li-ion battery controller.	 Li-ion battery controller
P3042	CELL CONTROLLER ASIC18		Cell overdischarge
P3043	CELL CONTROLLER ASIC19		Between Li-ion battery controller and cell harness or connector
P3044	CELL CONTROLLER ASIC20		
P3045	CELL CONTROLLER ASIC21		
P3046	CELL CONTROLLER ASIC22		
P3047	CELL CONTROLLER ASIC23		
P3048	CELL CONTROLLER ASIC24		

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P303D-P3048 detected?

- YES >> Refer to HBB-100. "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

(I) WITH CONSULT

- 1. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.
- 2. Check if the "P3030" is detected in "Self Diagnostic Result" of "HV BAT".

Is P3030 detected?

- YES >> Perform diagnosis procedure of "P3030". Refer to HBB-95, "Diagnosis Procedure".
- NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and <u>Assembly</u>".

INFOID:000000008140984

< DTC/CIRCUIT DIAGNOSIS >

P3049 - P3054 CELL CONTROLLER ASIC VOLTAGE

DTC Logic

INFOID:000000008140985

DTC DETECTION LOGIC

DTC	Trouble diagnosis nome		Dessible severe	
DTC	Trouble diagnosis name CELL CONTROLLER ASIC1 VOLTAGE	DTC detecting condition	Possible causes	HBB
P3049 P304A	CELL CONTROLLER ASICT VOLTAGE			
P304A	CELL CONTROLLER ASIC2 VOLTAGE			
P304D	CELL CONTROLLER ASICS VOLTAGE			D
P304C	CELL CONTROLLER ASIC4 VOLTAGE			
P304D	CELL CONTROLLER ASICS VOLTAGE		 Li-ion battery controller 	Е
P304E	CELL CONTROLLER ASICT VOLTAGE	When an A/D value by the A/D converter of the Li- ion battery controller is abnormal.	 Cell overdischarge 	
P3050	CELL CONTROLLER ASIC8 VOLTAGE		Cell overcharge	
P3051	CELL CONTROLLER ASICS VOLTAGE			F
P3052	CELL CONTROLLER ASICIO VOLTAGE			
P3053	CELL CONTROLLER ASIC11 VOLTAGE			0
P3054	CELL CONTROLLER ASIC12 VOLTAGE			G
				i
	ONFIRMATION PROCEDURE			Н
I.PER	FORM DTC CONFIRMATION PROC	CEDURE		
-	CONSULT			
	n ignition switch ON and wait at leas ect "Self Diagnostic Result" mode of			
	9-P3054 detected?	The BAT dailing CONSOLT.		
YES	>> Refer to <u>HBB-101, "Diagnosis F</u>	Procedure".		J
NO	>> INSPECTION END	<u></u>		
Diagno	osis Procedure		INFOID:00000008140986	K
1.PERI	FORM SELF-DIAGNOSIS-1			
(B)WITH	CONSULT			L
Select "	Self Diagnostic Result" mode of "EV	/HEV" and "MOTOR CONTROL" using CC	NSULT.	
	detected?			
YES NO	>> Perform diagnosis procedure of >> GO TO 2.	applicable DTC.		M
^	FORM SELF-DIAGNOSIS-2			
				N
	CONSULT the "P3374" is detected in "Self Dia	anostic Result" of "HV BAT".		14
	4 detected?	5		
YES	>> Perform diagnosis procedure of	"P3374". Refer to HBB-154, "Diagnosis Pi	rocedure".	0
NO	>> GO TO 3.			
3.CHE	CK CELL VOLTAGE			Ρ
	CONSULT 01-96 CELL VOLTAGE" in "DATA M	ONITOR" mode.		
	spection result normal?			
When	voltage is measurable and normal>>	GO TO 4. ELi-ion battery controller, harness and app	licable module.	
	CK HARNESS			

А

В

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between Li-ion battery controller harness connector and cell (module) harness connector.

Madula Na	Calling	Module		Li-ion battery controller		Continuity
Module No.	Cell no.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 1		1		50	
	Cell 3	LB8	3	LB3	51	Existed
	Cell 5	LDO	5		52	
Module 1	Cell 7		7		53	
	Cell 2		2		34	Existed
	Cell 4	LB7	4	LB3	35	
	Cell 6		6		36	
	Cell 8		8		37	
	Cell 9		1		54	
	Cell 11	LB10	3	LB3	55	
	Cell 13	LDIV	5		56	
Module 2	Cell 15		7		57	Existed
	Cell 10		2		38	LAISIEU
	Cell 12	LB9	4	LB3	39	
	Cell 14		6		40	
	Cell 16		8		42	
	Cell 17		1	- LB3 -	58	Existed
	Cell 19	LB12	3		59	
	Cell 21	LDTZ	5		60	
Module 3	Cell 23		7		61	
would 5	Cell 18		2	- LB3 -	43	
	Cell 20	LB11	4		44	
	Cell 22		6		45	
	Cell 24		8		46	
	Cell 25		1	LB3	62	Existed
	Cell 27	LB14	3		63	
	Cell 29		5		77	
Module 4	Cell 31		7		78	
Module 4	Cell 26		2	LB3	47	
	Cell 28	LB13	4		48	
	Cell 30		6	LB4	65	
	Cell 32		8	LD4	66	
	Cell 33		1		80	
	Cell 35	LB16	3		81	
	Cell 37		5	LB4	82	
Module 5	Cell 39		7] [83	Evictod
MOUULE 3	Cell 34		2		69	Existed
	Cell 36	LB15	4	LB4	70	
	Cell 38		6		71	
	Cell 40		8	1	72	

< DTC/CIRCUIT DIAGNOSIS >

Madula Na	Collins	Module		Li-ion battery controller		Continuity	-
Module No.	Cell no.	Connector	Terminal	Connector	Terminal	Continuity	А
	Cell 41		1		84		
	Cell 43	LB18 -	3	LB4	85		В
Module 6	Cell 45		5		86		
	Cell 47		7		87	Existed	
Module 0	Cell 42		2		73	LAISteu	HBB
	Cell 44	LB17	4	LB4	74		
	Cell 46	LDT/	6	LD4	75		D
	Cell 48		8		76		
	Cell 49		1		110		
	Cell 51	LB20	3	LB5	111		Е
	Cell 53	LDZU	5	LDJ	112		
Module 7	Cell 55		7		113	Existed	F
	Cell 50		2		90	LABICU	
	Cell 52	LB19	4	LB5	91		
	Cell 54	LD13	6	LDJ	92		G
	Cell 56		8		93		
	Cell 57		1		114		Н
	Cell 59	LB22	3	LB5	115		П
	Cell 61		5		116		
Module 8	Cell 63		7		117	Existed	
Module 0	Cell 58	LB21	2	- LB5 -	94	LAISteu	
	Cell 60		4		95		
	Cell 62	LDZT	6		96		J
	Cell 64		8		97		
	Cell 65		1		118		K
	Cell 67	LB24	3	LB5	119		
	Cell 69	LDZ4	5	LDJ	120		
Module 9	Cell 71		7		121	Existed	L
Module 5	Cell 66		2		99	LABICU	
	Cell 68	LB23	4	LB5	100		Μ
	Cell 70	LD20	6	LDJ	101		
	Cell 72		8		102		
	Cell 73		1		122		Ν
	Cell 75	LB26	3	LB5	123		
	Cell 77		5		124		0
Module 10	Cell 79		7		125	Existed	0
	Cell 74		2		103	LAISIEU	
	Cell 76	LB25	4	LB5	104		Ρ
	Cell 78	LDZO	6	LDJ	105		
	Cell 80		8		106		

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell no.	Mo	dule	Li-ion battery controller		Continuity
would no.	Cell IIO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 81		1	LB5	127	
	Cell 83	LB28	3	LDJ	128	
	Cell 85	LD20	5	LB6	137	
Module 11	Cell 87		7	LDU	138	Existed
	Cell 82		2	LB5	107	Existed
	Cell 84	LB27	4	LDJ	108	
	Cell 86		6	LB6	130	
	Cell 88		8		131	
	Cell 89	LB30	1	LB6	140	Existed
	Cell 91		3		141	
	Cell 93		5		142	
Module 12	Cell 95		7		143	
Module 12	Cell 90		2		132	
	Cell 92	LB29	4	LB6	133	
	Cell 94		6		134	
	Cell 96		8		135	

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

NO >> Repair harness or connector.

DTC detecting condition

< DTC/CIRCUIT DIAGNOSIS >

P3055 - P3060 CELL CONTROLLER ASIC VOLTAGE

DTC Logic

DTC

INFOID:000000008140987

Possible causes

DTC DETECTION LOGIC

Trouble diagnosis name

	В
	HBB
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ller	E

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DIC	l rouble diagnosis name	DIC detecting condition	Possible causes							
P3055	CELL CONTROLLER ASIC13 VOLTAGE			HBB						
P3056	CELL CONTROLLER ASIC14 VOLTAGE									
P3057	CELL CONTROLLER ASIC15 VOLTAGE			D						
P3058	CELL CONTROLLER ASIC16 VOLTAGE			D						
P3059	CELL CONTROLLER ASIC17 VOLTAGE									
P305A	CELL CONTROLLER ASIC18 VOLTAGE	Li-ion battery controllerCell overdischarge	Е							
P305B	P305B CELL CONTROLLER ASIC19 VOLTAGE battery controller is abnormal. • Cell overcharg									
P305C	CELL CONTROLLER ASIC20 VOLTAGE			F						
P305D	CELL CONTROLLER ASIC21 VOLTAGE			Г						
P305E	CELL CONTROLLER ASIC22 VOLTAGE									
P305F	CELL CONTROLLER ASIC23 VOLTAGE			G						
P3060	CELL CONTROLLER ASIC24 VOLTAGE									
DTC CC	ONFIRMATION PROCEDURE			Н						
1.PERI	FORM DTC CONFIRMATION PRO	CEDURE		П						
1. Turr	CONSULT n ignition switch ON and wait at leas ect "Self Diagnostic Result" mode of			I						
<u>ls P305</u>	5P3060 detected?	-								
YES NO	>> Refer to <u>HBB-105, "Diagnosis I</u> >> INSPECTION END	Procedure".		J						
Diagno	osis Procedure		INFOID:00000008140988	IZ.						
1.PERI	FORM SELF-DIAGNOSIS-1			K						
	CONSULT			L						
	-	<pre>//HEV" and "MOTOR CONTROL" using CON</pre>	NSULT.							
<u>IS DIC (</u> YES	<u>detected?</u>	f applicable DTC		ЪЛ						
NO	>> Perform diagnosis procedure o >> GO TO 2.	applicable DTC.		M						
2.peri	FORM SELF-DIAGNOSIS-2									
	CONSULT the "P3374" is detected in "Self Dia	agnostic Result" of "HV BAT".		Ν						
<u>ls P3374</u>	4 detected?			0						
YES NO	>> Refer to <u>HBB-154, "Diagnosis I</u> >> GO TO 3.	Procedure".		0						
-	CK CELL VOLTAGE			Р						
	CONSULT 01-96 CELL VOLTAGE" in "DATA M	ONITOR" mode.								
Is the in:	spection result normal?									
	voltage is measurable and normal>: voltage is not measurable>>Replac	>GO TO 4. e Li-ion battery controller, harness and appli	cable module.							
1		,, ,,								

4.CHECK HARNESS

< DTC/CIRCUIT DIAGNOSIS >

Check continuity between Li-ion battery controller harness connector and cell (module) harness connector.

Madula Na	Qall ras	Module		Li-ion battery controller		Continuity
Module No.	Cell no.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 1		1		50	
	Cell 3	LB8	3	LB3	51	
	Cell 5		5		52	
Module1	Cell 7		7		53	Eviated
Module	Cell 2		2		34	Existed
	Cell 4	LB7	4	LB3	35	
	Cell 6		6		36	
	Cell 8		8		37	
	Cell 9		1		54	
	Cell 11		3		55	
	Cell 13	LB10 -	5	- LB3 -	56	
MadulaQ	Cell 15		7		57	Existed
Module2	Cell 10		2		38	Existed
	Cell 12		4	1.00	39	
	Cell 14	LB9	6	LB3 -	40	
	Cell 16		8		42	
	Cell 17	LB12	1	- LB3 -	58	Existed
	Cell 19		3		59	
	Cell 21		5		60	
M	Cell 23		7		61	
Module3	Cell 18		2	- LB3 -	43	
	Cell 20	LB11	4		44	
	Cell 22		6		45	
	Cell 24		8		46	
	Cell 25		1		62	Existed
	Cell 27		3	LB3	63	
	Cell 29	LB14	5	LB4	77	
NA	Cell 31		7		78	
Module4	Cell 26		2	1.50	47	
	Cell 28		4	LB3	48	
	Cell 30	LB13 -	6		65	
	Cell 32		8	LB4	66	
	Cell 33		1		80	Existed
	Cell 35		3		81	
	Cell 37	LB16 -	5	LB4	82	
Modula	Cell 39		7		83	
Module5	Cell 34		2		69	
	Cell 36		4		70	
	Cell 38	LB15 -	6	LB4	71	
	Cell 40		8		72	

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Callina	Module		Li-ion battery controller		Continuity	
Module No.	Cell no.	Connector	Terminal	Connector	Terminal	Continuity	А
	Cell 41		1		84		
	Cell 43	LB18	3	LB4	85		В
-	Cell 45	LDTO	5		86		
Module6	Cell 47		7		87	Existed	
Moduleo	Cell 42		2		73	LAISIEU	HBI
	Cell 44	LB17	4	LB4	74		
	Cell 46		6	LD4	75		D
	Cell 48		8		76		
	Cell 49		1		110		
	Cell 51	LB20	3	LB5	111		E
	Cell 53	LDZU	5		112		
Module7	Cell 55		7		113	Existed	F
WOULIE?	Cell 50		2		90		1
	Cell 52	LB19	4	LB5	91		
	Cell 54	LDIA	6	LDO	92		G
	Cell 56	-	8		93		
	Cell 57		1	- LB5	114		
	Cell 59	LB22	3		115		Н
	Cell 61	LBZZ	5		116		
Module8	Cell 63	-	7		117	Existed	
wouleo	Cell 58	LB21	2	- LB5 -	94	EXISIEU	
	Cell 60		4		95		
	Cell 62		6		96		J
	Cell 64	-	8		97		
	Cell 65		1		118		K
	Cell 67	1004	3		119		
	Cell 69	LB24	5	LB5	120	-	
Module9	Cell 71	-	7		121	- Eviated	L
wodulea	Cell 66		2		99	Existed	
	Cell 68	LB23	4	LB5	100		M
	Cell 70	LDZJ	6	LDO	101		IVI
	Cell 72	-	8		102		
	Cell 73		1		122		Ν
	Cell 75	LDOC	3		123		
	Cell 77	- LB26	5	LB5	124		0
Madulato	Cell 79	-	7		125	- Eviated	0
Module10	Cell 74		2		103	Existed	
	Cell 76	L DOC	4		104	1	Ρ
	Cell 78	- LB25	6	LB5	105	1	
	Cell 80	-	8		106	1	

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell no.	Mo	dule	Li-ion battery controller		Continuity
Module No.	Cell IIO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 81		1	LB5	127	
	Cell 83	LB28	3	LDJ	128	
	Cell 85	LD20	5	LB6	137	
Module11	Cell 87		7	LDO	138	Evictod
ModuleTT	Cell 82		2	LB5	107	Existed
	Cell 84	LB27	4	LDJ	108	
	Cell 86		6	LB6	130	
	Cell 88		8		131	
	Cell 89	LB30	1	LB6	140	Existed
	Cell 91		3		141	
	Cell 93		5		142	
Module12	Cell 95		7		143	
Module12	Cell 90		2		132	
	Cell 92	LB29	4	LB6	133	
	Cell 94		6		134	
	Cell 96		8		135	

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

NO >> Repair harness or connector.

P3061 CELL BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P3061 CELL BATTERY VOLTAGE

DTC Logic

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INFOID:000000008140989

В

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3061	CELL BATTERY VOLTAGE	When overcharge is detected in the Li-ion battery con- troller or a malfunction is detected in the overdischarge detection circuit.	Li-ion battery controller
C CO	NFIRMATION PROCE	DURE	
PERF	ORM DTC CONFIRMAT	ION PROCEDURE	
WITH (CONSULT		
Turn	ignition switch ON and w		
	ignition switch OFF and ignition switch ON and w	wait at least 60 seconds. /ait at least 10 seconds.	
Selec	t "Self Diagnostic Result	" mode of "HV BAT" using CONSULT.	
	detected?		
	>> Refer to <u>HBB-109, "D</u> >> INSPECTION END	lagnosis Procedure.	
aano	sis Procedure		INFOID:000000081409
•			
R : Dis	assembly and Assembly	e Li-ion battery controller. Refer to <u>HBB-200, "L</u> <u>"</u> .	I-ION BATTERY CONTROL

< DTC/CIRCUIT DIAGNOSIS >

P3062 BYPASS SWITCH

DTC Logic

INFOID:000000008140991

INFOID:000000008140992

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3062	BYPASS SWITCH	When a malfunction is detected in the Li-ion battery con- troller circuit (bypass switch).	 Li-ion battery controller Between Li-ion battery controller and cell harness or connector

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I)WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 60 seconds.
- 3. Turn ignition switch ON and wait at least 10 seconds.
- 4. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P3062 detected?

- YES >> Refer to <u>HBB-110</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

Check if the "P3374" or "P308B-P30A2" is detected in "Self Diagnostic Result" of "HV BAT".

Is P3374 or P308B-P30A2 detected?

- YES >> Perform diagnosis procedure of applicable DTC.
- NO >> Replace Li-ion battery (battery pack). Refer to <u>HBB-188, "Removal and Installation"</u>.

P308B - P3096 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

P308B - P3096 CELL CONTROLLER ASIC OPEN

DTC Logic

INFOID:000000008140993

А

В

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes							
P308B	CELL CONTROLLER ASIC1 OPEN			HBB						
P308C	CELL CONTROLLER ASIC2 OPEN									
P308D	CELL CONTROLLER ASIC3 OPEN			D						
P308E	CELL CONTROLLER ASIC4 OPEN			D						
P308F	CELL CONTROLLER ASIC5 OPEN									
P3090	CELL CONTROLLER ASIC6 OPEN	When a cell voltage recognized by the Li-ion battery controller is lower than 1.25 V or higher	Li-ion battery controllerBetween Li-ion battery controller	E						
P3091	CELL CONTROLLER ASIC7 OPEN	than 4.65 V.	and cell harness or connector							
P3092	CELL CONTROLLER ASIC8 OPEN			F						
P3093	CELL CONTROLLER ASIC9 OPEN			Г						
P3094	CELL CONTROLLER ASIC10 OPEN									
P3095	CELL CONTROLLER ASIC11 OPEN			G						
P3096	CELL CONTROLLER ASIC12 OPEN									
DTC CC	ONFIRMATION PROCEDURI	Ξ		Н						
1. PERI	FORM DTC CONFIRMATION P	ROCEDURE								
1. Turr 2. Sele	CONSULT n ignition switch ON and wait at ect "Self Diagnostic Result" mod			I						
<u>IS P3081</u> YES NO										
Diagno	Diagnosis Procedure									

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off 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
 ^N before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the "P3049-P3060" is detected in "Self Diagnostic Result" of "EV/HEV".

HBB-111

Ρ

P308B - P3096 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

Is P3049-P3060 detected?

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

2.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 3.

3. CHECK CELL VOLTAGE DETECTION HARNESS

Refer to below table and check connection status of connectors and continuity between Li-ion battery controller and Module, according to detected DTC.

DTC	Trouble diagnosis	Cell detection voltage	Мо	dule	Li-ion batte	ry controller	Continuity
DIC	name	harness	Connector	Terminal	Connector	Terminal	Continuity
			—	High voltage harness of Module 1		33	
P308B	CELL CONTROLLER	Cell 1-4 voltage detec-	LB8	1	LB3	50	Existed
1 0000	ASIC1 OPEN	tion harness	LB7	2	LDO	34	Existed
			LB8	3		51	
			LB7	4		35	
			LB7	4		35	
			LB8	5		52	
P308C	CELL CONTROLLER ASIC2 OPEN	Cell 5-8 voltage detec- tion harness	LB7	6	LB3	36	Existed
	ACIOZ OF EN	lion namess	LB8	7		53	
			LB7	8		37	
		Cell 9-12 voltage detec- tion harness	LB7	8		37	Existed
	CELL CONTROLLER ASIC3 OPEN		LB10	1	LB3	54	
P308D			LB9	2		38	
			LB10	3		55	
			LB9	4		39	
			LB9	4		39	Existed
			LB10	5	LB3	56	
P308E	CELL CONTROLLER ASIC4 OPEN	Cell 13-16 voltage de- tection harness	LB9	6		40	
	Action of Ell	lection namess	LB10	7		57	
			LB9	8		42	
			LB9	8		42	
			LB12	1		58	
P308F	CELL CONTROLLER ASIC5 OPEN	Cell 17-20 voltage de- tection harness	LB11	2	LB3	43	Existed
			LB12	3		59	
			LB11	4		44	
			LB11	4		44	
			LB12	5		60	
P3090	CELL CONTROLLER ASIC6 OPEN	Cell 21-24 voltage de- tection harness	LB11	6	LB3	45	Existed
			LB12	7		61	
			LB11	8		46	

P308B - P3096 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

DTO	Trouble diagnosis	Cell detection voltage	Mo	dule	Li-ion batte	ry controller	Orationity	-	
DTC	name	harness	Connector	Terminal	Connector	Terminal	Continuity	А	
			LB11	8		46		_	
			LB14	1		62		В	
P3091	CELL CONTROLLER ASIC7 OPEN	Cell 25-28 voltage de- tection harness	LB13	2	LB3	47	Existed		
			LB14	3		63			
			LB13	4		48		HB	
			LB13	4	LB3	48		-	
			LB14	5		77		D	
P3092	CELL CONTROLLER ASIC8 OPEN	Cell 29-32 voltage de- tection harness	LB13	6		65	Existed		
			LB14	7	LB4	78			
			LB13	8		66		E	
			LB13	8		66		_	
			LB16	1	LB4	-	80		F
P3093	CELL CONTROLLER ASIC9 OPEN	Cell 33-36 voltage de- tection harness	LB15	2		69	Existed		
			LB16	3		81			
			LB15	4		70		G	
			LB15	4			70		-
			LB16	5		82			
P3094	CELLCONTROLLER ASIC10 OPEN	Cell 37-40 voltage de- tection harness	LB15	6	LB4	71	Existed	F	
	Action of En		LB16	7		83			
			LB15	8		72			
			LB15	8		72		_	
			LB18	1		84			
P3095	CELLCONTROLLER ASIC11 OPEN	Cell 41-44 voltage de- tection harness	LB17	2	LB4	73	Existed	J	
	AGIOTT OF EN		LB18	3	-	85			
			LB17	4		74		K	
			LB17	4		74		_	
			LB18	5	+	86			
P3096	CELLCONTROLLER ASIC12 OPEN	Cell 45-48 voltage de- tection harness	LB17	6	LB4	75 Exist	Existed	L	
	ASIC12 OPEN		LB18	7	87	87			
			LB17	8		76		N	

Is the inspection result normal?

