SECTION HBB
HYBRID BATTERY SYSTEM

CONTENTS

PRECAUTION 5

PRECAUTIONS 5
Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER" 5
Precaution for Procedure without Cowl Top Cover 5

CAUTIONS AS TO HIGH VOLTAGE 6
High Voltage Precautions 6
How to Disconnect High Voltage 7
Check Voltage in High Voltage Circuit 9

PREPARATION 11

PREPARATION 11
Commercial Service Tools 11

SYSTEM DESCRIPTION 13

COMPONENT PARTS 13
Component Parts Location 13
Li-ion Battery 14
Service Plug 15
Battery Cooling Fan 15
Warning Label 16

SYSTEM 18
System Description 18
Battery Cooling Control 21
Circuit Diagram 23
Fail-safe 23

WARNING/INDICATOR/CHIME LIST 24
WARNING/INDICATOR/CHIME LIST : Warning lamps/Indicator lamps 24

HANDLING PRECAUTION 25
Hybrid Battery System 25

ON BOARD DIAGNOSTIC (OBD) SYSTEM 26
Diagnosis Description 26
GST (Generic Scan Tool) 26

DIAGNOSIS SYSTEM (LBC) 27

DIAGNOSIS DESCRIPTION 27
DIAGNOSIS DESCRIPTION : 1 Trip Detection Diagnosis and 2 Trip Detection Diagnosis 27
DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data 27
DIAGNOSIS DESCRIPTION : Counter System 28
DIAGNOSIS DESCRIPTION : Driving Pattern 28
DIAGNOSIS DESCRIPTION : Permanent Diagnostic Trouble Code (Permanent DTC) 29
CONSULT Function 29

ECU DIAGNOSIS INFORMATION 33

LI-ION BATTERY CONTROLLER (LBC) 33
Reference Value 33
Fail-safe 35
DTC Inspection Priority Chart 36
DTC Index 37

WIRING DIAGRAM 40

HYBRID BATTERY SYSTEM 40
Wiring Diagram 40

BASIC INSPECTION 50

DIAGNOSIS AND REPAIR WORK FLOW 50
Work Flow 50
Diagnostic Work Sheet 51

ADDITIONAL SERVICE WHEN REPLACING LI-ION BATTERY CONTROLLER 53
Description 53
Work Procedure 53

CONFIGURATION (LI-ION BATTERY CONTROLLER) 54
Description 54
Work Procedure 54

HOW TO ERASE PERMANENT DTC 56
Description 56

DTC/CIRCUIT DIAGNOSIS 57

P0A1F BATTERY ENERGY CONTROL MODULE 57
DTC Description 57
Diagnosis Procedure 57

P0A7E HYBRID BATTERY PACK OVER TEMPERATURE 58
DTC Description 58
Diagnosis Procedure 58

P0A7F CELL CONTROLLER DIAGNOSIS 60
DTC Description 60
Diagnosis Procedure 60

P0A84 HYBRID BAT PACK COOLING FAN 1.. 61
DTC Description 61
Diagnosis Procedure 61

P0A85 HYBRID BAT PACK COOLING FAN 1.. 66
DTC Description 66
Diagnosis Procedure 66

P0A95 HIGH VOLTAGE FUSE 67
DTC Description 67
Diagnosis Procedure 67
Component Inspection 68

P0A9D HYBRID BATTERY TEMPERATURE SENSOR A 69
DTC Description 69
Diagnosis Procedure 69

P0A9E HYBRID BATTERY TEMPERATURE SENSOR A 70
DTC Description 70
Diagnosis Procedure 70

P0AA7 HYBRID BATTERY VOLTAGE ISOLATION SENSOR 71
DTC Description 71
Diagnosis Procedure 71

P0AA9 HYBRID BATTERY VOLTAGE ISOLATION SENSOR 72
DTC Description 72
Diagnosis Procedure 72

P0AAA HYBRID BATTERY VOLTAGE ISOLATION SENSOR 73
DTC Description 73
Diagnosis Procedure 73