YES >> Replace Li-ion battery controller. Refer to HBB-200, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly".>> Replace cell voltage detection harness.

NO

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P3097 - P30A2 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

P3097 - P30A2 CELL CONTROLLER ASIC OPEN

DTC Logic

INFOID:000000008140995

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3097	CELL CONTROLLER ASIC13 OPEN		
P3098	CELL CONTROLLER ASIC14 OPEN		
P3099	CELL CONTROLLER ASIC15 OPEN		
P309A	CELL CONTROLLER ASIC16 OPEN		
P309B	CELL CONTROLLER ASIC17 OPEN		
P309C	CELL CONTROLLER ASIC18 OPEN	When a cell voltage recognized by the Li-ion battery controller is lower than 1.25 V or higher	 Li-ion battery controller Between Li-ion battery controller
P309D	CELL CONTROLLER ASIC19 OPEN		and cell harness or connector
P309E	CELL CONTROLLER ASIC20 OPEN		
P309F	CELL CONTROLLER ASIC21 OPEN	N	
P30A0	CELL CONTROLLER ASIC22 OPEN		
P30A1	CELL CONTROLLER ASIC23 OPEN		
P30A2	CELL CONTROLLER ASIC24 OPEN		

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P3097-P30A2 detected?

- YES >> Refer to HBB-114, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008140996

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the "P3049-P3060" is detected in "Self Diagnostic Result" of "EV/HEV".

HBB-114

P3097 - P30A2 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

Is P3049-P3060 detected?

YES >> Perform diagnosis procedure of applicable DTC.

NO >> GO TO 2.

2. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 3.

3.CHECK CELL VOLTAGE DETECTION HARNESS

Refer to below table and check connection status of connectors and continuity between Li-ion battery controller and Module, according to detected DTC.

DTC	Trouble diagnosis	Cell detection	Moc	lule	Li-ion batter	y controller	Continuity
טוט	name	voltage harness	Connector	Terminal	Connector	Terminal	Continuity
			LB17	8	LB4	76	
		Cell 49-52 volt-	LB20	1		110	
3097	CELL CONTROLLER ASIC13 OPEN	age detection	LB19	2	LB5	90	Existed
		harness	LB20	3	LDO	111	
			LB19	4		91	
			LB19	4		91	
		Cell 53-56 volt-	LB20	5		112	
P3098	CELL CONTROLLER ASIC14 OPEN	age detection	LB19	6	LB5	92	Existed
		harness	LB20	7		113	
			LB19	8		93	
			LB19	8		93	Existed
		Cell 57-60 volt- age detection harness	LB22	1	LB5	114	
P3099	CELL CONTROLLER ASIC15 OPEN		LB21	2		94	
			LB22	3		115	
			LB21	4		95	
			LB21	4		95	
		Cell 61-64 volt-	LB22	5		116	
309A	CELL CONTROLLER ASIC16 OPEN	age detection	LB21	6	LB5	96	Existed
		harness	LB22	7	_	117	-
			LB21	8		97	
			LB21	8		97	
		Cell 65-68 volt-	LB24	1		118	
309B	CELL CONTROLLER ASIC17 OPEN	age detection	LB23	2	LB5	99	Existed
		harness	LB24	3		119	
			LB23	4		100	
			LB23	4		100	
		Cell 69-72 volt-	LB24	5		120	
309C	CELL CONTROLLER ASIC18 OPEN	age detection	LB23	6	LB5	101	Existed
		harness	LB24	7		121	
			LB23	8		102	1

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P3097 - P30A2 CELL CONTROLLER ASIC OPEN

< DTC/CIRCUIT DIAGNOSIS >

DTO	Trouble diagnosis	Cell detection	Мо	dule	Li-ion batte	ry controller	Continuity	
DTC	name	voltage harness	Connector	Terminal	Connector	Terminal	Continuity	
			LB23	8		102		
P309D	CELL CONTROLLER ASIC19 OPEN	Cell 73-76 volt-	LB26	1		122		
		age detection	LB25	2	LB5	103	Existed	
		harness	LB26	3		123		
			LB25	4		104		
			LB25	4		104		
		Cell 77-80 volt-	LB26	5		124	-	
P309E	CELL CONTROLLER ASIC20 OPEN	age detection	LB25	6	LB5	105	Existed	
		harness	LB26	7		125	-	
			LB25	8	-	106	-	
			LB25	8		106		
	CELL CONTROLLER ASIC21 OPEN		Cell 81-84 volt-	LB28	1	-	127	
P309F		age detection harness	LB27	2	LB5	107	Existed	
			LB28	3		128		
			LB27	4		108		
			LB27	4	LB5	108		
		Cell 85-88 volt-	LB28	5		137	Existed	
P30A0	CELLCONTROLLER ASIC22 OPEN	age detection	LB27	6	- LB6	130		
		harness	LB28	7		138		
			LB27	8		131		
			LB27	8		131		
		Cell 89-92 volt-	LB30	1		140		
P30A1	CELLCONTROLLER ASIC23 OPEN	age detection	LB29	2	LB6	132	Existed	
	AGIOZO OI EN	harness	LB30	3		141		
			LB29	4		133	-	
			LB29	4		133		
		Cell 93-96 volt-	LB30	5	LB6	142	Existed	
P30A2	CELLCONTROLLER ASIC24 OPEN	age detection	LB29	6		134		
	AGIOZ4 OF LIN	harness	LB30	7		143		
			LB29	8		135		

Is the inspection result normal?

>> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas-</u> YES sembly and Assembly".
>> Replace cell voltage detection harness.

NO

P30D0 SOC RATIONALITY

< DTC/CIRCUIT DIAGNOSIS >

P30D0 SOC RATIONALITY

DTC Logic

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INFOID:000000008140997

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30D0	SOC RATIONALITY	A lapse of 5.1 seconds after the difference between the amount of change in the integrated current value and in SOC exceeds the specified value.	Li-ion battery ((Malfunction in SOC arithmetic logic)
	NFIRMATION PROCE	DURE	
	ORM DTC CONFIRMAT		
	CONSULT	de of "HV BAT" using CONSULT."	
	the vehicle, according to		
_			
		9. "DIAGNOSIS DESCRIPTION : Driving Pattern"	
	detected?		
′ES > NO >	>> Refer to <u>HBB-117, "D</u> >> INSPECTION END	lagnosis Procedure".	
	sis Procedure		
aynu			INFOID:0000000814099
	s DTC is detected, repla	ace Li-ion battery (battery pack). Refer to HBB-	188, "Removal and Installa
<u>n"</u> .			

< DTC/CIRCUIT DIAGNOSIS >

P30EF INTERNAL RESISTANCE

DTC Logic

INFOID:000000008140999

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30EF	INTERNAL RESISTANCE	When the Li-ion battery internal resistance becomes high.	 Li-ion battery controller Li-ion battery DC/DC junction box Service plug

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 15 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30EF detected?

- YES >> Refer to <u>HBB-118</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008141000

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1. CHECK CONNECTION STATUS OF SERVICE PLUG

Check the connection of service plug.

Is the inspection result normal?

- YES >> GO TO 2.
- NO >> Repair the connection of harness.

2.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

 $\mathbf{3}$. CHECK CONNECTION STATUS OF BUS BAR

Check the connection of bus bar.

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair the connection of harness.

4. CHECK THE CONNECTION OF ALL WIRING RELATED TO HIGH VOLTAGE

Check the connection of all wiring related to high voltage.

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the connection of harness.

5.CHECK CELL VOLTAGE DETECTION HARNESS

Check continuity between Li-ion battery controller harness connector and all cell (cell voltage detection harness) harness connector.

	Coll Ma	Мос	dule	Li-ion batter	ry controller	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 1		1		50		
	Cell 3		3	100	51		
module 1	Cell 5	LB8	5	LB3	52		
	Cell 7		7		53	E viete d	
	Cell 2		2		34	Existed	
	Cell 4		4		35		
	Cell 6	LB7	6	LB3	36	-	
	Cell 8		8		37	-	
	Cell 9		1		54		
	Cell 11		3		55		
	Cell 13	- LB10 -	5	LB3	56		
module 0	Cell 15	_	7		57	Eviated	
module 2	Cell 10	- LB9 -	2		38	Existed	
	Cell 12		4	LB3	39		
	Cell 14		6		40		
	Cell 16		8		42		
	Cell 17		1		58		
	Cell 19	1.040	3		59		
	Cell 21	- LB12 -	5	LB3	60		
mandul-0	Cell 23		7		61	E viete el	
module 3	Cell 18		2		43	Existed	
	Cell 20		4		44		
	Cell 22	- LB11 -	6	LB3	45		
	Cell 24		8		46		
	Cell 25		1	L D 2	62		
	Cell 27		3	LB3	63		
	Cell 29	LB14	5		77		
module 1	Cell 31		7	LB4	78	Eviated	
module 4	Cell 26		2	I P2	47	Existed	
	Cell 28	1040	4	LB3	48		
	Cell 30	– LB13 –	6		65		
	Cell 32	1	8	LB4	66		

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< DTC/CIRCUIT DIAGNOSIS >

	0.11.11	Мо	dule	Li-ion batte	ry controller	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 33		1		80		
	Cell 35		3		81		
	Cell 37	LB16	5	LB4	82		
modulo 5	Cell 39		7		83	Eviated	
module 5	Cell 34	LB15 -	2		69	Existed	
	Cell 36		4		70		
	Cell 38	LB15	6	LB4	71		
	Cell 40		8		72		
	Cell 41		1		84		
	Cell 43	LB18	3	LB4	85		
	Cell 45	LDTO	5	LD4	86		
module 6	Cell 47		7		87	Existed	
module o	Cell 42		2		73	Existed	
	Cell 44	LB17	4	LB4	74		
	Cell 46	LDT	6	LD4	75		
	Cell 48	-	8		76		
	Cell 49	LB20 -	1	LB5 LB5	110		
	Cell 51		3		111		
	Cell 53		5		112		
module 7	Cell 55		7		113	Existed	
module /	Cell 50		2		90	LABIEU	
	Cell 52		4		91		
	Cell 54	LD13	6		92		
	Cell 56		8		93		
	Cell 57		1		114		
	Cell 59	LB22	3	LB5	115		
	Cell 61	LDZZ	5	LDJ	116		
module 8	Cell 63		7		117	Existed	
module o	Cell 58		2		94	Existed	
	Cell 60	LB21	4	LB5	95		
	Cell 62	LDZI	6	LDU	96		
	Cell 64		8		97		
	Cell 65		1		118		
	Cell 67	LB24	3	LB5	119		
	Cell 69	LDZA	5	LDU	120	Existed	
module 9	Cell 71		7		121		
modulo o	Cell 66		2		99		
	Cell 68	LB23	4	LB5	100		
	Cell 70	LDZJ	6	205	101		
	Cell 72		8		102		

< DTC/CIRCUIT DIAGNOSIS >

Madula Na		Мо	dule	Li-ion batte	ry controller	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	А
	Cell 73		1		122		
	Cell 75	1 000	3	LB5	123	-	В
	Cell 77	- LB26	5	LB0	124	-	
module 10	Cell 79		7		125		
module 10	Cell 74		2		103	Existed	HBE
	Cell 76	L DOF	4		104		
	Cell 78	- LB25	6	LB5	105		D
	Cell 80		8		106		
	Cell 81		1	LB5	127		
	Cell 83	1 000	3	LBO	128	-	E
	Cell 85	– LB28	5	LB6	137		
module 11	Cell 87		7	LDO	138	Existed	F
module 11	Cell 82		2		107	Existed	Γ
	Cell 84	LB27	4	LB5	108		
	Cell 86		6		130		G
	Cell 88		8	LB6	131		
	Cell 89		1		140		Н
	Cell 91	- LB30	3	LB6	141		П
	Cell 93	- LD3U	5	LDO	142		
module 12	Cell 95		7		143	Existed	
module 12	Cell 90		2		132	Existed	
	Cell 92	L DOO	4		133	-	
	Cell 94	- LB29	6	LB6	134	1	J
	Cell 96	1	8		135		
Is the inspectio	n result nor	mal?					K

>> Replace Li-ion battery (battery pack). Refer to <u>HBB-188, "Removal and Installation"</u>. >> Replace cell voltage detection harness. YES

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< DTC/CIRCUIT DIAGNOSIS >

P30F1 REGENERATION CONTROL

DTC Logic

INFOID:000000008141001

INFOID:000000008141002

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30F1	REGENERATION CONTROL	When exceeding the SOC usage range with continuous regeneration (charge).	 DC/DC junction box Li-ion battery controller HPCM Traction motor inverter Between DC/DC junction box and Li-ion battery controller harness

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30F1 detected?

- YES >> Refer to <u>HBB-122</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS-1

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the DTC is detected in "Self Diagnostic Result" of "EV/HEV". and "MOTOR CONTROL".

Is DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.

NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS-2

(I) WITH CONSULT

Check if the "P0AC0", "P0AC1" or "P0AC2" is detected in "Self Diagnostic Result" of "EV/HEV".

Is DTC detected?

- YES >> Perform diagnosis procedure of applicable DTC.
- NO >> Replace battery junction box (current sensor) and Li-ion battery controller.

P30F2 DISCHARGE CONTROL

< DTC/CIRCUIT DIAGNOSIS >

P30F2 DISCHARGE CONTROL

DTC Logic

DTC DETECTION LOGIC

NOTE:

- If DTC "P0AC0", "P0AC1" or "P0AC2" is displayed with DTC "P30F2", first perform the trouble diagnosis for DTC "P0AC0", "P0AC1" or "P0AC2".
- Prolonged cranking due to running out of gasoline may cause the detection of this DTC.

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30F2	DISCHARGE CONTROL	When SOC usage range is not satisfied and the output (discharge) continues.	 DC/DC junction box Li-ion battery controller HPCM Traction motor inverter Between DC/DC junction box and Li-ion battery controller harness Out of gasoline
DTC CO	NFIRMATION PROCE	DURE	
1 .PERF	ORM DTC CONFIRMAT	ION PROCEDURE	
1. Turn 2. Select Is P30F2 YES	CONSULT ignition switch ON and v ct "Self Diagnostic Resul <u>detected?</u> >> Refer to <u>HBB-123, "D</u> >> INSPECTION END	t" mode of "HV BAT" using CONSULT.	
Diagno	sis Procedure		INFOID:00000008141004
1.PERF	ORM SELF-DIAGNOSIS	6	
	CONSULT		
Is DTC de	<pre>'All DTC Reading" with C etected?</pre>	ONSULI.	
		ocedure of applicable DTC. ion box (current sensor) and Li-ion battery cont	roller.

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P30F3 TOTAL VOLTAGE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P30F3 TOTAL VOLTAGE SENSOR

DTC Logic

INFOID:000000008141005

INFOID:000000008141006

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30F3	TOTAL VOLTAGE SEN- SOR	When a malfunction occurs in the communication system of the Li-ion battery controller.	 Li-ion battery controller Between Li-ion battery controller and cell harness or connector Cell overdischarge

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30F3 detected?

- YES >> Refer to HBB-124, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.
- 2. Check if the "P3030" or "P3374" is detected in "Self Diagnostic Result" of "EV/HEV".

Is P3030 or P3374 detected?

- YES >> Perform diagnosis procedure of applicable DTC.
- NO >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".

P30F4 TOTAL VOLTAGE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P30F4 TOTAL VOLTAGE SENSOR

DTC Logic

А INFOID:000000008141007

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	
P30F4	TOTAL VOLTAGE SENSOR	When a total voltage exceeds the available voltage.	 Li-ion battery controller Li-ion battery over charge 	ł
DTC CO	ONFIRMATION PROCE	DURE		
1.PER	FORM DTC CONFIRMATIO	ON PROCEDURE		
1. Turi 2. Sele	I CONSULT n ignition switch ON and wa ect "Self Diagnostic Result" <u>4 detected?</u>	ait at least 10 seconds. ' mode of "HV BAT" using CONSULT.		
YES NO	>> Refer to <u>HBB-125, "Dia</u> >> INSPECTION END	agnosis Procedure".		
Diagno	osis Procedure		INFOID:00000008141008	
1.PERI	FORM SELF-DIAGNOSIS			
<pre> B)WITH </pre>	CONSULT			
		' mode of "HV BAT" using CONSULT. ed in "Self Diagnostic Result" of "EV/HEV".		
2. Che <u>s P330'</u>	eck if the "P3301" is detecte 1 detected?	ed in "Self Diagnostic Result" of "EV/HEV".		
2. Che <u>s P330'</u>	eck if the "P3301" is detecte <u>1 detected?</u> >> Perform diagnosis proc	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>s P330'</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>ls P330'</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>s P330⁻</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>Is P330⁻</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>s P330⁻</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>Is P330⁻</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>s P330'</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		
2. Che <u>s P330'</u> YES	eck if the "P3301" is detected <u>1 detected?</u> >> Perform diagnosis prod >> Replace Li-ion battery	ed in "Self Diagnostic Result" of "EV/HEV". cedure of "P3301". Refer to <u>HBB-138, "Diagno</u> controller. Refer to <u>HBB-200, "LI-ION BATTI</u>		

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P30F5 TOTAL VOLTAGE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P30F5 TOTAL VOLTAGE SENSOR

DTC Logic

INFOID:000000008141009

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30F5	TOTAL VOLTAGE SENSOR	When there is a difference larger than 30 V between a total voltage measured by the total voltage detection circuit and the sum of measured cell voltages for 2 seconds or more.	 Li-ion battery controller High voltage fuse (Service plug integrated)

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30F5 detected?

YES >> Refer to <u>HBB-126</u>, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008141010

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage".

>> GO TO 2.

2. CHECK HIGH VOLTAGE FUSE

Check high voltage fuse (service plug integrated).

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u> sembly and Assembly".
- NO >> Replace service plug after repairing the part causing the blowout of the fuse.

P30F6 TOTAL VOLTAGE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P30F6 TOTAL VOLTAGE SENSOR

DTC Logic

INFOID:000000008141011

DTC DETECTION LOGIC

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INFOID:00000008141012

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DTC	Trouble diagnosis name	DTC detecting condition	Possible causes		
			Li-ion battery controllerBetween Li-ion battery controller	HBB	
P30F6	TOTAL VOLTAGE SENSOR	When a total voltage is below the range of available voltage.	 and cell harness or connector Li-ion battery overdischarge High voltage fuse (Service plug integrated) 		
DTC CONFIRMATION PROCEDURE 1. PERFORM DTC CONFIRMATION PROCEDURE					

WITH CONSULT

Turn ignition switch ON and wait at least 10 seconds.

2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30F6 detected?

YES >> Refer to HBB-127, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to HBB-6, "High Voltage Precautions".

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.
- 2. Check if the "P3374" is detected in "Self Diagnostic Result" of "HV BAT".

Is P3374 detected?

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

2. CHECK CONNECTION STATUS OF SERVICE PLUG

Check the connection of service plug.

Is the inspection result normal?

- YES >> GO TO 3.
- NO >> Repair the connection of harness.

P30F6 TOTAL VOLTAGE SENSOR

< DTC/CIRCUIT DIAGNOSIS >

3. CHECK HIGH VOLTAGE FUSE

Check high voltage fuse (service plug integrated).

Is the inspection result normal?

- YES >> Replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disas</u><u>sembly and Assembly"</u>.
- NO >> Replace service plug after repairing the part causing the blowout of the fuse.

P30FC OVER CURRENT

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P0AC0", "P0AC1" or "P0AC2" is displayed with DTC "P30FC", first perform the trouble diagnosis for DTC "P0AC0", "P0AC1" or "P0AC2".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	
P30FC	OVER CURRENT	When the high voltage harness temperature estimated from a current value is extremely high.	 Traction motor Traction motor inverter HPCM Battery current sensor Li-ion battery controller 	D
DTC CO	ONFIRMATION PROC	EDURE		
1.PER	FORM DTC CONFIRMA	TION PROCEDURE		F
	I CONSULT			
1. Sele		ode of "HV BAT" using CONSULT." to driving pattern B.		G
[Driving pattern B : <u>HBB-29, '</u>	DIAGNOSIS DESCRIPTION : Driving Pattern"		
<u>Is P30D</u>	0 detected?			Н
YES NO	>> Refer to <u>HBB-117, "I</u> >> INSPECTION END	<u>Diagnosis Procedure"</u> .		
				1
Diagno	osis Procedure		INFOID:00000008141014	
1.PER	FORM SELF-DIAGNOSI	S-1		
				J
	form "All DTC Reading" v eck if the DTC is detected	I in "Self Diagnostic Result" of "EV/HEV".		
	detected?	-		K
YES NO	>> Perform diagnosis p >> GO TO 2.	rocedure of applicable DTC. Refer to <u>HBC-71, "D</u>	<u>TC Index"</u> .	
•	FORM SELF-DIAGNOSI	S-2		L
		52		
		Ilt" mode of "HV BAT" using CONSULT.		M
		in "Self Diagnostic Result" of "HV BAT".		
<u>IS DTC (</u> YES	<u>detected?</u>	sis procedure of applicable DTC, GO TO 3.		Ν
NO	>> GO TO 3.			
3.per	FORM DTC CONFIRMA	TION PROCEDURE		
Perform	DTC confirmation proce	dure. Refer to <u>HBB-129, "DTC Logic"</u> .		0
	detected?			
YES NO	>> GO TO 2. >> INSPECTION END			Ρ

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P30FD TOTAL VOLTAGE MONITOR SWITCH

< DTC/CIRCUIT DIAGNOSIS >

P30FD TOTAL VOLTAGE MONITOR SWITCH

DTC Logic

INFOID:000000008141015

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P30FD	TOTAL VOLTAGE MONITOR SWITCH	 When the total voltage detection switch of the Li-ion battery controller is malfunctioning (The total voltage detection switch cannot be turned OFF). When the self-diagnosis detects a malfunction in the total voltage detection circuit stop function of the Li-ion battery controller. 	Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- 2. Turn ignition switch OFF and wait at least 60 seconds.
- 3. Turn ignition switch ON and wait at least 10 seconds.
- 4. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P30FD detected?

- YES >> Refer to <u>HBB-130</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008141016

When this DTC is detected, replace Li-ion battery controller. Refer to <u>HBB-200, "LI-ION BATTERY CONTROL-</u> <u>LER : Disassembly and Assembly"</u>.

P30FE 12V BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P30FE 12V BATTERY VOLTAGE

DTC Logic

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INFOID:000000008141017

INFOID:00000008141018

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes	
P30FE	12V BATTERY VOLTAGE	When the 12 V battery voltage drops to less than 9 V and maintains the voltage for 1 second or more.	12V batteryLi-ion battery controllerHarness or connector	HBB

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(P)WITH CONSULT

- 1. Turn ignition switch ON and wait at least 10 seconds.
- Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT. 2.

Is P30FE detected?

- YES >> Refer to HBB-131, "Diagnosis Procedure".
- >> INSPECTION END NO

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of elec-Н tric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not Κ 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 HBB-6, "High Voltage Precautions".

CAUTION:

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

1.CHECK FUSE

1. Turn ignition switch is OFF. Ν 2. Pull out 10A fuse (No.64) and check that the fuse is not fusing. NOTE: Refer to PG-43, "Fuse and Fusible Link Arrangement" for fuse layout. Is the inspection result normal? YES >> GO TO 2. NO >> Replace fuse after repairing the part causing the blowout of the fuse. Ρ 2.CHECK BATTERY POWER SUPPLY-1

Check voltage between Li-ion battery harness connector terminals.

P30FE 12V BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

	+		-	
	Li-ion	battery		Voltage
Connector	Terminal	Connector	Terminal	
B283	6	B283	2	Battery voltage
6205	0	6205	14	Dattery Voltage

Is the inspection result normal?

>> GO TO 6. YES NO >> GO TO 3.

3.CHECK BATTERY POWER SUPPLY-2

1. Disconnect Li-ion battery harness connector.

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

+			
Li-ion battery		_	Voltage
Connector	Terminal		
B283	6	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace the malfunctioning part.

4.CHECK GROUND-1

Check the installation condition of the ground (B264).

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair the installation state of the ground.

5.CHECK GROUND-2

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

Li-ion battery			Continuity
Connector	Terminal	_	Continuity
B283	2	Ground	Existed
B203	14	Ground	Existed

Is the inspection result normal?

YES >> Perform intermittent incident. Refer to GI-49, "Intermittent Incident".

>> Repair or replace the malfunctioning part. NO

6.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". Remove Li-ion battery. Refer to HBB-188, "Removal and Installation".

>> GO TO 7.

7. CHECK BATTERY POWER SUPPLY CIRCUIT

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

Li-ion	Li-ion battery		Li-ion battery controller		
Connector	Terminal	rminal Connector Terminal		Continuity	
LB39	6	LB1	12	Existed	

P30FE 12V BATTERY VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace the malfunctioning part.

8. CHECK GROUND CIRCUIT

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

Li-ion b	pattery	Li-ion batter	ry controller	Continuity	
Connector	Terminal	Connector	Terminal	Continuity	
1 000	2		3	Evieto d	
LB39	14	LB1	15	Existed	
ne inspection	n result normal	?			
S >> Per	form intermitte	nt incident. Refe	er to <u>GI-49, "Int</u>	ermittent Incident".	
) >> Rep	pair or replace	the malfunctioni	ng part.		

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P31A5 CAN ERROR HPCM

< DTC/CIRCUIT DIAGNOSIS >

P31A5 CAN ERROR HPCM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P31A5" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P31A5	CAN ERROR HPCM	When the Li-ion battery controller detects an er- ror in CAN data.	 ECM Li-ion battery controller Traction motor inverter HPCM

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 5 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P31A5 detected?

- YES >> Refer to <u>HBB-134</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

(I) WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check "Self Diagnostic Result".

DTC	DTC detected control module	malfunction parts
	Only in "ENGINE"	• ECM • HPCM
	Only in "HV BAT"	Li-ion battery controllerHPCM
	Only in "MOTOR CONTROL"	Traction motor inverterHPCM
P31A5	 "ENGINE" "MOTOR CONTROL"	
	 "ENGINE" "HV BAT"	
	 "MOTOR CONTROL" "HV BAT"	НРСМ
	 "ENGINE" "HV BAT" "MOTOR CONTROL"	

>> Replace a malfunctioning part corresponding to the control module that DTC "P31A5" is detected.

INFOID:000000008141020

INFOID:000000008141019

P31A7 CAN ERROR INV/MC

< DTC/CIRCUIT DIAGNOSIS >

P31A7 CAN ERROR INV/MC

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P31A7" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P31A7	CAN ERROR INV/MC	When the Li-ion battery controller detects an error in CAN data.	 HPCM Traction motor inverter Li-ion battery controller
тс со	NFIRMATION PROCEDUR	RE	
.PERF	ORM DTC CONFIRMATION F	PROCEDURE	
. Turn 2. Selec <u>s P31A7</u> YES :	CONSULT ignition switch ON and wait at ct "Self Diagnostic Result" mo <u>detected?</u> >> Refer to <u>HBB-135, "Diagno</u> >> INSPECTION END	de of "HV BAT" using CONSULT.	
-	sis Procedure		INFOID:00000008141022
PERF	ORM SELF-DIAGNOSIS		
. Perfo	CONSULT orm "All DTC Reading" with C(k "Self Diagnostic Result".	ONSULT.	
DTC	DTC detected control module	malfunction parts	
	Only in "EV/HEV"	HPCM Traction motor inverter	
	Only in "HV BAT"	Li-ion battery controller	
P31A7			

>> Replace a malfunctioning part corresponding to the control module that DTC "P31A7" is detected.

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P3300 TOTAL VOLTAGE OVER

< DTC/CIRCUIT DIAGNOSIS >

P3300 TOTAL VOLTAGE OVER

DTC Logic

INFOID:000000008141023

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3300	TOTAL VOLTAGE OVER	When a total voltage exceeds the available voltage.	 Li-ion battery Li-ion battery controller HPCM Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P3300 detected?

- YES >> Refer to <u>HBB-136</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008141024

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS-1

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the DTC is detected in "Self Diagnostic Result" of "EV/HEV" and "MOTOR CONTROL".

Is DTC detected?

- YES >> Perform diagnosis of the applicable system.
- NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS-2

(I) WITH CONSULT

1. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is DTC detected?

YES-1 >> If P30EF is detected, refer to <u>HBB-118, "Diagnosis Procedure"</u>.

YES-2 >> If P3374 is detected, refer to HBB-154, "Diagnosis Procedure".

NO >> GO TO 3.

P3300 TOTAL VOLTAGE OVER

< DTC/CIRCUIT DIAGNOSIS >	
3. PRECONDITIONING	Δ
WARNING: Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u> .	
>> GO TO 4.	В
4. CHECK CONNECTION OF HIGH VOLTAGE HARNESS	
Check the connection between the following high voltage parts and the high voltage harness for deterioration in terminals and improper fit. • Traction motor inverter • Traction motor	HBB D
Electric compressor Is the increasing result normal?	
<u>Is the inspection result normal?</u> YES >> GO TO 5.	Е
NO >> Repair connection state of the harness or replace the harness.	
5. CHECK HIGH VOLTAGE HARNESS	F
 Remove Li-ion battery. Refer to <u>HBB-188</u>, <u>"Removal and Installation"</u>. Check the connection between the following high voltage parts and the high voltage harness for deterioration in terminals and improper fit. Service plug 	G
 Bus bar DC/DC converter Battery junction box 	Н
<u>Is the inspection result normal?</u> YES >> Replace Li-ion battery (battery pack). Refer to <u>HBB-188, "Removal and Installation"</u> . NO >> Repair or replace the malfunctioning part.	I
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< DTC/CIRCUIT DIAGNOSIS >

P3301 CELL VOLTAGE OVER

DTC Logic

INFOID:000000008141025

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3301	CELL VOLTAGE OVER	When a cell voltage exceeds the range of available voltage.	 Li-ion battery Li-ion battery controller HPCM Traction motor

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 10 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P3301 detected?

- YES >> Refer to <u>HBB-138</u>, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000008141026

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS-1

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the "P3300" is detected in "Self Diagnostic Result" of "EV/HEV".

Is P3300 detected?

YES >> Perform diagnosis procedure of "P3300". Refer to <u>HBB-136. "Diagnosis Procedure"</u>.

NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS-2

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if a DTC is detected in "Self Diagnostic Result" of other systems.

Is DTC detected?

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

HBB-138

3.PRECONDITIONING A WARNING: Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". Remove Lion battery. Refer to HBB-188. "Removal and Installation". B >> GO TO 4. 4.CHECK FFD (FREEZE-FRAME DATA) 1. Check FFD (freeze-frame data) of "P3301". Check every "CELL VOLTAGE" to identify cells of which voltage is more than 4,265 mV. D 2. Check every "CELL VOLTAGE" to identify cells of which voltage is more than 4,265 mV.: GO TO 5. >> The voltage of Cell 1, 3, 5, and 7 is more than 4,265 mV.: GO TO 6. >> The voltage of Cell 10, 12, 14, and 16 is more than 4,265 mV.: GO TO 7. >> The voltage of Cell 10, 12, 14, and 16 is more than 4,265 mV.: GO TO 8. >> The voltage of Cell 10, 12, 14, and 16 is more than 4,265 mV.: GO TO 8. >> The voltage of Cell 10, 2, 14, and 23 is more than 4,265 mV.: GO TO 10. >> The voltage of Cell 10, 2, 14, and 43 is more than 4,265 mV.: GO TO 10. >> The voltage of Cell 26, 27, 29, and 34 is more than 4,265 mV.: GO TO 10. >> The voltage of Cell 26, 27, 29, and 34 is more than 4,265 mV.: GO TO 11. >> The voltage of Cell 26, 27, 29, and 34 is more than 4,265 mV.: GO TO 11. >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 16. >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 16. >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 16. >> The voltage of Cell 52, 52, 54, and 56 is more than 4,265 mV.: GO TO 10. >> The voltage of Cell 52, 52, 54, and 56 is more than 4,265 mV.: GO TO 10. >> The voltage of Cell 52,	< DTC/CIRCUIT DIAGNOSIS >	
WARNING: Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". B Sector 1 >> GO TO 4. HBB-188. "Removal and Installation". B >> GO TO 4. 4.CHECK FFD (FREEZE-FRAME DATA) HBB 1. Check FFD (FREEZE-FRAME DATA) HBB 2. Check every "CELL VOLTAGE" to identify cells of which voltage is more than 4,265 mV. D Check results>>The voltage of Cell 1, 3, 5, and 7 is more than 4,265 mV.: GO TO 5. >> The voltage of Cell 9, 11, 13, and 15 is more than 4,265 mV.: GO TO 7. E >> The voltage of Cell 10, 12, 14, and 16 is more than 4,265 mV.: GO TO 7. E >> The voltage of Cell 10, 12, 14, and 16 is more than 4,265 mV.: GO TO 7. E >> The voltage of Cell 25, 27, 29, and 31 is more than 4,265 mV.: GO TO 10. F >> The voltage of Cell 25, 27, 29, and 31 is more than 4,265 mV.: GO TO 11. F >> The voltage of Cell 33, 35, 37, and 39 is more than 4,265 mV.: GO TO 13. F >> The voltage of Cell 34, 36, 38, and 40 is more than 4,265 mV.: GO TO 14. F >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 15. F >> The voltage of Cell 42, 44, 46, and 48 is more than 4,265 mV.: GO TO 15. F >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 16. F >> The voltage of Cell	3. PRECONDITIONING	А
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 >> The voltage of Cell 34, 36, 38, and 40 is more than 4,265 mV.: GO TO 14. >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 15. >> The voltage of Cell 42, 44, 46, and 48 is more than 4,265 mV.: GO TO 16. >> The voltage of Cell 50, 52, 54, and 55 is more than 4,265 mV.: GO TO 17. > The voltage of Cell 57, 59, 61, and 63 is more than 4,265 mV.: GO TO 18. >> The voltage of Cell 58, 60, 62, and 64 is more than 4,265 mV.: GO TO 20. >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		
 >> The voltage of Cell 41, 43, 45, and 47 is more than 4,265 mV.: GO TO 15. >> The voltage of Cell 42, 44, 46, and 48 is more than 4,265 mV.: GO TO 16. >> The voltage of Cell 49, 51, 53, and 55 is more than 4,265 mV.: GO TO 17. >> The voltage of Cell 50, 52, 54, and 56 is more than 4,265 mV.: GO TO 18. >> The voltage of Cell 57, 59, 61, and 63 is more than 4,265 mV.: GO TO 19. >> The voltage of Cell 58, 60, 62, and 64 is more than 4,265 mV.: GO TO 20. >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		G
 >> The voltage of Cell 49, 51, 53, and 55 is more than 4,265 mV.: GO TO 17. > The voltage of Cell 50, 52, 54, and 56 is more than 4,265 mV.: GO TO 18. >> The voltage of Cell 57, 59, 61, and 63 is more than 4,265 mV.: GO TO 19. >> The voltage of Cell 58, 60, 62, and 64 is more than 4,265 mV.: GO TO 20. >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		
 >> The voltage of Cell 50, 52, 54, and 56 is more than 4,265 mV.: GO TO 18. >> The voltage of Cell 57, 59, 61, and 63 is more than 4,265 mV.: GO TO 19. >> The voltage of Cell 58, 60, 62, and 64 is more than 4,265 mV.: GO TO 20. >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 74, 76, 78, and 80 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		
 >> The voltage of Cell 57, 59, 61, and 63 is more than 4,265 mV.: GO TO 19. >> The voltage of Cell 58, 60, 62, and 64 is more than 4,265 mV.: GO TO 20. >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 74, 76, 78, and 80 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		H
 >> The voltage of Cell 65, 67, 69, and 71 is more than 4,265 mV.: GO TO 21. >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 74, 76, 78, and 80 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		
 >> The voltage of Cell 66, 68, 70, and 72 is more than 4,265 mV.: GO TO 22. >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 74, 76, 78, and 80 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		I
 >> The voltage of Cell 73, 75, 77, and 79 is more than 4,265 mV.: GO TO 23. >> The voltage of Cell 74, 76, 78, and 80 is more than 4,265 mV.: GO TO 24. >> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27. 		
>> The voltage of Cell 81, 83, 85, and 87 is more than 4,265 mV.: GO TO 25. >> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27.		
>> The voltage of Cell 82, 84, 86, and 88 is more than 4,265 mV.: GO TO 26. >> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27.		J
>> The voltage of Cell 89, 91, 93, and 95 is more than 4,265 mV.: GO TO 27.		
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	>> The voltage of Cell 90, 92, 94, and 96 is more than 4,265 mV.: GO TO 28.	1 X

5. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mod	dule	LB	SC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 1		1		50	
	Cell 3	LB8	3	LB3	51	
	Cell 5	LD0	5		52	
Module 1	Cell 7		7		53	Existed
MOUUIE I	Cell 2		2		34	EXISIEU
	Cell 4	LB7	4	LB3	35	
	Cell 6		6		36	
	Cell 8		8	1	37	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

6.CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Moo	dule	LE	3C	Continuity		
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 1		1	LB3	50			
	Cell 3	LB8	3		51			
	Cell 5	LDO	5		52			
Module 1	Cell 7		7		53	Existed		
Module I	Cell 2		2	LB3	34			
	Cell 4	LB7	4		35			
	Cell 6	LB7	6		36			
	Cell 8		8		37			
	Cell 9		1		54			
Module 2	Cell 11	1040	3	LB3	55	Existed		
	Cell 13	LB10	5	LB3	56			
	Cell 15		7		57			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

7. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	3C	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 2		2		34		
Module 1	Cell 4	LB7	4	102	35	Existed	
	Cell 6	LD/	6	LB3	36		
	Cell 8		8		37		
	Cell 9		1	- LB3	54	Fuicted	
	Cell 11	LB10	3		55		
	Cell 13		5		56		
Module 2	Cell 15		7		57		
wodule 2	Cell 10		2		38	Existed	
	Cell 12	1.00	4	102	39		
	Cell 14	LB9	6	LB3	40		
	Cell 16		8		42		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

8.CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Mod	dule	LE	LBC		
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 9		1		54		
Cell 11	LB10	3	LB3	55			
	Cell 13	LDIU	5	LDJ	56		
Module 2 Cell 15 Cell 10		7		57	Existed		
	Cell 10		2		38	Existed	
	Cell 12	LB9	4	LB3	39		
	Cell 14	LD9	6		40		
	Cell 16		8		42		
	Cell 17		1		58		
Modulo 2	Cell 19	LB12	3	LB3	59	Evictod	
Module 3 Cell 21 Cell 23	LDIZ	5		60	Existed		
		7		61			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

9.CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Moo	dule	LE	BC	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 10		2	LB3		38	
Module 2	Cell 12	LPO	4		39	Existed	
	Cell 14	LB9	6		40		
	Cell 16		8		42		
	Cell 17		1		58	59 60 61	
	Cell 19	LB12	3	LB3	59		
	Cell 21	LDIZ	5	LDJ	60		
Module 3	Cell 23		7		61		
Module 5	Cell 18		2		43	Existed	
	Cell 20	LB11	4	LB3	44		
	Cell 22		6		45		
	Cell 24		8		46		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

10.check cell voltage detection circuit

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Moo	dule	LE	3C	Continuity		
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 17		1	LB3	58			
	Cell 19	LB12	3		59			
	Cell 21	LDIZ	5		60			
Module 3	Cell 23		7		61	Existed		
Module 3	Cell 18		2	LB3	43	-		
	Cell 20	LB11	4		44			
	Cell 22		6		45			
	Cell 24		8		46			
	Cell 25		1	LB3	62			
Module 4	Cell 27		3	LB3	63	Existed		
	Cell 29	LB14	5	LB4	77			
	Cell 31		7		78			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

11. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мо	dule	LE	3C	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 18		2		43		
Module 3	Cell 20	LB11 -	4	102	44	Eviated	
	Cell 22	LDII	6	LB3	45	Existed	
	Cell 24		8		46		
	Cell 25	LB14	1	LB3	62	Fuinted	
	Cell 27		3		63		
	Cell 29		5	LB4	77		
Module 4	Cell 31		7		78		
Module 4	Cell 26		2	LB3	47	Existed	
	Cell 28	LB13	4	LD3	48		
	Cell 30		6		65		
	Cell 32		8	LB4	66		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

12. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	dule	LE	BC	Continuity	
	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 25		1	LB3	62		
	Cell 27	LB14	3	LDJ	63		
	Cell 29	LD14	5	LB4	77		
Module 4	Cell 31		7	LD4	78	Existed	
MOUULE 4	Cell 26		2	LB3	47	Existed	
	Cell 28	LB13	4	LDJ	48		
	Cell 30	LDIJ	6	LB4	65		
	Cell 32		8	LD4	66		
	Cell 33		1		80		
Module 5	Cell 35	LB16	3	LB4	81	Existed	
	Cell 37	LDIU	5	LD4	82	EXISION	
	Cell 39		7		83		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $13. {\sf check \ cell \ voltage \ detection \ circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мос	dule	LE	3C	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 26		2	LB3	47		
Module 4	Cell 28	LB13	4	LB3 -		48	Existed
MOUUIE 4	Cell 30	LDIJ	6			65	
	Cell 32		8	LD4	66		
	Cell 33		1		80	-	
	Cell 35	LB16	3	LB4	81		
	Cell 37	LDIU	5	LD4	82		
Module 5	Cell 39		7		83		
Module 5	Cell 34		2		69	Existed	
	Cell 36	LB15	4	LB4	70		
	Cell 38	LD10	6		71		
	Cell 40		8		72		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

14. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Мос	dule	LE	3C	Continuity		
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 33		1	- LB4	80			
	Cell 35	LB16 -	3		81			
	Cell 37		5		82			
Module 5	Cell 39		7		83	Existed		
Wodule 5	Cell 34		2	- LB4	69			
	Cell 36	LB15	4		70			
	Cell 38		6		71			
	Cell 40		8		72			
	Cell 41		1		84			
Module 6	Cell 43	1.540	3	LB4	85	Existed		
	Cell 45	LB18	5		86			
	Cell 47		7		87			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

15. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	3C	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 34		2	LB4	69		
Module 5	Cell 36	LB15 -	4		70	Existed	
	Cell 38		6		71		
	Cell 40		8		72		
	Cell 41		1	- LB4	84		
	Cell 43	LB18	3		85		
	Cell 45		5		86		
Module 6	Cell 47		7		87		
wodule 6	Cell 42		2	LB4	73	Existed	
	Cell 44	1047	4		74		
	Cell 46	LB17	6		75		
	Cell 48		8		76		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $16. {\sf check \, cell \, voltage \, detection \, circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