P0ABF HYBRID BATTERY PACK CURRENT SENSOR 74
DTC Description 74
Diagnosis Procedure 74

P0AC0 HYBRID BATTERY PACK CURRENT SENSOR 76
DTC Description 76
Diagnosis Procedure 76

P0AC1 HYBRID BATTERY PACK CURRENT SENSOR 77
DTC Description 77
Diagnosis Procedure 77

P0AC2 HYBRID BATTERY PACK CURRENT SENSOR 78
DTC Description 78
Diagnosis Procedure 78

P0AC7 HYBRID BATTERY TEMPERATURE SENSOR B 79
DTC Description 79
Diagnosis Procedure 79

P0AC8 HYBRID BATTERY TEMPERATURE SENSOR B 80
DTC Description 80
Diagnosis Procedure 80

P0ACC HYBRID BATTERY TEMPERATURE SENSOR C 81
DTC Description 81
Diagnosis Procedure 81

P0ACD HYBRID BATTERY TEMPERATURE SENSOR C 82
DTC Description 82
Diagnosis Procedure 82

P0AEA HYBRID BATTERY TEMPERATURE SENSOR D 83
DTC Description 83
Diagnosis Procedure 83

P0AEB HYBRID BATTERY TEMPERATURE SENSOR D 84
DTC Description 84
Diagnosis Procedure 84

P0C6E HYBRID BATTERY TEMPERATURE SENSOR A/B 85
DTC Description 85
Diagnosis Procedure 85

P0C70 HYBRID BATTERY TEMPERATURE SENSOR C/D 86
DTC Description 86
Diagnosis Procedure 86

P3030 CELL CONTROLLER LIN 87
DTC Description 87
Diagnosis Procedure 87

P30D0 SOC RATIONALITY 89
DTC Description 89

Diagnosis Procedure 89

P30EE CELL PROTECTION ON 90
DTC Description 90
Diagnosis Procedure 90

P30EF INTERNAL RESISTANCE 91
DTC Description 91
Diagnosis Procedure 91

P30F1 REGENERATION CONTROL 93
DTC Description 93
Diagnosis Procedure 93

P30F2 DISCHARGE CONTROL 95
DTC Description 95
Diagnosis Procedure 95

P30F4 TOTAL VOLTAGE SENSOR 97
DTC Description 97
Diagnosis Procedure 97

P30F5 TOTAL VOLTAGE SENSOR 98
DTC Description 98
Diagnosis Procedure 98
Component Inspection 99

P30F6 TOTAL VOLTAGE SENSOR 100
DTC Description 100
Diagnosis Procedure 100
Component Inspection 101

P30F7 CELL CONT IC SLEEP DIAG 102
DTC Description 102
Diagnosis Procedure 102

P30F8 SELF SHUT OFF POWER SUPPLY ... 103
DTC Description 103
Diagnosis Procedure 103

P30F9 CONTROL MODULE 104
DTC Description 104
Diagnosis Procedure 104

P30FA SENSOR POWER SUPPLY 105
DTC Description 105
Diagnosis Procedure 105

P30FB SENSOR POWER SUPPLY 106
DTC Description 106
Diagnosis Procedure 106

P30FC OVER CURRENT 107
DTC Description 107
Diagnosis Procedure 107

P30FE 12V BATTERY VOLTAGE 109
DTC Description 109
Diagnosis Procedure 109

P31A5 CAN ERROR HPCM 110
DTC Description 110
Diagnosis Procedure 110

P31A7 CAN ERROR INV/MC 112
DTC Description 112
Diagnosis Procedure 112

P326E - P3273 CELL CONTROLLER IC 114
DTC Description 114
Diagnosis Procedure 115

P327A - P327F CELL CONT IC VOLTAGE2 . 116
DTC Description 116
Diagnosis Procedure 117