< DTC/CIRCUIT DIAGNOSIS >

Module No.		Mod	dule	LE	C	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 41		1		84		
	Cell 43	LB18	3	LB4	85		
	Cell 45		5		86		
Modulo 6	Cell 47		7		87	Existed	
Cel	Cell 42	LB17	2	- LB4 -	73	Existed	
	Cell 44		4		74		
	Cell 46		6		75		
	Cell 48		8		76		
	Cell 49		1		110		
Modulo 7	Cell 51	LB20	3	LB5	111	Existed	
Module 7 Cell 53		5		112	LAISted		
	Cell 55		7	1	113		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

17. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Moo	dule	LE	BC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 42		2		73	
Module 6	Cell 44	LB17	4	LB4	74	Existed
	Cell 46	LDI/	6	LD4	75	
	Cell 48		8		76	
	Cell 49		1	LB5	110	
	Cell 51	LB20	3		111	
	Cell 53	LDZU	5		112	
Module 7	Cell 55		7		113	Evicted
	Cell 50		2		90	Existed
	Cell 52	LB19	4	LB5	91	
	Cell 54	LDIA	6	LDJ	92	
	Cell 56		8		93	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $18. {\sf CHECK \ CELL \ VOLTAGE \ DETECTION \ CIRCUIT}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Mo	dule	LE	3C	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 49		1		110		
Module 7	Cell 51	LB20	3	LB5	111		
	Cell 53	LDZU	5		112		
	Cell 55		7		113	Existed	
Module /	Cell 50		2	LB5	90		
	Cell 52		4		91		
	Cell 54	LB19	6		92		
	Cell 56		8		93		
	Cell 57		1		114		
Modulo 9	Cell 59	LB22	3		115	Existed	
Module 8	Cell 61	LDZZ	5	LB5	116		
	Cell 63		7		117		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

$19. {\sf check \ cell \ voltage \ detection \ circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	SC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 50		2		90	Existed
Module 7	Cell 52	LB19	4	LB5	91	
	Cell 54	LD19	6		92	
	Cell 56	-	8		93	
	Cell 57	LB22	1	LB5	114	- Existed
	Cell 59		3		115	
	Cell 61		5		116	
Module 8	Cell 63		7		117	
	Cell 58		2		94	
	Cell 60	LB21	4	LB5	95	
	Cell 62		6		96	
	Cell 64		8		97	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $20. {\sf CHECK} \, {\sf CELL} \, {\sf VOLTAGE} \, {\sf DETECTION} \, {\sf CIRCUIT}$

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Mod	lule	LB	C	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity Existed
	Cell 57		1		114	
	Cell 59	1000	3	LB5	115	
	Cell 61	- LB22 -	5	5 116 7 117	116	
Module 8	Cell 63		7		Eviated	
	Cell 58		2		94	Existed
	Cell 60	1001	4	I D S	95	
	Cell 62		LB21 4 LB5 95 6 96			
	Cell 64		8		97	
	Cell 65		1		118	
Module 9	Cell 67	LB24	3	LB5	119	Existed
would 9	Cell 69	LD24	5		120	EXISTED
	Cell 71		7	1	121	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

21. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mod	dule	LE	SC	Continuity
wodule No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 58		2		94	
Module 8	Cell 60	LB21	4 LB5	I D E	95	Eviated
	Cell 62			LDO	96	Existed
	Cell 64		8		97	
	Cell 65		1		118	
	Cell 67	LB24	3	- LB5 -	119	
	Cell 69	LD24	5		120	
Module 9	Cell 71		7		121	Existed
would 9	Cell 66		2		99	EXISIEU
	Cell 68	LB23	4	LB5	100	
	Cell 70	LDZJ	6		101	
	Cell 72		8		102	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

22. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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Module No.	Cell No.	Moo	dule	LE	3C	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 65		1		118		
Module 9	Cell 67	LB24	3	LB5	119		
	Cell 69		5		120		
	Cell 71		7		121	Existed	
	Cell 66		2	LB5	99		
	Cell 68	1000	4		100		
	Cell 70	LB23	6		101		
	Cell 72		8		102		
	Cell 73		1		122		
Madula 10	Cell 75	I DOG	3		123	Existed	
Module 10	Cell 77	LB26	5	LB5	124		
	Cell 79		7		125		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

$23. {\sf CHECK} \, {\sf CELL} \, {\sf VOLTAGE} \, {\sf DETECTION} \, {\sf CIRCUIT}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	BC	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 66		2		99	Existed	
Module 9	Cell 68	LB23	4	LB5	100		
	Cell 70	LD25	6		101		
	Cell 72	-	8		102		
	Cell 73	LB26	1	- LB5	122	Existed	
	Cell 75		3		123		
	Cell 77		5		124		
Module 10	Cell 79	-	7		125		
	Cell 74		2		103		
	Cell 76	LB25	4	LB5	104		
	Cell 78	LD20	6		105		
	Cell 80		8		106		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

24. CHECK CELL VOLTAGE DETECTION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

		Mod	dule	LE	SC	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 73	LB26 -	1		122		
	Cell 75		3	- LB5 -	123		
Module 10	Cell 77		5		LDO	124	
	Cell 79		7		125	Existed	
	Cell 74	- LB25 -	2	LB5	103	Existed	
	Cell 76		4		104		
	Cell 78		6		105		
	Cell 80		8		106		
	Cell 81		1	I D5	127		
Madula 11	Cell 83	1000	3	LB5	128	Eviated	
Module 11	Cell 85	- LB28 -	5	LDC	137	Existed	
	Cell 87		7	LB6	138		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

25. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Moo	dule	LE	BC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 74		2		103	
Module 10	Cell 76	LB25	4	LB5	104	Existed
	Cell 78	LDZJ	6		105	EXISTED
	Cell 80		8		106	
	Cell 81		1	LB5	127	_
	Cell 83	LB28	3	LDJ	128	
	Cell 85	LDZO	5		137	
Module 11	Cell 87		7	LB6	138	Existed
	Cell 82		2	LB5	107	EXISTED
	Cell 84	LB27	4		108	
	Cell 86		6	LB6	130	
	Cell 88		8		131	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

26. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Мо	dule	LE	3C	Continuity
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 81		1	LB5	127	
	Cell 83	LB28	3	LDJ	128	
	Cell 85		5	LB6	137	
Module 11	Cell 87		7		138	Existed
Module 11	Cell 82		2	LB5	107	
	Cell 84	LB27	4		108	
	Cell 86	LB27	6	LB6	130	
	Cell 88		8		131	
	Cell 89		1		140	Existed
Module 12	Cell 91	LB30	3	LB6	141	
would 12	Cell 93		5		142	
	Cell 95		7		143	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

27. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мо	dule	LE	3C	Continuity
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 82		2	LB5	107	Eviated
Module 11	Cell 84	LB27	4	LDJ	108	
	Cell 86	LDZI	6	LB6	130	Existed
	Cell 88	-	8		131	1
	Cell 89		1	LB6	140	- Existed
	Cell 91	LB30	3		141	
	Cell 93		5		142	
Module 12	Cell 95	-	7		143	
wodule 12	Cell 90		2		132	
	Cell 92	LB29	4	I D6	133	
-	Cell 94	LDZ9	6	LB6	134	
	Cell 96		8		135	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $28. {\sf CHECK} \, {\sf CELL} \, {\sf VOLTAGE} \, {\sf DETECTION} \, {\sf CIRCUIT}$

< DTC/CIRCUIT DIAGNOSIS >

Madul-N-		Mod	Module LBC		SC	Continuity	
Module No.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 89		1		140		
	Cell 91	1 000	3		141		
	Cell 93	– LB30 –	5	- LB6 -	142		
Module 12	Cell 95		7		143	Eviated	Н
wodule 12	Cell 90		2		132	Existed	
	Cell 92	LB29	4	LB6	133		
	Cell 94	LB29	6	LB0	134		
	Cell 96		8	1	135		
29.CHECK T	THE HISTOF		ACEMENT-		ck assembly	<i>ι</i> .	-
YES-1 >> W	hen there is	a history of re					
YES-1 >> W YES-2 >> W if mm YES-3 >> W NO >> G	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is O TO 31.	a history of re a history of re odule replaced attery is within ng an abnorn a history of b	eplacing sin d in the past n 17 month nal cell. Ref attery pack	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep	eplace all o to replace anufacturing 8, "Exploded	the 12 modules. However, wher t as a single module replacemen g date. In this case, replace only <u>d View"</u> .	l I
YES-1 >> W YES-2 >> W if M YES-3 >> W NO >> G 30. CHECK 1	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is O TO 31. THE HISTOR	a history of re a history of re odule replaced attery is within ng an abnorn a history of b	eplacing sin d in the past n 17 month nal cell. Ref attery pack	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2	eplace all o to replace anufacturing 8, "Explode placement, C	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31.	l I
YES-1 >> W YES-2 >> W re if YES-3 >> W NO >> G 30. CHECK 1 Check the mod	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is O TO 31. THE HISTOF	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA	eplacing sin d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded du	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replace	eplace all o to replace anufacturing 8, "Explode placement, C	the 12 modules. However, wher t as a single module replacemen g date. In this case, replace only <u>d View"</u> .	
YES-1 >> W YES-2 >> W rej if to YES-3 >> W NO >> GO SO.CHECK To theck the modes it more than YES >> Rest bly	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is O TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> .	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re from the date the 12 modul	ACEMENT-2 ecorded dur of manufactors attery pack ACEMENT-2 ecorded dur of manufactors les. Refer to	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replac ture? o <u>HBB-202, "I</u>	eplace all or to replace anufacturing <u>8, "Explode</u> placement, of cement of a	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31.	
YES-1 >> W YES-2 >> W rej if to YES-3 >> W NO >> GO SO.CHECK To theck the modes it more than YES >> Rest bly	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> .	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re from the date the 12 modul dule including	eplacing sin d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufact les. Refer to abnormal o	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replac ture? o <u>HBB-202, "I</u> cell. Refer to <u>1</u>	eplace all or to replace anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u>	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31.	
YES-1 >> W YES-2 >> W YES-2 >> W YES-3 >> W NO >> GO O.CHECK 1 Check the mod S it more than YES >> Re NO >> Re S1.CHECK 1 Check the batt battocation, refer	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> ". eplace a mod THE DATE C ery pack ass to <u>HBB-208.</u>	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re trom the date the 12 modul dule including DF MANUFAC sembly manuf "MODULE S	ACEMENT-2 accorded dur of manufac ecorded dur of manufac es. Refer to abnormal of TURE OF I	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replac ture? b <u>HBB-202, "I</u> cell. Refer to <u>1</u> cell. Refer to <u>1</u> LI-ION BATTE te included in <u>pection</u> ".	eplace all or to replace anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u> ERY	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31.	-
YES-1 >> W YES-2 >> W YES-2 >> W YES-3 >> W NO >> G 0.CHECK T Check the modes it more than YES >> Re bly NO >> Re 0.CHECK T Check the batt bocation, references it more than	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>CHE DATE C</u> ery pack ass to <u>HBB-208.</u> <u>17 months f</u> eplace all of	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPL/ cturing date re from the date the 12 modul dule including DF MANUFAC sembly manuf <u>"MODULE S</u> from the date	ACEMENT-2 accorded dur abnormal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal of TURE OF I acturing da TACK : Insp of manufac	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replac ture? 0 <u>HBB-202, "I</u> cell. Refer to <u>J</u> LI-ION BATTE te included in <u>pection</u> ".	eplace all of to replace anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u> ERY the module	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31. If the 12 modules. TACK : Disassembly and Assem Exploded View".	-
YES-1 >> W YES-2 >> W YES-2 >> W YES-3 >> W NO >> GO O.CHECK 1 Check the mode it more than YES >> Re DI.CHECK 1 Check the batt ocation, reference it more than YES >> Re DI.CHECK 1	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> . eplace a mod THE DATE C ery pack ass to <u>HBB-208.</u> <u>17 months f</u> eplace all of <u>/</u> .	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re from the date the 12 modul dule including DF MANUFAC sembly manuf "MODULE S from the date the 12 modul	eplacing sin d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal of TURE OF I acturing da TACK : Insp of manufac es. Refer to	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replace ture? b <u>HBB-202, "I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> te included in <u>pection</u> ".	eplace all or anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> HBB-195, "E ERY the module	the 12 modules. However, when t as a single module replacemen g date. In this case, replace only <u>d View"</u> . SO TO 31. If the 12 modules. <u>TACK : Disassembly and Assem</u> <u>Exploded View"</u> . serial number label. For the labe	-
YES-1 >> W YES-2 >> W YES-2 >> W YES-3 >> W NO >> GO O.CHECK 1 Check the mode it more than YES >> Re DI.CHECK 1 Check the batt ocation, reference it more than YES >> Re DI.CHECK 1	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> . eplace a mod THE DATE C ery pack ass to <u>HBB-208.</u> <u>17 months f</u> eplace all of <u>/</u> .	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re from the date the 12 modul dule including OF MANUFAC sembly manuf "MODULE S from the date the 12 modul	eplacing sin d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal of TURE OF I acturing da TACK : Insp of manufac es. Refer to	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replace ture? b <u>HBB-202, "I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> te included in <u>pection</u> ".	eplace all or anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> HBB-195, "E ERY the module	the 12 modules. However, when the as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31. If the 12 modules. TACK : Disassembly and Assem Exploded View". serial number label. For the labe	
YES-1 >> W YES-2 >> W YES-2 >> W YES-3 >> W NO >> GO O.CHECK 1 Check the mode it more than YES >> Re DI.CHECK 1 Check the batt ocation, reference it more than YES >> Re DI.CHECK 1	hen there is hen there is placing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>/</u> . eplace a mod THE DATE C ery pack ass to <u>HBB-208.</u> <u>17 months f</u> eplace all of <u>/</u> .	a history of re a history of re odule replaced attery is within ng an abnorn a history of b RY OF REPLA cturing date re from the date the 12 modul dule including OF MANUFAC sembly manuf "MODULE S from the date the 12 modul	eplacing sin d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal of TURE OF I acturing da TACK : Insp of manufac es. Refer to	gle module, r t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the replace ture? b <u>HBB-202, "I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> cell. Refer to <u>I</u> te included in <u>pection</u> ".	eplace all or anufacturing <u>8, "Explode</u> placement, C cement of a <u>MODULE S</u> HBB-195, "E ERY the module	the 12 modules. However, when the as a single module replacemen g date. In this case, replace only <u>d View"</u> . GO TO 31. If the 12 modules. TACK : Disassembly and Assem Exploded View". serial number label. For the labe	-

P3373 TOTAL VOLTAGE OVER DISCHARGE

< DTC/CIRCUIT DIAGNOSIS >

P3373 TOTAL VOLTAGE OVER DISCHARGE

DTC Logic

INFOID:000000008141027

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3373	TOTAL VOLTAGE OVER DISCHARGE	When a total voltage is below the range of available voltage.	 Li-ion battery Li-ion battery controller HPCM Traction motor

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Select "DATA MONITOR" mode of "HV BAT" using CONSULT.
- 2. Drive the vehicle, according to driving condition B.

Driving condition B : <u>HBC-44</u>, "DIAGNOSIS DESCRIPTION : Driving Pattern".

Is P3373 detected?

YES >> Refer to HBB-152. "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS-1

INFOID:000000008141028

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the DTC is detected in "Self Diagnostic Result" of "EV/HEV" and "MOTOR CONTROL".

Is DTC detected?

- YES >> Perform diagnosis procedure of applicable system. GO TO 2
- NO >> GO TO 2.

2.PERFORM SELF-DIAGNOSIS-2

WITH CONSULT

Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is DTC detected?

- YES-1 >> If P30EF is detected, refer to <u>HBB-118, "Diagnosis Procedure"</u>.
- YES-2 >> If P3374 is detected, refer to HBB-154, "Diagnosis Procedure".
- NO >> GO TO 3.

3.CHECK FFD (FREEZE-FRAME DATA)

WITH CONSULT

- 1. Check FFD (freeze-frame data) of "P3373".
- 2. Identify a cell voltage which is \pm 100 mV or more higher than the mean voltage of all the cells.

>> Check module including the applicable cell. GO TO 4. Refer to HBB-195. "Exploded View".

4.CHECK THE HISTORY OF REPLACEMENT-1

Check the latest replacement history of the module or battery pack assembly.

Is there a history of part replacement?

- YES-1 >> When there is a history of replacing all of the 12 modules, GO TO 5.
- YES-2 >> When there is a history of replacing single module, replace all of the 12 modules. However, when replacing a module replaced in the past, it is possible to replace it as a single module replacement if the Li-ion battery is within 17 months from the manufacturing date.
- YES-3 >> When there is a history of battery pack assembly replacement, GO TO 6.

HBB-152

P3373 TOTAL VOLTAGE OVER DISCHARGE

< DTC/CIRCUIT DIAGNOSIS >	
NO >> GO TO 6.	
5. CHECK THE HISTORY OF REPLACEMENT-2	А
Check the module manufacturing date recorded during the replacement of all the 12 modules.	
Is it more than 17 months from the date of manufacture?	В
YES >> Replace all of the 12 modules. Refer to <u>HBB-202, "MODULE STACK : Disassembly and Assem-</u> bly".	
NO >> Replace a module including abnormal cell. Refer to <u>HBB-195, "Exploded View"</u> .	HBB
6.CHECK THE DATE OF MANUFACTURE OF LI-ION BATTERY	
Check the battery pack assembly manufacturing date included in the module serial number label. For the label location, refer to <u>HBB-208</u> , "MODULE STACK : Inspection".	D
Is it more than 17 months from the date of manufacture?	
YES >> Replace all of the 12 modules. Refer to <u>HBB-202, "MODULE STACK : Disassembly and Assem-</u> bly".	Е
NO >> Replace a module including abnormal cell. Refer to <u>HBB-195, "Exploded View"</u> .	
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< DTC/CIRCUIT DIAGNOSIS >

P3374 CELL VOLTAGE OVER DISCHARGE

DTC Logic

INFOID:000000008141029

INFOID:000000008141030

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P3374	CELL VOLTAGE OVER DISCHARGE	When a cell voltage is below the range of available voltage.	 Li-ion battery Li-ion battery controller HPCM Traction motor

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- 1. Select "DATA MONITOR" mode of "HV BAT" using CONSULT.
- 2. Drive the vehicle, according to driving condition B.

Driving condition B : <u>HBC-44</u>, "<u>DIAGNOSIS DESCRIPTION</u> : <u>Driving Pattern</u>".

Is P3374 detected?

YES >> Refer to HBB-154, "Diagnosis Procedure".

NO >> INSPECTION END

Diagnosis Procedure

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PERFORM SELF-DIAGNOSIS-1

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check if the DTC is detected in "Self Diagnostic Result" of "EV/HEV" and "MOTOR CONTROL".

Is DTC detected?

- YES >> Perform diagnosis procedure of applicable system. GO TO 3.
- NO >> GO TO 2.
- 2.PERFORM SELF-DIAGNOSIS-2

WITH CONSULT

Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT. Is DTC detected?

< DTC/CIRCUIT DIAGNOSIS >

YES >> Perform diagnosis procedure of applicable system. GO TO 3. >> GO TO 3

NO

3. PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 4.

4.CHECK FFD (FREEZE-FRAME DATA)

1. Check FFD (freeze-frame data) of "P3374".

Identify a cell voltage which is \pm 100 mV or more higher than the mean voltage of all the cells. 2.

Check results>>The voltage difference of Cell 1, 3, 5, and 7 is more than ± 100mV, respectively.: GO TO 5.

>> The voltage difference of Cell 2, 4, 6, and 8 is more than \pm 100mV, respectively.: GO TO 6.	
>> The voltage difference of Cell 9, 11, 13, and 15 is more than \pm 100mV, respectively.: GO TO 7.	
>> The voltage difference of Cell 10, 12, 14, and 16 is more than \pm 100mV, respectively.: GO TO 8.	F
>> The voltage difference of Cell 17, 19, 21, and 23 is more than \pm 100mV, respectively.: GO TO 9.	
>> The voltage difference of Cell 18, 20, 22, and 24 is more than \pm 100mV, respectively.: GO TO 10.	
>> The voltage difference of Cell 25, 27, 29, and 31 is more than \pm 100mV, respectively.: GO TO 11.	
>> The voltage difference of Cell 26, 28, 30, and 32 is more than \pm 100mV, respectively.: GO TO 12.	G
>> The voltage difference of Cell 33, 35, 37, and 39 is more than \pm 100mV, respectively.: GO TO 13.	
>> The voltage difference of Cell 34, 36, 38, and 40 is more than \pm 100mV, respectively.: GO TO 14.	
>> The voltage difference of Cell 41, 43, 45, and 47 is more than \pm 100mV, respectively.: GO TO 15.	Н
>> The voltage difference of Cell 42, 44, 46, and 48 is more than \pm 100mV, respectively.: GO TO 16.	
>> The voltage difference of Cell 49, 51, 53, and 55 is more than \pm 100mV, respectively.: GO TO 17.	
>> The voltage difference of Cell 50, 52, 54, and 56 is more than \pm 100mV, respectively.: GO TO 18.	
>> The voltage difference of Cell 57, 59, 61, and 63 is more than \pm 100mV, respectively.: GO TO 19.	
>> The voltage difference of Cell 58, 60, 62, and 64 is more than \pm 100mV, respectively.: GO TO 20.	
>> The voltage difference of Cell 55, 67, 69, and 71 is more than \pm 100mV, respectively.: GO TO 21.	
>> The voltage difference of Cell 66, 68, 70, and 71 is more than \pm 100mV, respectively.: GO TO 22.	.1
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>> The voltage difference of Cell 73, 75, 77, and 79 is more than \pm 100mV, respectively.: GO TO 23.	
>> The voltage difference of Cell 74, 76, 78, and 80 is more than \pm 100mV, respectively.: GO TO 24.	
>> The voltage difference of Cell 81, 83, 85, and 87 is more than \pm 100mV, respectively.: GO TO 25.	Κ
>> The voltage difference of Cell 82, 84, 86, and 88 is more than \pm 100mV, respectively.: GO TO 26.	
>> The voltage difference of Cell 89, 91, 93, and 95 is more than \pm 100mV, respectively.: GO TO 27.	
>> The voltage difference of Cell 90, 92, 94, and 96 is more than \pm 100mV, respectively.: GO TO 28.	1

5. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Modulo No	Module No. Cell No.		Module		LBC	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 1		1		50	
	Cell 3	LB8	3	LB3	51	- - - Existed
	Cell 5	LDO	5		52	
Module 1	Cell 7		7		53	
Module 1	Cell 2		2		34	EXISIEU
	Cell 4	LB7	4	LB3	35	
	Cell 6		6	LDJ	36	
	Cell 8		8		37	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector. А

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< DTC/CIRCUIT DIAGNOSIS >

6. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	BC	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 1		1		50		
	Cell 3	LB8	3	LB3	51		
	Cell 5	LDO	5	LDJ	52		
Module 1	Cell 7		7		53	Existed	
	Cell 2	LB7	2	LB3	34		
	Cell 4		4		35		
	Cell 6		6		36		
	Cell 8		8		37		
	Cell 9		1	LB3	54		
Module 2	Cell 11	LB10	3		55	Existed	
woodle 2	Cell 13	LDTU	5		56		
	Cell 15		7		57		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

7. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Module		LE	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 2		2		34	
Module 1	Cell 4	LB7	4	LB3	35	Existed
Module 1	Cell 6	LD/	6	LDJ	36	Existed
	Cell 8	-	8		37	
	Cell 9	LB10	1		54	Existed
	Cell 11		3	LB3	55	
	Cell 13		5		56	
Module 2	Cell 15	-	7		57	
	Cell 10		2		38	
	Cell 12		4		39	
	Cell 14	LB9	6		40	
	Cell 16		8		42	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

8. CHECK CELL VOLTAGE DETECTION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Module No. Cell No.		Module		LBC		Continuity	
	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 9		1		54		
	Cell 11	LB10	3	LB3	55		
	Cell 13	LDIV	5	LD3	56		
lodule 2	Cell 15		7		57	Existed	
	Cell 10		2	– LB3 –	38	EXISIEU	
	Cell 12	LB9	4		39		
	Cell 14	LD9	6	LDJ	40		
	Cell 16		8		42		
	Cell 17		1		58		
lodulo 2	Cell 19	LB12	3	102	LB3 59 Existed	Eviated	
Module 3 Cell 21 Cell 23	Cell 21	LBIZ	5	LD3 -	60	EXISIEU	
	Cell 23		7	1	61		

YES >> GO TO 29.

NO >> Repair harness or connector.

9.CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Module		LBC		Continuity		
	Cell No.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 10		2		38			
Module 2	Cell 12	LB9	4	102	39	Existed		
	Cell 14	LD9	6	LB3	40	EXISIEU		
	Cell 16		8		42			
	Cell 17		1	LB3 58 59 60 61 Existed LB3		58		
	Cell 19	LB12	3		59	59		
	Cell 21	LDIZ	5		60			
Module 3	Cell 23		7		61	Existed		
would 3	Cell 18		2		43		LXISIEU	
	Cell 20	LB11	4					
	Cell 22		6		45			
	Cell 24		8		46			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

10.check cell voltage detection circuit

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Мо	dule	LE	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 17		1		58	
	Cell 19	LB12	3	LB3	59	
	Cell 21	LDTZ	5	LDJ	60	
Module 3	Cell 23		7		61	Existed
wodule 3	Cell 18		2	LB3	43	EXISIO
	Cell 20	LB11	4		44	
	Cell 22		6		45	
	Cell 24		8		46	
	Cell 25		1	LB3	62	Existed
Module 4	Cell 27		3		63	
WOULLE 4	Cell 29	LB14	5		77	
_	Cell 31		7	LB4	78	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

11. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Module		LE	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 18		2		43	
Module 3	Cell 20	LB11	4	LB3	44	Existed
wodule 3	Cell 22	LDII	6	LDJ	45	Existed
	Cell 24		8	-	46	
	Cell 25	LB14	1	LB3 LB4	62	Existed
	Cell 27		3		63	
	Cell 29		5		77	
Module 4	Cell 31		7		78	
Module 4	Cell 26		2	1 00	47	
	Cell 28	1.040	4	LB3	48	
	Cell 30	LB13	6	LB4	65	
	Cell 32		8		66	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

12. CHECK CELL VOLTAGE DETECTION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	dule	LB	SC	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 25		1	LB3	62		
	Cell 27	LB14	3		63		
	Cell 29	LD14	5		LB4 77		
Module 4	Cell 31		7	LD4	78	Eviated	
	Cell 26	- LB13	2	LB3	47	Existed	
	Cell 28		4		48		
	Cell 30		6	LB4	65		
	Cell 32		8	LD4	66		
	Cell 33		1		80		
Module 5	Cell 35	LB16	3	LB4	81	Existed	
	Cell 37	LDIO	5	LD4	82	EXISIEU	
C	Cell 39		7	1	83		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $13. {\sf check \ cell \ voltage \ detection \ circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мос	dule	LE	BC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 26		2	LB3	47	
Module 4	Cell 28	LB13	4	LDJ	48	Existed
MOUUIE 4	Cell 30	LDIJ	6	LB4	65	
	Cell 32		8	LD4	66	
	Cell 33		1		80	
	Cell 35	LB16	3	- LB4 -	81	
	Cell 37	LDIU	5		82	
Module 5	Cell 39		7		83	Existed
would 5	Cell 34		2		69	Existed
	Cell 36	LB15	4	LB4	70	
	Cell 38		6		71	
	Cell 40		8		72	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

14. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Мо	dule	LE	3C	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 33		1		80		
Module 5	Cell 35	LB16	3	LB4	81		
	Cell 37	LDIU	5		82		
	Cell 39		7		83	Existed	
Module 5	Cell 34		2	LB4	69		
	Cell 36	LB15	4		70		
	Cell 38	LB15	6		71		
	Cell 40		8		72		
	Cell 41		1		84		
Module 6	Cell 43	LB18	3		85	Existed	
	Cell 45	LDIO	5	LB4	86	Existed	
	Cell 47		7		87		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

$15. {\sf check \ cell \ voltage \ detection \ circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	3C	Continuity	
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 34		2		69		
Module 5	Cell 36	LB15	4	LB4	70	Eviated	
wodule 5	Cell 38		6		71	Existed	
	Cell 40		8		72		
	Cell 41		1	- LB4	84	- Existed	
	Cell 43		3		85		
	Cell 45	LB18	5		86		
Module 6	Cell 47		7		87		
wodule 6	Cell 42		2		73		
	Cell 44		4		74		
	Cell 46	LB17	6	_ LB4 -	75		
	Cell 48		8		76		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $16. {\sf check \, cell \, voltage \, detection \, circuit}$

< DTC/CIRCUIT DIAGNOSIS >

Module No.		Moo	dule	LE	BC	Continuity		
module no.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity		
	Cell 41		1		84		-	
Cell 4 Cell 4	Cell 43	- LB18 -	3	LB4	LB4	85		
	Cell 45		5			86		
	Cell 47		7		87	Existed		
	Cell 42	- LB17	2	LB4	73	Existed		
	Cell 44		4		74			
	Cell 46		6		75			
	Cell 48		8		76			
	Cell 49		1		110		-	
Modulo 7	Cell 51		3	IDE	111	Evictod		
Module 7 Cell 53	Cell 53	LB20	5	LB5	112	Existed		
	Cell 55		7		113			

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

17. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Moo	dule	LE	3C	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 42		2		73	
Module 6	Cell 44	LB17	4	– LB4 –	74	Existed
Module 6	Cell 46	LD1/	6	LD4	75	
	Cell 48		8		76	
	Cell 49		1		110	
	Cell 51	LB20	3	- LB5 -	111	
	Cell 53	LDZU	5		112	
Module 7	Cell 55		7		113	
	Cell 50		2		90	Existed
	Cell 52	LB19	4	LB5	91	
	Cell 54	LD19	6	LDJ	92	
	Cell 56		8		93	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $18. {\sf check \ cell \ voltage \ detection \ circuit}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	dule	LE	3C	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 49		1		110		
Module 7	Cell 51	LB20	3	LB5	111		
	Cell 53	LD2U	5		112		
	Cell 55		7		113	Existed	
	Cell 50		2	LB5	90		
	Cell 52	LB19	4		91		
	Cell 54	LB19	6		92		
	Cell 56		8		93		
	Cell 57		1		114		
Madula 9	Cell 59	1 000	3	I DE	115	Existed	
Module 8	Cell 61	LB22	5	LB5	116	Existed	
	Cell 63		7		117		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

19. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мо	dule	LE	3C	Continuity
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 50		2		90	
Module 7	Cell 52	LB19	4	LB5	91	Existed
wodule /	Cell 54	LD19	6		92	Existed
	Cell 56		8		93	
	Cell 57		1	LB5	114	Existed
	Cell 59	LB22	3		115	
	Cell 61	LBZZ	5		116	
Module 8	Cell 63		7		117	
Module o	Cell 58		2		94	
	Cell 60	1004	4		95	
	Cell 62	LB21	6	LB5	96	
	Cell 64		8		97	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

20. CHECK CELL VOLTAGE DETECTION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	dule	LE	SC	Continuity	
module no.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 57		1		114		
Ce Module 8	Cell 59	1000	3	_ LB5 -	115		
	Cell 61	LB22	5		116		
	Cell 63	_	7		117	Eviated	
	Cell 58	- LB21	2	- LB5 -	94	Existed	
	Cell 60		4		95		
	Cell 62		6		96		
	Cell 64		8		97		
	Cell 65		1		118		
Module 9	Cell 67	1004	3	LB5	119	Eviated	
Module 9	Cell 69	LB24	5		120	Existed	
	Cell 71	1	7	1	121		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

21. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mod	dule	LE	BC	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 58		2		94	
Module 8	Cell 60	LB21	4	LB5	95	Estinta d
	Cell 62	LBZI	6	LDO	96	Existed
	Cell 64		8		97	
	Cell 65		1 3		118	
	Cell 67	LB24		- LB5 -	119	
	Cell 69	LD24	5		120	
Module 9	Cell 71		7		121	
wodule 9	Cell 66		2		99	Existed
	Cell 68	LB23	4	LB5	100	
	Cell 70	LDZJ	6		101	
	Cell 72		8		102	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

22. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Мо	dule	LE	3C	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 65		1		118		
	Cell 67	LB24	3	LB5	119		
	Cell 69	LD24	5		120		
Module 9	Cell 71		7		121	Existed	
Module 9	Cell 66		2	LB5	99	LABled	
	Cell 68	1000	4		100		
	Cell 70	LB23	6		101		
	Cell 72		8		102		
	Cell 73		1		122		
Module 10	Cell 75	LEDE	3		123	Eviated	
module 10	Cell 77	LB26	5	LB5	124	Existed	
	Cell 79		7		125		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

$23. {\sf CHECK} \, {\sf CELL} \, {\sf VOLTAGE} \, {\sf DETECTION} \, {\sf CIRCUIT}$

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Mo	dule	LE	3C	Continuity
Noule No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 66		2		99	
Module 9	Cell 68	LB23	4	LB5	100	Existed
	Cell 70		6		101	
	Cell 72		8		102	
	Cell 73	LB26	1	LB5	122	- Existed
	Cell 75		3		123	
	Cell 77		5		124	
Module 10	Cell 79		7		125	
	Cell 74		2		103	
	Cell 76	LB25	4	LB5	104	
	Cell 78		6		105	
	Cell 80		8		106	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

24. CHECK CELL VOLTAGE DETECTION CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	dule	LE	BC	Continuity	
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity	
	Cell 73		1		122		
	Cell 75	LB26	3	I D 5	123		
	Cell 77	LD20	5	LB5	124		
Madula 10	Cell 79		7		125	Existed	
Module 10 Cell 74	Cell 74		2		103	Existed	
	Cell 76	I DOF	4	- LB5 -	104)4	
	Cell 78	- LB25	6		105		
	Cell 80		8		106		
	Cell 81 1	1	I P5	127		-	
Module 11	Cell 83	1 000	3	LB5	128	Existed	
	Cell 85	- LB28	5	LB6	137	EXISTED	
	Cell 87		7	LDO	138		

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

25. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Мос	dule	LE	3C	Continuity
	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 74 Cell 76		2		103	
Module 10		LB25	4	LB5	E viete d	
	Cell 78	LDZJ	6	LDJ	105	Existed
	Cell 80		8		106	
	Cell 81		1	LB5	127	
	Cell 83	LB28	3	LDJ	128	
	Cell 85	LDZO	5	LB6	137	
Module 11	Cell 87		7	LDU	138	Existed
	Cell 82		2	LB5	107	Existed
	Cell 84	LB27	4	LDJ	108	
	Cell 86		6	LB6	130	
	Cell 88		8	LDU	131	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

26. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

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< DTC/CIRCUIT DIAGNOSIS >

Module No.	Cell No.	Moo	Module		3C	Continuity
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 81		1	LB5	127	
	Cell 83	LB28	3	LDJ	128	
	Cell 85	LD20	5	L DC	137	
Module 11	Cell 87		7	LB6	138	Existed
	Cell 82		2	LB5 LB6	107	EXISTED
	Cell 84	LB27	4		108	
	Cell 86		6		130	
	Cell 88		8	LDO	131	
	Cell 89		1		140	Existed
Module 12	Cell 91		3		141	
would 12	Cell 93	LB30	5	LB6	142	
	Cell 95		7		143	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

27. CHECK CELL VOLTAGE DETECTION CIRCUIT

Check continuity between Li-ion battery controller harness connector and module (cell) harness connector.

Module No.	Cell No.	Module		LBC		Continuity
Module No.	Cell NO.	Connector	Terminal	Connector	Terminal	Continuity
	Cell 82		2	LB5	107	
Module 11	Cell 84	LB27	4	LDJ	108	Evictod
	Cell 86	LDZI	6	I P6	130	Existed
	Cell 88	-	8	LB6	131	
	Cell 89	- LB30	1	LB6	140	Existed
	Cell 91		3		141	
	Cell 93		5		142	
Madula 12	Cell 95	-	7		143	
Module 12	Cell 90		2		132	
	Cell 92	1 000	4		133	
	Cell 94	LB29	6	LB6	134	
	Cell 96		8		135	

Is the inspection result normal?

YES >> GO TO 29.

NO >> Repair harness or connector.

 $28. {\sf CHECK} \, {\sf CELL} \, {\sf VOLTAGE} \, {\sf DETECTION} \, {\sf CIRCUIT}$

< DTC/CIRCUIT DIAGNOSIS >

Module No.		O all N a	O all Nia	Mod	lule	LE	BC	O an time it a	
Woddie 140.	Cell No.	Connector	Terminal	Connector	Terminal	Continuity			
	Cell 89		1		140				
	Cell 91	1 0 2 0	3		141				
	Cell 93	_ LB30	5	LB6	142				
Madula 12	Cell 95		7		143	Eviated			
Module 12	Cell 90		2		132	Existed			
	Cell 92	LB29 -	4	LB6	133				
	Cell 94	- LD29 -	6	LD0	134				
	Cell 96		8		135				
9.снеск т	HE HISTOP	s or connecto RY OF REPLA ent history of	CEMENT-		ck assembly	<u>.</u>			
there a histo	•	•			-				
YES-2 55 W	nen there is	a history of re	eplacing sin	alo modulo r					
rej if 1 MG YES-3 >> W NO >> GG	blacing a mo the Li-ion ba bdule includi hen there is D TO 31.	odule replaced attery is withir ing an abnorn a history of b	in the past 17 month nal cell. Ref attery pack	i, it is possible s from the m er to <u>HBB-18</u> assembly rep	e to replace anufacturing <u>8, "Explode</u>		ement		
ге if t YES-3 >> W NO >> G 0.СНЕСК Т	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF	odule replaced attery is within ing an abnorn a history of b RY OF REPLA	d in the past 17 month nal cell. Ref attery pack	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2	e to replace anufacturing 8, "Explode placement, C	t as a single module replac date. In this case, replac <u>d View"</u> . SO TO 31.	ement		
re if t MC YES-3 >> W NO >> GO O.CHECK 1 heck the mod	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded du	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla	e to replace anufacturing 8, "Explode placement, C	t as a single module replac g date. In this case, replac <u>d View"</u> .	ement		
re if t YES-3 >> W NO >> G 0.CHECK 1 heck the mod it more than	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa 17 months f	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re from the date	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla <u>ture?</u>	e to replace anufacturing 8, "Explode blacement, C	t as a single module replace date. In this case, replace <u>View"</u> . SO TO 31.	cement ce only		
re if t YES-3 >> W NO >> G 0.CHECK 1 heck the mod it more than	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re from the date	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla <u>ture?</u>	e to replace anufacturing 8, "Explode blacement, C	t as a single module replac date. In this case, replac <u>d View"</u> . SO TO 31.	cement ce only		
$re \\ if t \\ may \\ YES-3 >> Wi \\ NO >> GO \\ O.CHECK T \\ heck the mode \\ it more than \\ YES >> Re \\ bly \\ NO >> Re \\ content \\ Solution \\ Solut$	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>r</u> .	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re from the date the 12 modul dule including	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal o	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla ture? o <u>HBB-202, "</u> cell. Refer to j	e to replace anufacturing <u>8, "Explode</u> blacement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u>	t as a single module replace date. In this case, replace <u>View"</u> . SO TO 31.	cement ce only		
$re \\ if t \\ may \\ YES-3 >> Wi \\ NO >> GO \\ O.CHECK T \\ heck the mode \\ it more than \\ YES >> Re \\ bly \\ NO >> Re \\ content \\ Solution \\ Solut$	blacing a mo the Li-ion ba odule includi hen there is D TO 31. THE HISTOF dule manufa <u>17 months f</u> eplace all of <u>r</u> .	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re from the date the 12 modul	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal o	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla ture? o <u>HBB-202, "</u> cell. Refer to j	e to replace anufacturing <u>8, "Explode</u> blacement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u>	t as a single module replace date. In this case, replace <u>d View"</u> . SO TO 31. I the 12 modules. <u>FACK : Disassembly and A</u>	cement ce only		
$re \\ if t \\ mo \\ YES-3 >> W \\ NO >> G \\ 0.CHECK T \\ heck the mode it more than \\ YES >> Re \\ bly \\ NO >> Re \\ 0.CHECK T \\ heck the batt \\ heck the batt \\ bcation, refer the batt \\ bcation $	blacing a mo the Li-ion ba odule includi hen there is 0 TO 31. THE HISTOF dule manufa <u>17 months f</u> place all of <u>/'</u> . place a mod THE DATE C ery pack ass to <u>HBB-208.</u>	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re- from the date the 12 modul dule including OF MANUFAC sembly manuf "MODULE S	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal o TURE OF I acturing da TACK : Inst	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla <u>ture?</u> b <u>HBB-202, "</u> cell. Refer to LI-ION BATTE te included in <u>bection"</u> .	e to replace anufacturing 8, "Explode blacement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u> ERY	t as a single module replace date. In this case, replace <u>d View"</u> . SO TO 31. I the 12 modules. <u>FACK : Disassembly and A</u>	ement e only		
re i f f f f f f f f f f f f f f f f f f	blacing a mo the Li-ion ba odule includi hen there is 0 TO 31. THE HISTOF dule manufa <u>17 months f</u> place all of <u>the DATE C</u> ery pack ass to <u>HBB-208.</u> 17 months f	odule replaced attery is within ing an abnorm a history of b RY OF REPLA cturing date re- from the date the 12 modul dule including DF MANUFAC sembly manuf "MODULE S from the date	d in the past n 17 month nal cell. Ref attery pack ACEMENT-2 ecorded dur of manufac es. Refer to abnormal of TURE OF I acturing da TACK : Insp of manufac	t, it is possible s from the m er to <u>HBB-18</u> assembly rep 2 ring the repla <u>ture?</u> o <u>HBB-202, "I</u> cell. Refer to _ _I-ION BATTE te included in <u>pection"</u> .	e to replace anufacturing 8, "Explode blacement, C cement of a <u>MODULE S</u> <u>HBB-195, "E</u> ERY the module	t as a single module replace g date. In this case, replace <u>d View"</u> . SO TO 31. I the 12 modules. <u>FACK : Disassembly and A</u> <u>Exploded View"</u> . serial number label. For the	e label		
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P33E0 DLC DIAGNOSIS HPCM

< DTC/CIRCUIT DIAGNOSIS >

P33E0 DLC DIAGNOSIS HPCM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P33E0" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P33E0	DLC DIAGNOSIS HPCM	When the Li-ion battery controller detects an error in CAN data.	HPCMLi-ion battery controller

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I)WITH CONSULT

- Turn ignition switch ON and wait at least 5 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P33E0 detected?

- YES >> Refer to <u>HBB-168, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check "Self Diagnostic Result".

DTC-detected control module and DTC	malfunction parts
"P33E0" is detected only in "HV BAT".	LBC
 "P33E0" is detected in "HV BAT". "P3250" is detected in "MOTOR CONTROL".	НРСМ

>> Replace a malfunctioning part corresponding to the control module detecting DTC.