P3286 - P328B CELL CONT IC VOLTAGE1 .. 118
DTC Description 118
Diagnosis Procedure 119

P3292 - P3297 CELL CONT IC COMM ER-ROR 120
DTC Description 120
Diagnosis Procedure 121

P329E - P32A9 CELL CONT IC OPEN 122
DTC Description 122
Diagnosis Procedure 124

P32AA - P32AF CELL CONT IC OPEN 125
DTC Description 125
Diagnosis Procedure 126

P3300 TOTAL VOLTAGE OVER 127
DTC Description 127
Diagnosis Procedure 127

P3301 CELL VOLTAGE OVER 129
DTC Description 129
Diagnosis Procedure 129

P3373 TOTAL VOLTAGE OVER DIS-CHARGE 131
DTC Description 131
Diagnosis Procedure 131

P3374 CELL VOLTAGE OVER DISCHARGE. 133
DTC Description 133
Diagnosis Procedure 133

U0100 LOST COMMUNICATION ECM 135
DTC Description 135
Diagnosis Procedure 135

U0101 LOST COMMUNICATION TCM 137
DTC Description 137
Diagnosis Procedure 137

U0110 LOST COMMUNICATION INV/MC 139
DTC Description 139
Diagnosis Procedure 139

U0140 LOST COMMUNICATION BCM 141
DTC Description .....

Diagnosis Procedure 141

U0155 LOST COMMUNICATION METER 142
DTC Description 142
Diagnosis Procedure 142

U0293 LOST COMMUNICATION HPCM 143
DTC Description 143
Diagnosis Procedure 143

U1000 CAN COMM CIRCUIT 145
DTC Description 145
Diagnosis Procedure 145

U1321 CONFIG UNFINISH 146
DTC Description 146
Diagnosis Procedure 146

INSULATION RESISTANCE 147
Component Inspection 147

POWER SUPPLY AND GROUND CIRCUIT .. 149

LI-ION BATTERY CONTROLLER 149
LI-ION BATTERY CONTROLLER : Diagnosis Procedure 149

REMOVAL AND INSTALLATION 151

COOLING SYSTEM 151
Exploded View 151

AIR DUCT A 151
AIR DUCT A : Removal and Installation 151

AIR DUCT B 152
AIR DUCT B : Removal and Installation 152

AIR DUCT C 153
AIR DUCT C : Removal and Installation 153

BATTERY COOLING FAN 154
BATTERY COOLING FAN : Removal and Installation 154

UNIT REMOVAL AND INSTALLATION ... 155

LI-ION BATTERY 155
Exploded View 155
Removal and Installation 155
Inspection 159

DC/DC CONVERTER 160
Exploded View 160
Removal and Installation 160
Inspection 162

SERVICE DATA AND SPECIFICATIONS (SDS) 164

SERVICE DATA AND SPECIFICATIONS (SDS) 164
Li-ion Battery 164

PRECAUTION

PRECAUTIONS

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

INFOID:0000000014749796

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. Information necessary to service the system safely is included in the SR and SB section of this Service Manual.

WARNING:

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

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

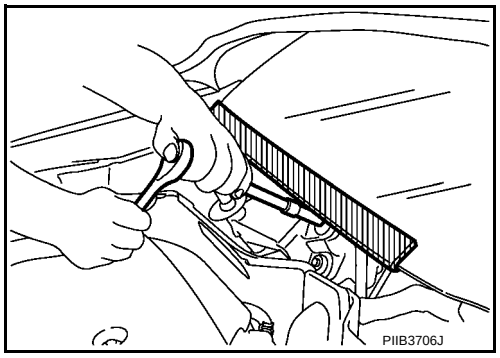
WARNING:

- **When working near the Air Bag Diagnosis Sensor Unit or other Air Bag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.**
- **When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery or batteries, and wait at least three minutes before performing any service.**

Precaution for Procedure without Cowl Top Cover

INFOID:0000000014630667

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



CAUTIONS AS TO HIGH VOLTAGE

High Voltage Precautions

INFOID:0000000015024239

DANGER:

Since hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents resulting in death or severe injury, if high voltage components and vehicle are mishandled. When performing an inspection or maintenance, be sure to comply with the instructions below to perform correct work procedures.