Revision: 2013 March

INFOID:000000008141032

P33E1 DLC DIAGNOSIS ECM

< DTC/CIRCUIT DIAGNOSIS >

P33E1 DLC DIAGNOSIS ECM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P33E1" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P33E1	DLC DIAGNOSIS ECM	When the Li-ion battery controller detects an error in CAN	data. • ECM • Li-ion battery controller
отс со	NFIRMATION PROCE	DURE	
1. PERF	ORM DTC CONFIRMAT	ION PROCEDURE	
P)WITH	CONSULT		
1. Turn 2. Sele	ignition switch ON and v	vait at least 5 seconds. " mode of "HV BAT" using CONSULT.	
YES	>> Refer to <u>HBB-169, "D</u> >> INSPECTION END	iagnosis Procedure".	
Diagno	sis Procedure		INFOID:00000008141034
1. PERF	ORM SELF-DIAGNOSIS		
1. Perfo	CONSULT orm "All DTC Reading" w ck "Self Diagnostic Resul		
DT	C-detected control module and	DTC malfunction parts	
"P33E1" i	s detected only in "HV BAT".	LBC	
• "P33E1	" is detected in "HV BAT". " is detected in "MOTOR CON	ECM	

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INFOID:000000008141033

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P33E2 DLC DIAGNOSIS TCM

< DTC/CIRCUIT DIAGNOSIS >

P33E2 DLC DIAGNOSIS TCM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P33E2" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P33E2	DLC DIAGNOSIS TCM	When the Li-ion battery controller detects an error in CAN data.	Li-ion battery controllerTransmission-related parts

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

(I) WITH CONSULT

- Turn ignition switch ON and wait at least 5 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P33E2 detected?

- YES >> Refer to <u>HBB-170, "Diagnosis Procedure"</u>.
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check "Self Diagnostic Result".

DTC-detected control module and DTC	malfunction parts
"P33E2" is detected only in "HV BAT".	LBC
 "P33E2" is detected in "HV BAT". A control module other than "HV BAT" detects a transmission-related DTC. 	Perform diagnosis of the transmission-related DTC detected by a control module other than "HV BAT".

>> Replace a malfunctioning part corresponding to the control module detecting DTC.

P33F0 DLC DIAGNOSIS TCM

< DTC/CIRCUIT DIAGNOSIS >

P33F0 DLC DIAGNOSIS TCM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P33F0" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P33F0	DLC DIAGNOSIS TCM	When the Li-ion battery controller detects an error in CAN data.	Li-ion battery controllerTransmission-related parts
DTC CON	NFIRMATION PROCEDU	RE	
1.PERFC	ORM DTC CONFIRMATION	PROCEDURE	
	ONSULT		
	•	it least 5 seconds. ode of "HV BAT" using CONSULT.	
	> Refer to <u>HBB-171, "Diagn</u> > INSPECTION END	osis Procedure".	
Diagnos	is Procedure		INFOID:00000008141038
1 .PERFC	ORM SELF-DIAGNOSIS		
	CONSULT m "All DTC Reading" with C < "Self Diagnostic Result".	ONSULT.	
DTC	-detected control module and DTC	malfunction parts	
"P33F0" is	detected only in "HV BAT".	LBC	
• "P33F0"	is detected in "HV BAT".	Perform diagnosis of the transmission-	related

 "P33F0" is detected in "HV BAT". 	Perform diagnosis of the transmission-related
 A control module other than "HV BAT" detects a 	DTC detected by a control module other than "HV
transmission-related DTC.	BAT".

>> Replace a malfunctioning part corresponding to the control module detecting DTC.

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P33F1 DLC DIAGNOSIS TCM

< DTC/CIRCUIT DIAGNOSIS >

P33F1 DLC DIAGNOSIS TCM

DTC Logic

DTC DETECTION LOGIC

NOTE:

If DTC "P33F1" is displayed with DTC "UXXXX", first perform the trouble diagnosis for DTC "UXXXX".

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
P33F1	DLC DIAGNOSIS TCM	When the Li-ion battery controller detects an error in CAN data.	Li-ion battery controllerTransmission-related parts

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

- Turn ignition switch ON and wait at least 5 seconds.
- 2. Select "Self Diagnostic Result" mode of "HV BAT" using CONSULT.

Is P33F1 detected?

- YES >> Refer to HBB-172, "Diagnosis Procedure".
- NO >> INSPECTION END

Diagnosis Procedure

1.PERFORM SELF-DIAGNOSIS

(I)WITH CONSULT

- 1. Perform "All DTC Reading" with CONSULT.
- 2. Check "Self Diagnostic Result".

DTC-detected control module and DTC	malfunction parts
"P33F1" is detected only in "HV BAT".	LBC
 "P33F1" is detected in "HV BAT". A control module other than "HV BAT" detects a transmission-related DTC. 	Perform diagnosis of the transmission-related DTC detected by a control module other than "HV BAT".

>> Replace a malfunctioning part corresponding to the control module detecting DTC.

INFOID:000000008141040

U0100 LOST COMMUNICATION ECM

< DTC/CIRCUIT DIAGNOSIS >

U0100 LOST COMMUNICATION ECM

DTC Logic

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INFOID:000000008141041

DTC DETECTION LOGIC

U0100 LOST COMMUNICATION ECM Li-ion battery controller cannot receive a CAN communication signal from ECM for 2 seconds or more continuously. Harness or connector (CAN communication line of 2 AN communication line of 2 Seconds or more continuously. DTC CONFIRMATION PROCEDURE 1.PREPARATION BEFORE STARTING OPERATIONS If other DTC confirmation Procedure is performed immediately before this procedure, turn the ign OFF and wait at least 10 seconds to start the next test. >> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE BWITH CONSULT 1. Perform work procedure (inspection mode 5). Refer to HBC-91, "Work Procedure (Inspection 2. Start the engine and wait for 5 seconds or more. 3. Perform "All DTC Reading" with CONSULT. 4. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". Is U0100, U0101, U0111 or U0293 detected? YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to HBB-173, "Diagn dure")	s
 PREPARATION BEFORE STARTING OPERATIONS If other DTC confirmation Procedure is performed immediately before this procedure, turn the ignorphic and wait at least 10 seconds to start the next test. >> GO TO 2. PERFORM DTC CONFIRMATION PROCEDURE WITH CONSULT Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> 2. Start the engine and wait for 5 seconds or more. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". Is U0100, U0101, U0111 or U0293 detected? YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173. "Diagnoture"</u>) >> INSPECTION END 	pen or short)
f other DTC confirmation Procedure is performed immediately before this procedure, turn the ign DFF and wait at least 10 seconds to start the next test. >> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE WITH CONSULT 1. Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> 2. Start the engine and wait for 5 seconds or more. 3. Perform "All DTC Reading" with CONSULT. 4. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". Is U0100, U0101, U0111 or U0293 detected? YES => GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn</u> <u>dure"</u>) => INSPECTION END	
 DFF and wait at least 10 seconds to start the next test. >> GO TO 2. 2.PERFORM DTC CONFIRMATION PROCEDURE WITH CONSULT Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> 2. Start the engine and wait for 5 seconds or more. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". s U0100, U0101, U0111 or U0293 detected? YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn dure"</u>) >> INSPECTION END 	
 PERFORM DTC CONFIRMATION PROCEDURE WITH CONSULT Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> Start the engine and wait for 5 seconds or more. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". <u>U0100, U0101, U0111 or U0293 detected?</u> YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn dure"</u>) >> INSPECTION END 	nition switch
 WITH CONSULT Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> Start the engine and wait for 5 seconds or more. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". <u>Is U0100, U0101, U0111 or U0293 detected?</u> YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn dure"</u>) >> INSPECTION END 	
 Perform work procedure (inspection mode 5). Refer to <u>HBC-91, "Work Procedure (Inspection</u> Start the engine and wait for 5 seconds or more. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". <u>Is U0100, U0101, U0111 or U0293 detected?</u> YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn dure"</u>) >> INSPECTION END 	
 Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". <u>Is U0100, U0101, U0111 or U0293 detected?</u> YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173. "Diagn dure"</u>) >> INSPECTION END 	<u>Mode 5)"</u> .
YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173. "Diagn</u> <u>dure"</u>) >> INSPECTION END	
NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at receiving.)>>GO TO 3 NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173</u> , "Diagn <u>dure"</u>) >> INSPECTION END	
NO-2 (When repaired after performing the diagnosis procedure. Refer to <u>HBB-173, "Diagn</u> <u>dure"</u>) >> INSPECTION END	t the time of
O	nosis Proce-
3. PERFORM CAN DIAGNOSIS	
 WITH CONSULT Perform "CAN DIAGNOSIS" Check diagnosis result. 	
>> Refer to <u>HBB-173, "Diagnosis Procedure"</u> .	
Diagnosis Procedure	IFOID:000000008141042
CAUTION:	
 To perform diagnosis, observe the cautions in performing diagnoses. Refer to <u>LAN-9</u>, "F for <u>Trouble Diagnosis</u>". To repair harnesses, observe the cautions in repairing harnesses. Refer to <u>LAN-9</u>, "Precedarments of the precedence of the	
1.START INSPECTION	
Check for malfunctions (Check "CAN DIAGNOSIS" results).	
Are there any current or past malfunctions?	
YES >> Refer to <u>LAN-19, "Trouble Diagnosis Flow Chart"</u> . NO >> GO TO 2.	
2. IDENTIFY MALFUNCTIONING PART	

Check "Self Diagnostic Result" of "MOTOR CONTROL".

U0100 LOST COMMUNICATION ECM

< DTC/CIRCUIT DIAGNOSIS >

Detected DTC	Malfunction part
DTC U0100, U0101, U0111, and U0293	 CAN communication system (Short circuit and traction motor invert- er branch lines^{*1}) ECM HPCM TCM Li-ion battery controller Traction motor inverter
DTC U0100	ECM branch linesECM
DTC U0101	TCM branch linesTCM
DTC U0111	Li-ion battery controller branch linesLi-ion battery controller
DTC U0293	 HPCM branch lines HPCM^{*2}
DTC U0101, U0111 and U0293	Main line between traction motor inverter and TCM
DTC U0111 and U0293	Main line between HPCM and TCM

NOTE:

*1: If DTC "U0110" is detected by "EV/HEV", check traction motor inverter branch lines first.
*2: When replacing HPCM, replace battery junction box together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-49, "Intermittent Incident".

U0101 LOST COMMUNICATION TCM

< DTC/CIRCUIT DIAGNOSIS >

U0101 LOST COMMUNICATION TCM

DTC Logic

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INFOID:000000008141043

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
U0101	LOST COMMUNICATION TCM	Li-ion battery controller cannot receive a CAN communication signal from TCM for 2 seconds or more continuously.	Harness or connector (CAN communication line open or short)
DTC CO	NFIRMATION PROCEDUI	RE	
1.PREPA	ARATION BEFORE STARTIN	NG OPERATIONS	
	TC confirmation procedure is wait at least 10 seconds to s	s performed immediately before this p tart the next test.	procedure, turn the ignition switch
•	> GO TO 2.		
	DRM DTC CONFIRMATION	PROCEDURE	
2. Start f	rm work procedure (inspection the engine and wait for 5 sections		Procedure (Inspection Mode 5)".
4. Checl	rm "All DTC Reading" with C < if the DTC is detected in "S U0101, U0111 or U0293 det	Self Diagnostic Result" of "MOTOR CO	NTROL".
YES > NO-1 (W	> GO TO 3.	', "U0111" or "U0293" is stored in "M	OTOR CONTROL" at the time of
NO-2 (V <u>dure"</u>) >	/hen repaired after perform	ning the diagnosis procedure. Refer	to HBB-173, "Diagnosis Proce-
<u> </u>	ORM CAN DIAGNOSIS		
	CONSULT rm "CAN DIAGNOSIS" < diagnosis result.		
>	> Refer to <u>HBB-173, "Diagn</u>	osis Procedure".	
Diagnos	sis Procedure		INFOID:00000008141044
		e cautions in performing diagnoses	s. Refer to <u>LAN-9, "Precautions</u>
• To repa		cautions in repairing harnesses. R	efer to <u>LAN-9, "Precautions for</u>
1.START	INSPECTION		
Check for	malfunctions (Check "CAN I	DIAGNOSIS" results).	
	any current or past malfunct		
NO >	 Refer to <u>LAN-19, "Trouble</u> GO TO 2. 		
2.IDENT	IFY MALFUNCTIONING PA	RT	

WITH CONSULT Check "Self Diagnostic Result" of "MOTOR CONTROL".

U0101 LOST COMMUNICATION TCM

< DTC/CIRCUIT DIAGNOSIS >

Detected DTC	Malfunction part
DTC U0100, U0101, U0111, and U0293	 CAN communication system (Short circuit and traction motor invert- er branch lines^{*1}) ECM HPCM TCM Li-ion battery controller Traction motor inverter
DTC U0100	ECM branch linesECM
DTC U0101	TCM branch linesTCM
DTC U0111	Li-ion battery controller branch linesLi-ion battery controller
DTC U0293	 HPCM branch lines HPCM^{*2}
DTC U0101, U0111 and U0293	Main line between traction motor inverter and TCM
DTC U0111 and U0293	Main line between HPCM and TCM

NOTE:

*1: If DTC "U0110" is detected by "EV/HEV", check traction motor inverter branch lines first.
*2: When replacing HPCM, replace battery junction box together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-49, "Intermittent Incident".

U0110 LOST COMM INV/MC

< DTC/CIRCUIT DIAGNOSIS >

U0110 LOST COMM INV/MC

DTC Logic

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В

INFOID:000000008141045

DTC DETECTION LOGIC

DTC DTC detecting condition Trouble diagnosis name Possible causes HBB Li-ion battery controller cannot receive a CAN LOST COMMUNICATION Harness or connector U0110 communication signal from traction motor inverter INV/MC (CAN communication line open or short) for 2 seconds or more continuously. DTC CONFIRMATION PROCEDURE D 1. PREPARATION BEFORE STARTING OPERATIONS If other DTC confirmation procedure is performed immediately before this procedure, turn the ignition switch E OFF and wait at least 10 seconds to start the next test. >> GO TO 2. F 2. PERFORM DTC CONFIRMATION PROCEDURE (P)WITH CONSULT 1. Perform work procedure (inspection mode 5). Refer to HBC-91, "Work Procedure (Inspection Mode 5)". Start the engine and wait for 5 seconds or more. 2. 3. Perform "All DTC Reading" with CONSULT. Check if the DTC is detected in "Self Diagnostic Result" of "MOTOR CONTROL". Н 4. Is U0100, U0101, U0111 or U0293 detected? YES >> GO TO 3. NO-1 (When DTC "U0100", "U0101", "U0111" or "U0293" is stored in "MOTOR CONTROL" at the time of receiving.)>>GO TO 3. NO-2 (When repaired after performing the diagnosis procedure. Refer to HBB-173, "Diagnosis Procedure") >> INSPECTION END 3.PERFORM CAN DIAGNOSIS (P)WITH CONSULT Κ Perform "CAN DIAGNOSIS" 1. 2. Check diagnosis result. >> Refer to <u>HBB-173</u>, "Diagnosis Procedure". **Diagnosis** Procedure INFOID:000000008141046 M CAUTION: To perform diagnosis, observe the cautions in performing diagnoses. Refer to <u>LAN-9</u>, "Precautions for Trouble Diagnosis". Ν To repair harnesses, observe the cautions in repairing harnesses. Refer to LAN-9, "Precautions for Harness Repair". **1.**START INSPECTION Check for malfunctions (Check "CAN DIAGNOSIS" results). Are there any current or past malfunctions? YES >> Refer to LAN-19, "Trouble Diagnosis Flow Chart". Ρ NO >> GO TO 2. 2. IDENTIFY MALFUNCTIONING PART (P)WITH CONSULT

Check "Self Diagnostic Result" of "MOTOR CONTROL".

U0110 LOST COMM INV/MC

< DTC/CIRCUIT DIAGNOSIS >

Detected DTC	Malfunction part
DTC U0100, U0101, U0111, and U0293	 CAN communication system (Short circuit and traction motor invert- er branch lines^{*1}) ECM HPCM TCM Li-ion battery controller Traction motor inverter
DTC U0100	ECM branch lines ECM
DTC U0101	TCM branch linesTCM
DTC U0111	Li-ion battery controller branch linesLi-ion battery controller
DTC U0293	 HPCM branch lines HPCM^{*2}
DTC U0101, U0111 and U0293	Main line between traction motor inverter and TCM
DTC U0111 and U0293	Main line between HPCM and TCM

NOTE:

*1: If DTC "U0110" is detected by "EV/HEV", check traction motor inverter branch lines first.
*2: When replacing HPCM, replace battery junction box together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-49, "Intermittent Incident".

U0293 LOST COMMUNICATION HPCM

< DTC/CIRCUIT DIAGNOSIS >

U0293 LOST COMMUNICATION HPCM

DTC Logic

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INFOID:000000008141047

DTC DETECTION LOGIC

	Trouble diagnosis name	DTC detecting condition	Possible causes
U0293	LOST COMMUNICATION HPCM	Li-ion battery controller cannot receive a CAN communication signal from HPCM for 2 seconds or more continuously.	Harness or connector (CAN communication line open or short)
1.PREPA	RATION BEFORE STAR	TING OPERATIONS	
	C confirmation Procedur	e is performed immediately before this o start the next test.	s procedure, turn the ignition switch
>	> GO TO 2.		
2.PERFC	RM DTC CONFIRMATIC	N PROCEDURE	
 Start tl Perfor 	m work procedure (inspe he engine and wait for 5 s m "All DTC Reading" with		
	U0101, U0111 or U0293	-	
NO-1 (W receiving NO-2 (W <u>dure"</u>) >:	.)>>GO TO 3. 'hen repaired after perfo > INSPECTION END	01", "U0111" or "U0293" is stored in " orming the diagnosis procedure. Ref	
3.PERFO	RM CAN DIAGNOSIS		
	ONSULT m "CAN DIAGNOSIS" diagnosis result.		
>:	> Refer to <u>HBB-173, "Dia</u>	gnosis Procedure".	
Diagnos	is Procedure		INFOID:0000000814104
		the cautions in performing diagnos	ses. Refer to <u>LAN-9, "Precautions</u>
To repai Harness	r harnesses, observe tl Repair".	he cautions in repairing harnesses.	Refer to LAN-9, "Precautions for
	INSPECTION		
опеск тог ч	malfunctions (Check "CA any current or past malfu	,	
Are there a YES >: NO >:	 Refer to <u>LAN-19, "Trou</u> GO TO 2. FY MALFUNCTIONING I 		

Check "Self Diagnostic Result" of "MOTOR CONTROL".

U0293 LOST COMMUNICATION HPCM

< DTC/CIRCUIT DIAGNOSIS >

Detected DTC	Malfunction part
DTC U0100, U0101, U0111, and U0293	 CAN communication system (Short circuit and traction motor invert- er branch lines^{*1}) ECM HPCM TCM Li-ion battery controller Traction motor inverter
DTC U0100	ECM branch linesECM
DTC U0101	TCM branch linesTCM
DTC U0111	Li-ion battery controller branch linesLi-ion battery controller
DTC U0293	 HPCM branch lines HPCM^{*2}
DTC U0101, U0111 and U0293	Main line between traction motor inverter and TCM
DTC U0111 and U0293	Main line between HPCM and TCM

NOTE:

*1: If DTC "U0110" is detected by "EV/HEV", check traction motor inverter branch lines first.
*2: When replacing HPCM, replace battery junction box together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-49, "Intermittent Incident".

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

CAN (Controller Area Network) is a serial communication line for real time applications. It is an on-vehicle multiplex communication line with high data communication speed and excellent error detection ability. Modern vehicle is equipped with many electronic control units, and each control unit shares information and links with other control units during operation (not independent). In CAN communication, control units are connected HBB with 2 communication lines (CAN-H, CAN-L) allowing a high rate of information transmission with less wiring Each control unit transmits/receives data but selectively reads the required data only.CAN communication signal chart. Refer to LAN-36, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart".

DTC Logic

INFOID:000000008141049

INFOID:000000008141050

INFOID:000000008141051

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	DTC detecting condition	Possible causes
U1000	CAN COMM CIRCUIT	Li-ion battery controller cannot receive a CAN communica- tion signal for 2 seconds or more continuously.	CAN communication system

Diagnosis Procedure

For the diagnosis procedure, refer to LAN-19, "Trouble Diagnosis Flow Chart".

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INSULATION RESISTANCE

Component Inspection

INFOID:000000008141052

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses/face shield before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

1.PRECONDITIONING

WARNING:

Shut off high voltage circuit. Refer to <u>GI-30, "How to Cut Off High Voltage"</u>. Remove Li-ion battery. Refer to <u>HBB-188, "Removal and Installation"</u>.

>> GO TO 2.

2.CHECK LI-ION BATTERY INSULATION RESISTANCE

CAUTION:

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

1. Disconnect Li-ion battery controller harness connector.

WARNING:

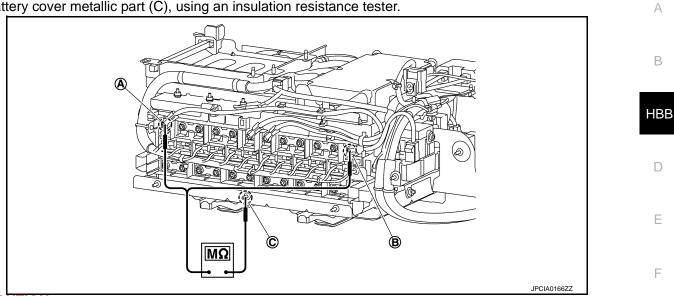
Immediately insulate disconnected high voltage connectors and terminals with insulating tape.

2. Remove front battery cover from Li-ion battery. Refer to <u>HBB-195, "Exploded View"</u>.

INSULATION RESISTANCE

< DTC/CIRCUIT DIAGNOSIS >

3. Check insulation resistance between Li-ion battery positive terminal (A)/negative terminal (B) and lower battery cover metallic part (C), using an insulation resistance tester.



CAUTION:

- Be sure to set the insulation resistance tester to 500V when performing this test.
- Using a setting higher than 500V can result in damage to the component being inspected.

Li-ion battery terminals	Ground	Resistance
+	Lower battery cover metallic part	21 M Ω or more
_	Lower battery cover metallic part	

Is the inspection result normal?