WARNING:

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

CAUTION:

- **Be sure to install the high voltage harness clips to the original positions to prevent damage to high voltage harness. If the clips are damaged, replace them with new ones before installing the high voltage harness.**
- **To prevent damage to parts, never allow coolant to splash on the high voltage harness connector. If coolant splashes on the high voltage harness connector, immediately remove moisture from the high voltage harness connector by using an air blow gun.**
- **Never bring the vehicle into the READY status with the service plug removed unless otherwise instructed in the Service Manual. A malfunction may occur if this is not observed.**

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

GUIDELINES ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

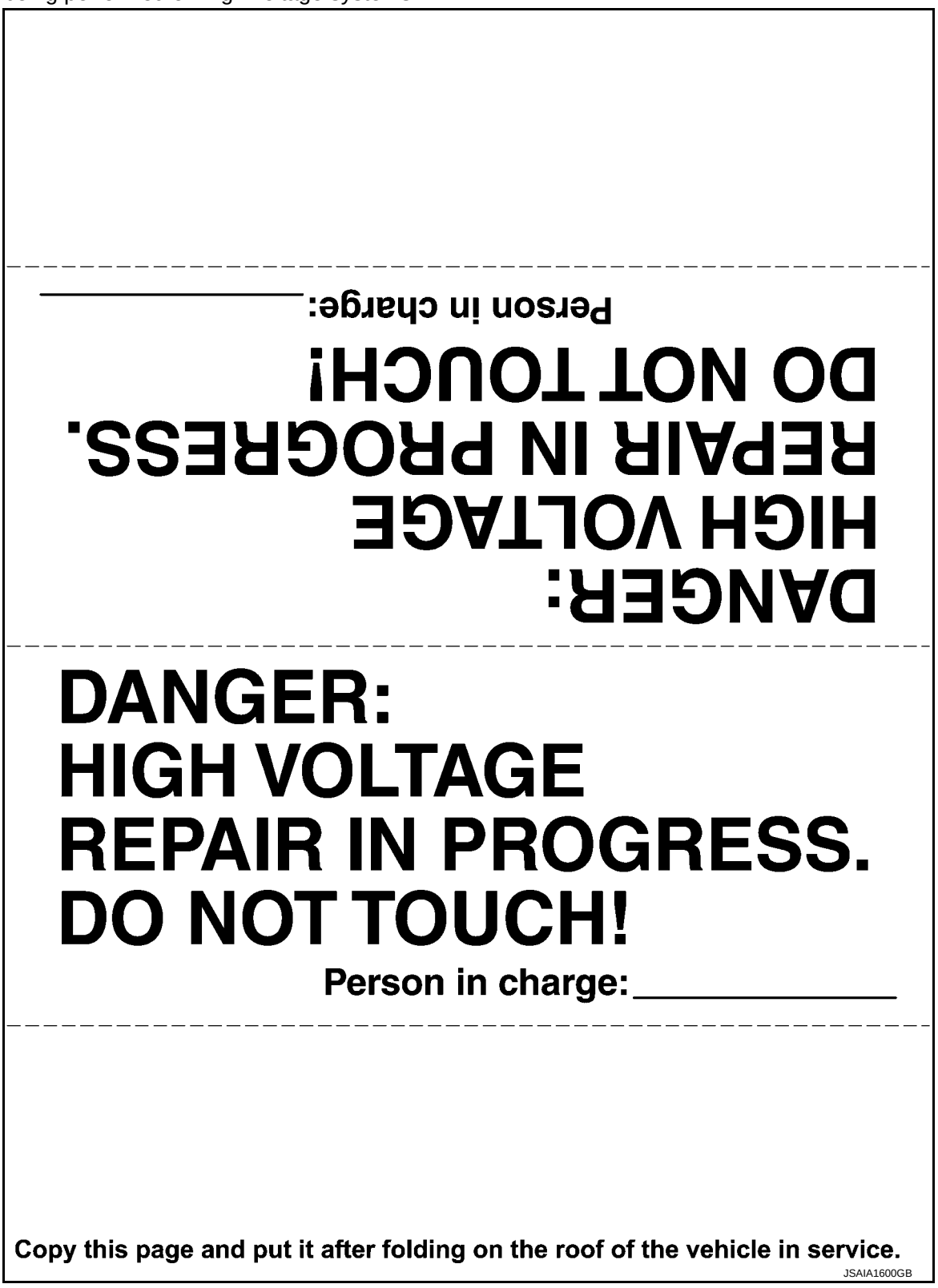
The vehicle contains parts that contain powerful magnets. If a person who is wearing a heart pacemaker or other medical device is close to these parts, the medical device may be affected by the magnets. Such persons must not perform work on the vehicle.