YES >> INSPECTION END

>> Replace Li-ion battery (battery pack). Refer to HBB-188, "Removal and Installation". NO

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< DTC/CIRCUIT DIAGNOSIS >

POWER SUPPLY AND GROUND CIRCUIT LI-ION BATTERY CONTROLLER

LI-ION BATTERY CONTROLLER : Diagnosis Procedure

INFOID:000000008141053

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective gear consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to HBB-6, "High Voltage Precautions".

CAUTION:

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

1.CHECK FUSE

Check that the 10A fuse (No.64) is not fusing.

NOTE:

Refer to PG-43, "Fuse and Fusible Link Arrangement" for fuse layout.

Is the fuse fusing?

YES >> GO TO 2.

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

2. CHECK POWER SUPPLY-1

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

	+			
	Li-ion	battery	Voltage	
Connector	Connector Terminal		Connector Terminal	
B283	6	B283	2	Battery voltage
6203	0	6205	14	Dattery Voltage

Is the inspection result normal?

YES >> GO TO 6.

NO >> GO TO 3.

3.CHECK POWER SUPPLY-2

1. Disconnect Li-ion battery harness connector.

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

	+		
Li-ion	battery	_	Voltage
Connector	Terminal		
B283 6		Ground	Battery voltage
منابع محمد معاني ما	المصبيح منافلين مصبحا	2	

Is the inspection result normal?

YES >> GO TO 4.

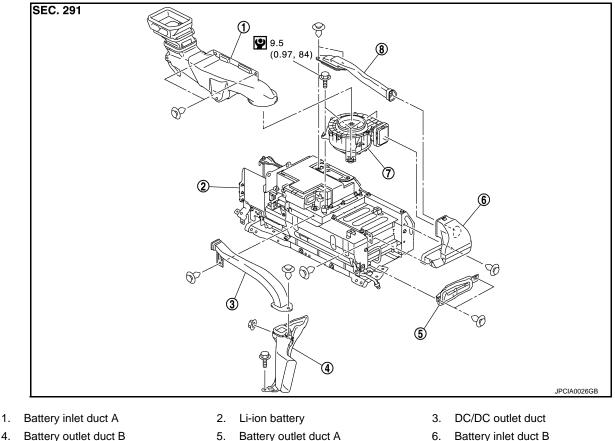
POWER SUPPLY AND GROUND CIRCUIT

	_	WER SUPP			
	T DIAGNOSIS				
	pair or replace e	rror-detected p	arts.		А
1. CHECK GRO	JUND				~
	•	. ,	fer to <u>GI-52, "C</u>	rcuit Inspection".	
•	n result normal?	-			В
YES >> GO NO >> Red	TO 5. cover the installa	ation status of (Pround		
_	OVER THE INSTANCE		Siouna.		HBB
	y between Li-ior		ss connector ar	nd ground.	
					D
Li-ion t	-	_	Continuity		
Connector	Terminal 2				_
B283	14	Ground	Existed		E
	n result normal?	-			F
				mittent Incident".	F
NO >> rei	pair or replace e	illoi-gerecrea h	ans.		
VARNING: Shut off high v Remove Li-ion b	oltage circuit. battery. Refer to			Dff High Voltage". allation".	G
VARNING: Shut off high v Remove Li-ion b >> GO CHECK POV	oltage circuit. battery. Refer to TO 7. VER SUPPLY C) <u>HBB-188, "Re</u> CIRCUIT	moval and Insta		H
Remove Li-ion B >> GO CHECK POV Check continuit	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior) <u>HBB-188, "Re</u> CIRCUIT n battery harnes	moval and Insta	<u>allation"</u> .	H
VARNING: Shut off high v Remove Li-ion b >> GO CHECK POV Check continuity Li-ion b	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior	HBB-188, "Re CIRCUIT n battery harnes Li-ion batter	moval and Insta ss connector ar ry controller	<u>allation"</u> .	H
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k	oltage circuit. pattery. Refer to TO 7. VER SUPPLY C y between Li-ior pattery Terminal	DIRCUIT n battery harnes Li-ion batter	moval and Insta ss connector ar ry controller Terminal	allation". nd Li-ion battery controller harness Continuity	H s connector.
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6	DIRCUIT n battery harnes Li-ion batter Connector LB1	moval and Insta ss connector ar ry controller	allation". Ind Li-ion battery controller harness	H
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39 s the inspection YES >> GO NO >> Rep CHECK GRO	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 n result normal? TO 8. Dair or replace e DUND CIRCUIT	DIRCUIT n battery harnes Li-ion batter Connector LB1 2 error-detected p	moval and Insta ss connector ar ry controller Terminal 12 varts.	allation". nd Li-ion battery controller harness Continuity	H s connector. J K
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39 s the inspection YES >> GO NO >> Rep CHECK GRO	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 TO 8. Dair or replace e DUND CIRCUIT y between Li-ior	P HBB-188, "Re CIRCUIT In battery harnes Li-ion batter Connector LB1 Connector LB1 Connector Connector LB1 Connector Connector LB1 Connector LB1 Connector Connector LB1 Connector Connector LB1 Connector Connector LB1 Connector Connector LB1 Connector Connect	moval and Insta ss connector ar ry controller Terminal 12 parts. ss connector ar	allation". nd Li-ion battery controller harness Continuity Existed	H I s connector. J K L
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39 s the inspection YES >> GO NO >> Rep CHECK GRO	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 TO 8. Dair or replace e DUND CIRCUIT y between Li-ior	P HBB-188, "Re CIRCUIT In battery harnes Li-ion batter Connector LB1 Connector LB1 Connected p -2 error-detected p -2 n battery harnes	moval and Insta ss connector ar ry controller Terminal 12 varts.	allation". nd Li-ion battery controller harness Continuity Existed	H I s connector. J K L
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39 S the inspection YES >> GO NO >> Rep CHECK GRO Check continuity Li-ion k Connector	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 n result normal? TO 8. Dair or replace e DUND CIRCUIT y between Li-ior	DIRCUIT n battery harnes Li-ion batter Connector LB1 Connected p -2 n battery harnes Li-ion batter	moval and Insta ss connector ar ry controller Terminal 12 Parts. ss connector ar ry controller	Allation". Ind Li-ion battery controller harness Continuity Existed Ind Li-ion battery controller harness Continuity	H I s connector. J K L s connector. M
VARNING: Shut off high v Semove Li-ion k >> GO .CHECK POV Check continuity Li-ion k Connector LB39 S the inspection YES >> GO NO >> Rep .CHECK GRO Check continuity Li-ion k	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 n result normal? TO 8. Dair or replace e DUND CIRCUIT y between Li-ior Dattery Terminal	DIRCUIT n battery harnes Li-ion batter Connector LB1 	moval and Insta ss connector ar ry controller Terminal 12 harts. ss connector ar ry controller Terminal	Allation". Ind Li-ion battery controller harness Continuity Existed Ind Li-ion battery controller harness	H s connector. J K L S connector. M
VARNING: Shut off high v Remove Li-ion k >> GO CHECK POV Check continuity Li-ion k Connector LB39 Sthe inspection YES >> GO NO >> Rep CHECK GRO Check continuity Li-ion k Connector LB39	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 D result normal? TO 8. Dair or replace e DUND CIRCUIT y between Li-ior Dattery Terminal 2 14	P HBB-188, "Re CIRCUIT In battery harnes Li-ion batter Connector LB1 Connected p F-2 In battery harnes Li-ion batter Connector LB1	moval and Insta ss connector ar ry controller Terminal 12 parts. ss connector ar ry controller ry controller Terminal 3	Allation". Ind Li-ion battery controller harness Continuity Existed Ind Li-ion battery controller harness Continuity	H I s connector. J K L s connector. M
VARNING: Shut off high v Remove Li-ion k >> GO 7.CHECK POV Check continuity Li-ion k Connector LB39 s the inspection YES 3.CHECK GRO Check continuity Li-ion k Connector Li-ion k Check continuity Li-ion k Connector LB39 s the inspection YES S the inspection YES S the inspection YES	oltage circuit. Dattery. Refer to TO 7. VER SUPPLY C y between Li-ior Dattery Terminal 6 D result normal? TO 8. Dair or replace e DUND CIRCUIT y between Li-ior Dattery Terminal 2 14 D result normal?	DIRCUIT n battery harnes Li-ion batter Connector LB1 	moval and Insta ss connector ar ry controller Terminal 12 Parts. ss connector ar ry controller Terminal 3 15 to <u>GI-49, "Inter</u>	Allation". Ind Li-ion battery controller harness Continuity Existed Ind Li-ion battery controller harness Continuity	H I s connector. J K L S connector. M

< REMOVAL AND INSTALLATION > **REMOVAL AND INSTALLATION** COOLING SYSTEM

Exploded View

INFOID:000000008141054



- Battery outlet duct B 4.
- Battery cooling fan 7.
- : N·m (kg-m, in-lb) U

Removal and Installation

INFOID:000000008141055

WARNING:

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

8. DC/DC inlet duct

- · Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to HBB-6, "High Voltage Precautions".

CAUTION:

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

COOLING SYSTEM

< REMOVAL AND INSTALLATION >

REMOVAL А WARNING: Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage". 1. Remove the trunk finisher front. Refer to INT-52, "TRUNK FINISHER FRONT : Removal and Installation". В 2. Remove the DC/DC outlet duct, battery outlet duct B, and battery inlet duct A. WARNING: HBB To prevent electric shock hazards, be sure to wear protective gear. D 3. Remove the DC/DC inlet duct. • Clip (A) is not visible because it is located on the reverse side of the DC/DC inlet duct (1). Remove as shown in the figure. Ð Е WARNING: F To prevent electric shock hazards, be sure to wear protective gear. Â e (B) JSCIA0298ZZ Н Remove the mounting bolts (A) and remove the battery cooling 4. fan (1). ና ት <□ : Vehicle front WARNING: To prevent electric shock hazards, be sure to wear protective gear. Κ (Ă) JSCIA0299ZZ **INSTALLATION** L Install in the reverse order of removal. Μ Ν

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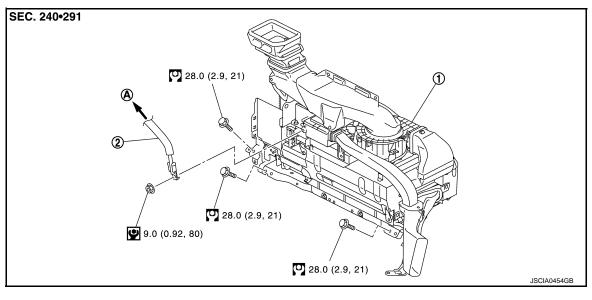
< UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION LI-ION BATTERY

Exploded View

INFOID:000000008141056

INFOID:000000008141057



1. Li-ion battery assembly

2. DC/DC harness

- A. To 12V battery
- : N·m (kg-m, in-lb)
- : N·m (kg-m, ft-lb)

Removal and Installation

WARNING:

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

• Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

REMOVAL

WARNING:

Shut off high voltage circuit. Refer to GI-30, "How to Cut Off High Voltage".

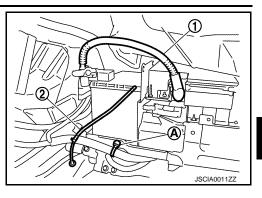
- 1. Remove the trunk finisher front. Refer to INT-52, "TRUNK FINISHER FRONT : Removal and Installation".
- 2. Remove battery inlet duct A, DC/DC outlet duct, and battery outlet duct B. Refer to <u>HBB-186</u>, "Exploded <u>View"</u>.

HBB-188

< UNIT REMOVAL AND INSTALLATION >

 Remove the DC/DC harness (1), the battery vent tube (2), and the high voltage harness clip (A).
 CAUTION:

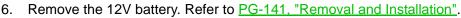
Hold the tip of tube to remove the battery vent tube.



(A)

- 4. Remove cover of 12V battery positive terminal.
- 5. Remove the mounting bolts (A) and then remove the 12V battery cover A (1).

: Removal direction



- 7. Remove the terminal cover (1).
 - A : Mounting bolt
 - B : Mounting nut

WARNING:

 \checkmark To prevent electric shock hazards, be sure to wear protective gear.

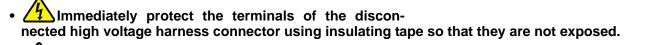
8. Disconnect the high voltage harness connectors (A).

: Removal direction

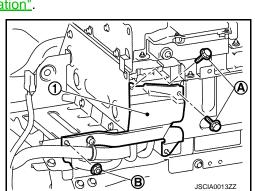
DANGER:

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

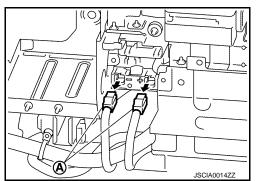




• 1 Immediately protect the terminals of the disconnected battery junction box using insulating tape so that they are not exposed.



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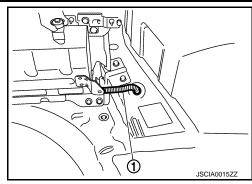
< UNIT REMOVAL AND INSTALLATION >

 Grasp the rubber base of the gas discharge tube (1) and remove the tube from the vehicle-side discharge port (body member).
 WARNING:

WARNING:

To prevent electric shock hazards, be sure to wear protective gear.





10. Hook approximately 15 mm (A) from the end of the gas discharge tube (1) onto the tube base on the battery and check that the flange on the end of the tube does not come off from the tube base.

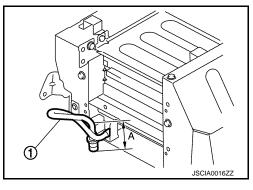
WARNING:

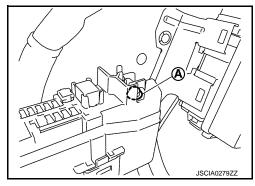
To prevent electric shock hazards, be sure to wear protective gear.

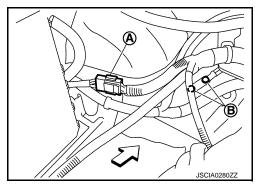


11. Remove the mounting nut (A), then disconnect the harness from the fuse box on the left side of the trunk room.

- 12. Disconnect the capacitor harness connector (A) and remove the ground cable mounting bolts (B).
 - \triangleleft : Vehicle front





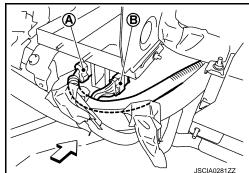


13. Disconnect the high voltage harness connector (A) and harness connector (B).

 \triangleleft : Vehicle front

DANGER:

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



< UNIT REMOVAL AND INSTALLATION >

Immediately protect the terminals of the disconnected high voltage harness connector В using insulating tape so that they are not exposed.

- 14. Disconnect the fusible link connector that is integrated with the battery. Refer to PG-142. "Exploded View".
- 15. Disconnect the atmospheric pressure sensor harness connector (A).
- 16. Disconnect the harness clip that is installed on the Li-ion battery. WARNING:

To prevent electric shock hazards, be sure to wear protective gear.

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- 17. Remove the rear seat. Refer to SE-93, "Removal and Installation".
- 18. Remove the HPCM. Refer to HBC-339, "Removal and Installation".
- 19. Remove the battery pack mounting bolts (A) from the passenger compartment side.

 \triangleleft : Vehicle front

WARNING:

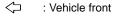
To prevent electric shock hazards, be sure to wear protective gear.



• When the noise insulation sheet (1) that is attached to the body panel on the rear seat back is removed, it is possible to check the mounting bolts.

 \triangleleft : Vehicle front

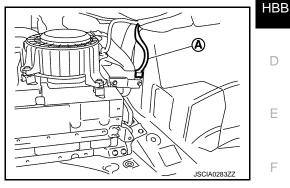
20. Remove the battery pack mounting bolts (A) from the trunk side.

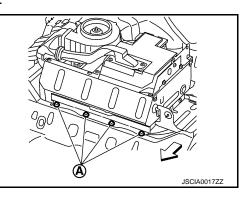


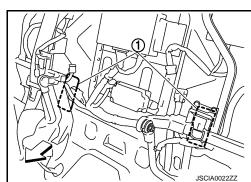
WARNING:

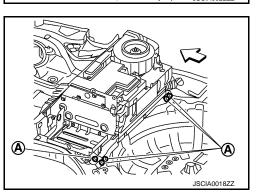
To prevent electric shock hazards, be sure to wear protective gear.











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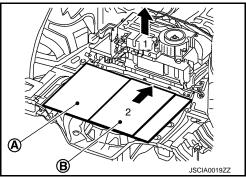
< UNIT REMOVAL AND INSTALLATION >

21. Place a veneer board (A) on top of the spare tire, then lift the battery pack upwards (1) and slide the cardboard (B) underneath the battery pack.

WARNING:

To prevent electric shock hazards, be sure to wear protective gear.



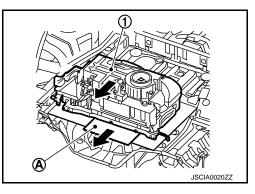


22. Pull the cardboard (A) together with the battery pack (1) toward the rear of the vehicle.

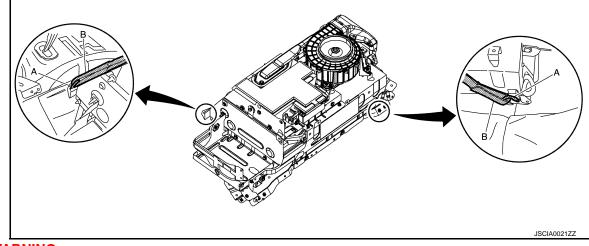


To prevent electric shock hazards, be sure to wear protective gear.





- 23. Follow the procedure below to remove the battery pack from inside the trunk room.
- a. Attach a carabiner (A) in the position as shown in the figure, then connect a belt slinger (B) to it.



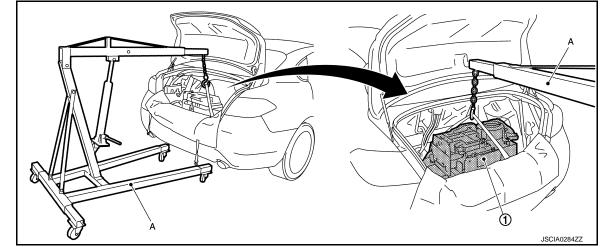


To prevent electric shock hazards, be sure to wear protective gear.



< UNIT REMOVAL AND INSTALLATION >

b. Use an engine crane (A) to lift up the battery pack (1) and remove it from the trunk room.



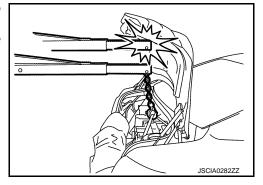
WARNING:

To prevent electric shock hazards, be sure to wear protective gear.



CAUTION:

- Be careful that the engine crane does not contact the trunk lid.
- Apply protection so that no scratches or other damage occurs on the body or trunk lid.



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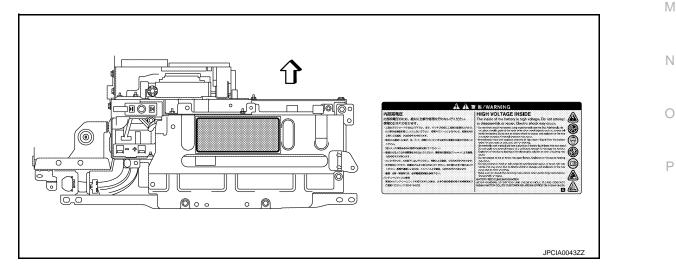
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INSTALLATION

Note the following, and install in the reverse order of removal.

- Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.
- After battery pack installed, be sure to check equipotential. Refer to HBB-194, "Inspection".
- When replacing the battery pack, apply the high voltage warning label as shown in the figure.



: Up side of vehicle

< UNIT REMOVAL AND INSTALLATION >

NOTE:

Before applying the label, check that there is no dust or dirt on the surface of the battery pack.

SERVICE PART

- Since the battery pack assembly is provided as a service part under the following conditions, the controller cover must be removed to connect the harness connector of the Li-ion battery controller before installing to the vehicle.
- Observe the instructions in "How to Install Battery Pack Assembly". For tightening torque, refer to <u>HBB-188</u>, <u>"Exploded View"</u>.

Battery pack assembly (service part) is provided with:

- Harness connector of Li-ion battery controller not connected
- No DC/DC converter
- No DC/DC converter cover

How to Install Battery Pack Assembly

- 1. Remove controller cover. Refer to <u>HBB-200, "LI-ION BATTERY CONTROLLER : Disassembly and Assembly"</u>.
- 2. Connect harness connector of li-ion battery controller.
- 3. Install controller cover.
- 4. Install DC/DC converter. Refer to HBB-197, "DC/DC CONVERTER : Disassembly and Assembly".
- 5. Install DC/DC converter cover. Refer to HBB-197, "DC/DC CONVERTER : Disassembly and Assembly".

Inspection

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INSPECTION AFTER INSTALLATION

EQUIPOTENTIAL TEST

After installing Li-ion battery, measure resistance below.

- Between the Li-ion battery (metal part) and the body (ground bolt).
- Between the Li-ion battery (metal part) and traction motor inverter (aluminum part).

WARNING:

⚠️ To prevent electric shock hazards, be sure to wear protective gear.



Standard : Less than 0.1 Ω

If the result deviates from the standard value, check for paint, oil, dirt, or other substance adhering to the bolts or conductive mounting parts. If such substances are found, clean the surrounding area and remove the foreign substances.

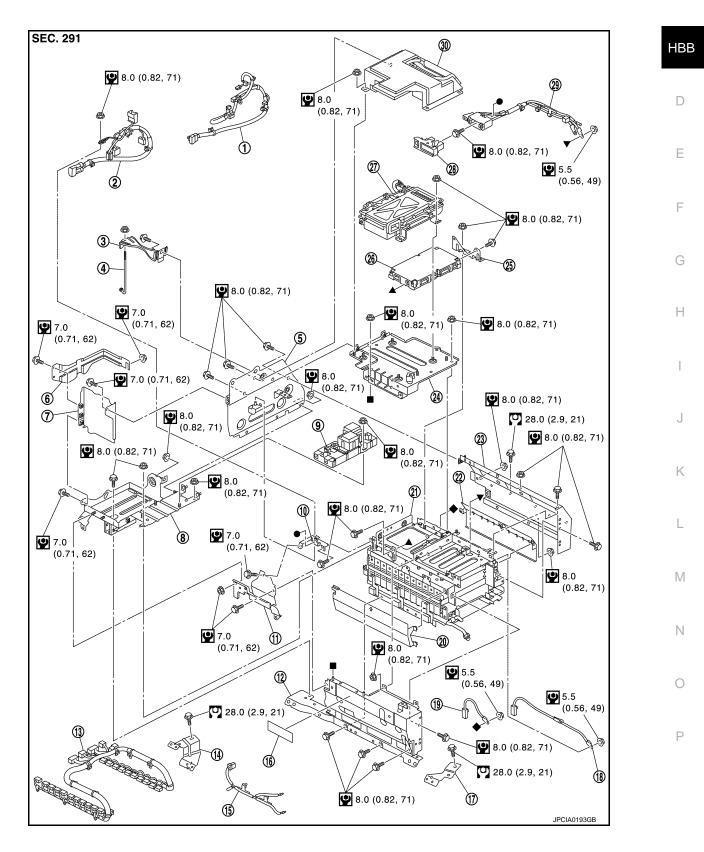
< UNIT DISASSEMBLY AND ASSEMBLY >

UNIT DISASSEMBLY AND ASSEMBLY LI-ION BATTERY

Exploded View

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< UNIT DISASSEMBLY AND ASSEMBLY >

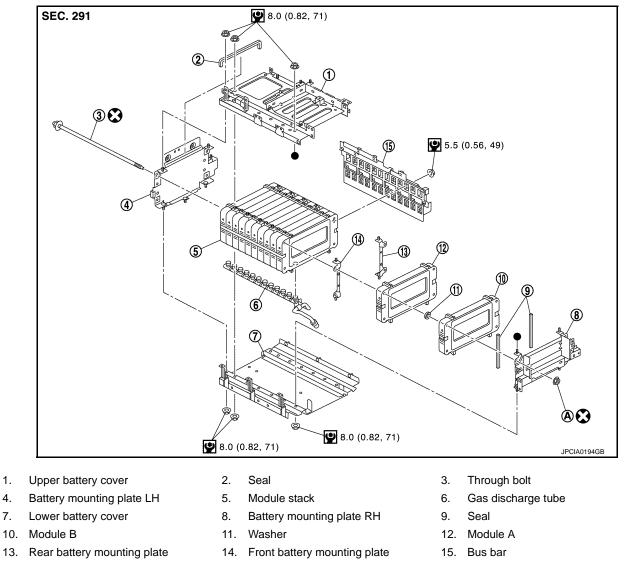
- 1. Vehicle communication harness
- 4. Battery fix rod
- 7. 12V battery cover A
- 10. Service plug bracket
- 13. Cell voltage detection harness
- 16. High voltage warning label
- 19. High voltage harness
- 22. Front harness protector
- 25. Controller bracket
- 28. Service plug
- : N·m (kg-m, in-lb) 0
- : N·m (kg-m, ft-lb) D

- 2. High voltage harness
- 5. Battery cover LH
- 8. Battery junction box bracket
- 11. Terminal cover
- Battery bracket 14.
- 17. Battery bracket
- 20. Rear harness protector
- 23. Front battery cover
- Li-ion battery controller 26.

29. Service plug harness

- 3. Battery fix frame
- 6. 12V battery cover B
- 9. Battery junction box bracket
- 12. Rear battery cover
- Battery temperature sensor 15.
- 18. High voltage harness
- 21. Module stack assembly
- 24. Controller cover
- 27. DC/DC converter
- 30. DC/DC converter cover





Comply with the assembly procedure when tightening. Refer to HBB-202, "MODULE STACK : Disassembly and Assembly". Α.

: Always replace every disassembly (\mathbf{X})

: N·m (kg-m, in-lb) Q

1.

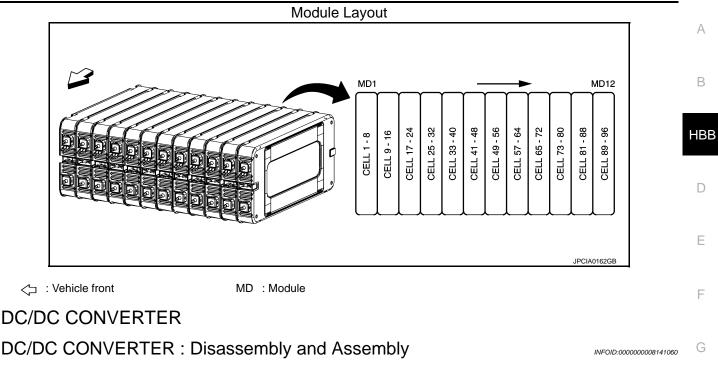
4.

7.

: Indicates that the part is connected at points with same symbol in actual vehicle.

HBB-196

< UNIT DISASSEMBLY AND ASSEMBLY >



WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

DISASSEMBLY

1. Remove battery outlet duct A, battery inlet duct B, and the DC/DC inlet duct from the battery pack. **WARNING:**

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



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< UNIT DISASSEMBLY AND ASSEMBLY >

- 2. Remove the battery cooling fan (1).
 - A. : Mounting bolt

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



- 3. Remove the DC/DC converter cover (1).
 - A. : Mounting nut
 - B. : Mounting bolt

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



Disconnect the DC/DC converter harness connectors (A) (B).
 DANGER:

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



- **1** To prevent electric shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.
- 5. Remove the DC/DC converter (1).

A. : Mounting nut

WARNING:

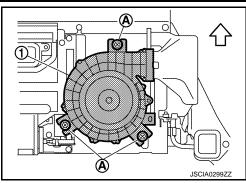
To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

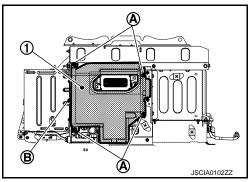


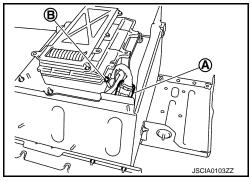
ASSEMBLY Assemble in the reverse order of disassembly. BATTERY JUNCTION BOX

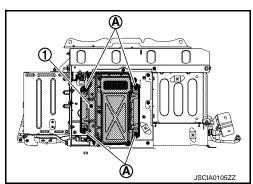
BATTERY JUNCTION BOX : Disassembly and Assembly

WARNING:









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< UNIT DISASSEMBLY AND ASSEMBLY >

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of elec-• tric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before HBB 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 HBB-6, "High Voltage Precautions".

CAUTION:

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

DISASSEMBLY

- Remove the DC/DC converter. Refer to HBB-197, "DC/DC CONVERTER : Disassembly and Assembly". 1.
- Remove the controller cover (1). 2
 - Α. : Mounting bolt
 - B. : Mounting nut

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



3. Remove the mounting bolt (A), and then disconnect the service plug harness (1) from the bracket.

WARNING:

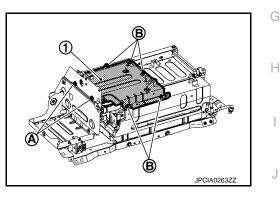
To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

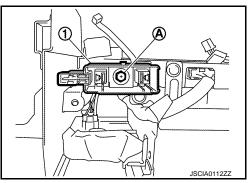


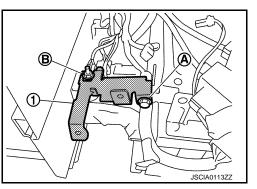
Remove the mounting bolt (A) and the ground cable mounting 4. nut (B), then remove the service plug bracket (1). WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.









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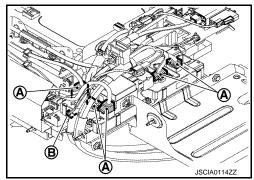
< UNIT DISASSEMBLY AND ASSEMBLY >

5. Disconnect the high voltage harness connectors (A) and vehicle communications harness connector (B) from the battery junction box.

DANGER:

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





 To prevent electric shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

- 6. Remove the battery cover LH (1).
 - A. : Mounting bolt
 - B. : Mounting nut

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



7. Remove the mounting nuts (A), then remove the battery junction box.

WARNING:

box bracket (1).

8.

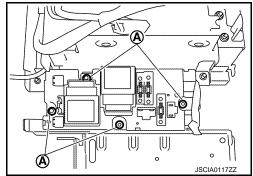
To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

Remove the mounting nuts (A), then remove the battery junction

insulated protective gear and use insulated tools.

To prevent electric shock hazards, be sure to put on





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ASSEMBLY Assemble in the reverse order of disassembly. LI-ION BATTERY CONTROLLER

LI-ION BATTERY CONTROLLER : Disassembly and Assembly

WARNING:

Revision: 2013 March

HBB-200

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< UNIT DISASSEMBLY AND ASSEMBLY >

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before HBB 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 HBB-6, "High Voltage Precautions".

CAUTION:

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

DISASSEMBLY

- 1. Remove the DC/DC converter. Refer to HBB-197, "DC/DC CONVERTER : Disassembly and Assembly".
- 2. Remove the controller cover (1).
 - A. : Mounting bolt
 - B. : Mounting nut

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



- 3. Remove the rear battery cover.
 - A. : Mounting bolt
 - B. : Mounting nut
 - C: : Clips

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

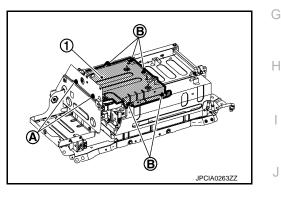


- 4. Remove the front battery cover (1).
 - A. : Mounting bolt
 - B. : Mounting nut

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.





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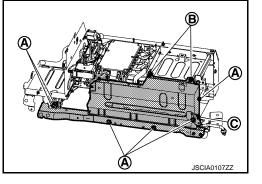
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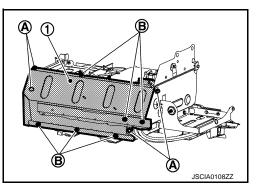
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< UNIT DISASSEMBLY AND ASSEMBLY >

5. Remove the mounting bolts (A) and harness connectors (B), then remove the Li-ion battery controller (1).

WARNING:

• 15 To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



 To prevent electric shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

ASSEMBLY Assemble in the reverse order of disassembly. MODULE STACK

MODULE STACK : Disassembly and Assembly

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(A)

B

(A)

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WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to shut off the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- Be sure to put the removed service plug in your pocket and carry it with you so that another person does not accidentally connect it while work is in progress.
- Be sure to wear insulating protective equipment consisting of glove, shoes and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to <u>HBB-6, "High Voltage Precautions"</u>.

CAUTION:

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

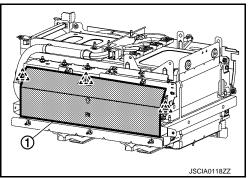
DISASSEMBLY

- 1. Remove the DC/DC converter (1). Refer to <u>HBB-197, "DC/DC CONVERTER : Disassembly and Assembly"</u>.
- 2. Remove the battery junction box. Refer to <u>HBB-198</u>, "<u>BATTERY JUNCTION BOX</u> : <u>Disassembly and</u> <u>Assembly</u>".
- 3. Remove Li-ion battery controller. Refer to <u>HBB-200</u>, "LI-ION BATTERY CONTROLLER : Disassembly and <u>Assembly</u>".
- 4. Remove the front harness protector (1).

2 : Pawls

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear.



< UNIT DISASSEMBLY AND ASSEMBLY >

5. Remove the rear harness protector (1).

: Pawls

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear.



 Remove the mounting nuts (A), then disconnect the high-voltage harness (1).

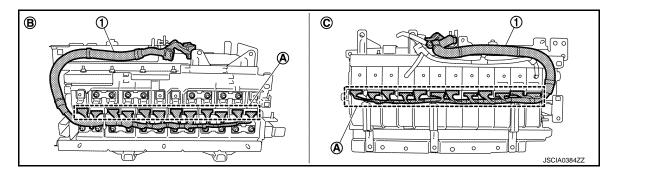
DANGER:

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



To prevent electric shock hazards, immediately wrap insulating tape around disconnected high voltage connector terminals.

7. Disconnect the harness connectors (A), then remove the cell voltage detection harness (1).



B. : Front side

C. : Rear side

WARNING:

• 4 To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



- <u>1</u>
 To prevent electric shock hazards, immediately wrap insulating tape around disconnected or high voltage connector terminals.
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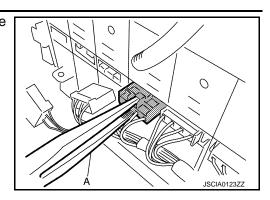
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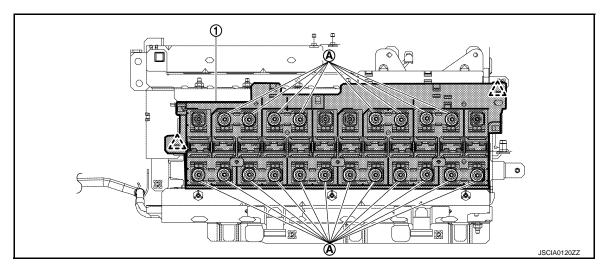
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< UNIT DISASSEMBLY AND ASSEMBLY >

 Disconnect the harness connectors using insulated long-nose pliers (A). Be careful not to pinch the harness.



8. Remove the mounting nuts (A), and then remove the bus bar (1).





DANGER:

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



9. Protect all module terminals (A) using insulating tape so that they are not exposed.

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear.

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< UNIT DISASSEMBLY AND ASSEMBLY >

10. Remove the battery temperature sensor (1).

: Pawls

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



11. Remove the mounting nuts (A), and then remove the upper battery cover (1).

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



12. Turn the module stack so that the bottom faces up, then remove the mounting nuts (A), and then the lower battery cover (1).

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

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13. Remove the gas discharge tube (1). WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear.



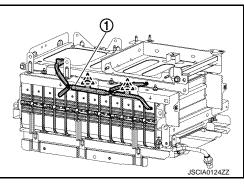
14. Loosen the through-bolt mounting nuts (A).

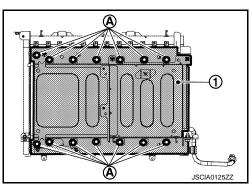
1. : Battery mounting plate RH

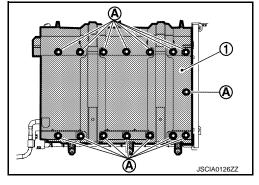
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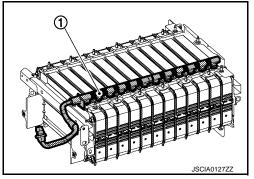
To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.

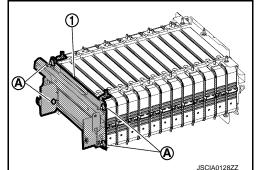












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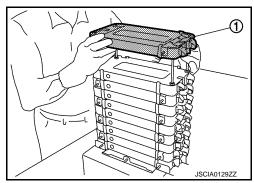
< UNIT DISASSEMBLY AND ASSEMBLY >

15. Stand the module stack as shown in the figure, then remove the module (1).

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.





ASSEMBLY

Note the following items, and assemble in the reverse order of disassembly.

Module

• After replacing with a new module, be sure to record the date of replacement.

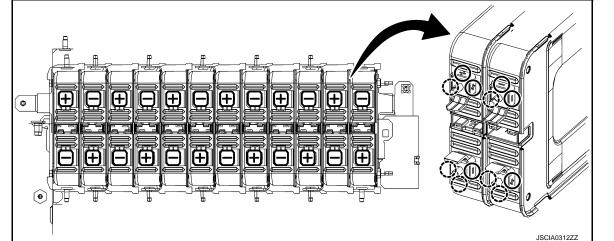
NOTE:

The manufacturing date is stamped on the side of module.

YY. MM. DD Y = Year M = Month D = Date

Example: 10. 11. 02 = November 2, 2010

- When replacing a module with a new module, it is necessary to adjust the voltage of the other modules before installing the new module. For the voltage adjustment procedure, refer to <u>HBB-50</u>, "Work Procedure".
- After assembly, check that the module terminals are arranged as shown in the figure.



• Tighten each through bolt mounting nut (A) to the specified torque.

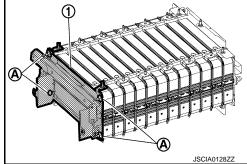
1. : Battery mounting plate RH

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



First tightening torque



: **1**3.0 N·m (0.31 kg-m, 27 in-lb)

< UNIT DISASSEMBLY AND ASSEMBLY >

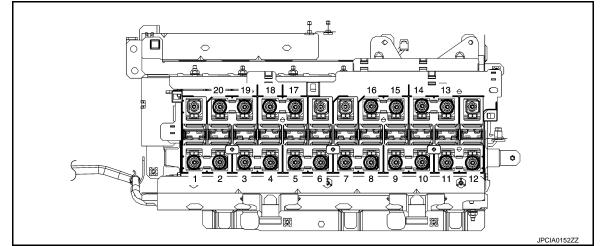
Second tightening torque	: 94.0 N·m (0.41 kg-m, 35 in-lb)	L
Third tightening torque	: 🗣6.7 N·m (0.68 kg-m, 59 in-lb)	

NOTE:

When installing, fix the end of the through bolt and tighten the mounting nut.

Bus Bar

• Tighten nuts in numerical order as shown in the figure to install the bus bar onto the module stack.



WARNING:

2 To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



High-voltage Harness

• Tighten nuts in the numerical order as shown in the figure to install the high-voltage harness onto the module stack.

WARNING:

To prevent electric shock hazards, be sure to put on insulated protective gear and use insulated tools.



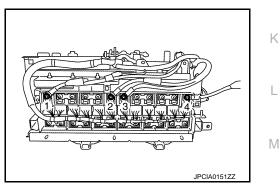
Battery Temperature Sensor

• Install the battery temperature sensor at the position (A) indicated by the arrow as shown in the figure.

- 1. : Battery temperature sensor 2 (Module 1)
- 2. : Battery temperature sensor 1 (Module 9)
- 3. : Battery temperature sensor 3 (Intake)

WARNING:

 \checkmark To prevent electric shock hazards, be sure to put on insulated protective gear.



В

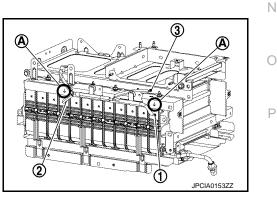
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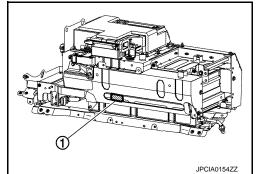
Revision: 2013 March

< UNIT DISASSEMBLY AND ASSEMBLY >

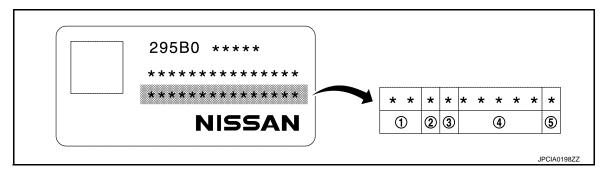
MODULE STACK : Inspection

MODULE SERIAL NUMBER LABEL

• The module serial number label (1) for the Li-ion battery is affixed as shown in the figure.



The module serial number label contains the date of manufacture of the Li-ion battery.



- Year: The last two digits of year 1. Serial No.: 00001 - 99999
 - 2. Month 5. Spare

3. Date

Month/Date

4.

Label	Month	Date	Label	Month	Date	Label	Month	Date
1	1	1	D	—	13	Р	—	23
2	2	2	E	_	14	Q	—	24
3	3	3	F	_	15	R	—	25
4	4	4	G	—	16	S	—	26
5	5	5	Н	_	17	Т	—	27
6	6	6	I	_	—	U	—	
7	7	7	J	_	18	V	—	28
8	8	8	К	_	19	W	—	29
9	9	9	L	—	20	Х	—	30
А	10	10	М	_	21	Y	—	31
В	11	11	N	_	22	Z	—	
С	12	12	0	—	_			

• If a module must be replaced, check the module serial number label. If the date of manufacture is more than 17 months ago, replace all modules at the same time.

Method of judging whether or not to replace all modules

Time since manufacture	Action to take
17 months or less	Replace only the malfunctioning module.
More than 17 months	Replace all modules.

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

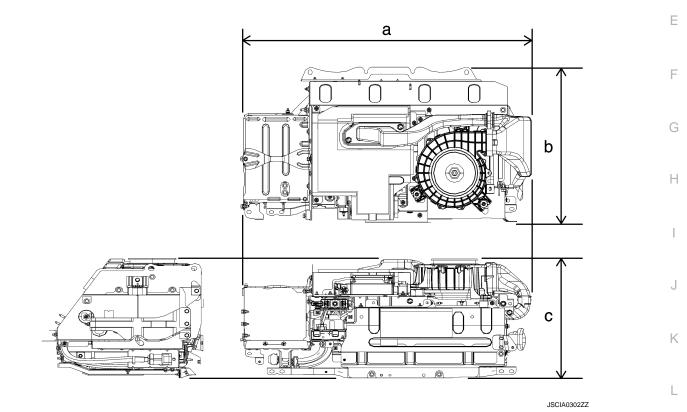
SERVICE DATA AND SPECIFICATIONS (SDS) SERVICE DATA AND SPECIFICATIONS (SDS)

Li-ion Battery

INFOID:000000008141065 B

А

	Items	Specification	HBB
Туре		Li-ion battery	
Structure		12 modules (96 cells)	
Rated voltage	(V)	Approx. 346	D
Weight	[kg (lb)]	Approx. 55.0 (121.28)	



External dimension	"a"	[mm (in)]	847.0 (33.35)	-
	"b"	[mm (in)]	453.0 (17.83)	M
	"c"	[mm (in)]	392.0 (15.43)	_

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