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

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



How to Disconnect High Voltage

INFOID:0000000014844759

PROCEDURE FOR DISCONNECTING HIGH VOLTAGE

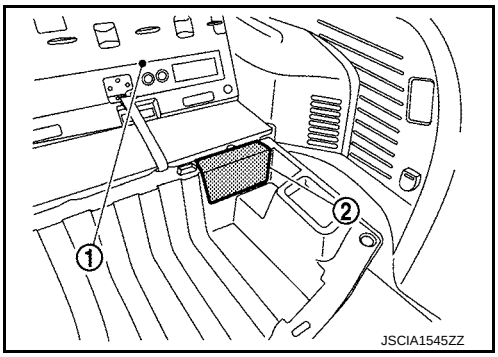
Be sure to follow the procedure below and disconnect the high voltage before performing inspection or servicing of the high voltage system.

1. Turn power switch OFF.

CAUTION:
The worker must keep the Intelligent Key on his/her person.

2. Disconnect 12V battery negative terminal. Refer to PG-128, "Exploded View".
3. Remove service plug, following below procedure.

a. Open the rear luggage floor board ①, and remove service plug cover ②.

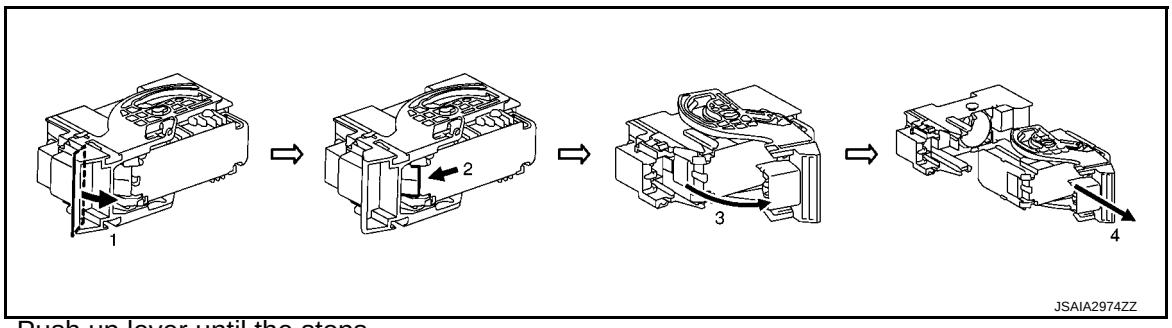


b. Remove service plug as per the following steps:

DANGER:

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





1. Push up lever until the stops.
2. Press pawl to unlock.
3. Push up lever.
4. Pull out service plug.

WARNING:
- **Immediately insulate removed high voltage connectors and terminals with insulating tape.**
- **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.**

4. After removing the service plug, immediately wind the insulation tape around the terminal on the Li-ion battery side.

DANGER:

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



5. Wait for a minimum of approximately 10 minutes after the service plug is removed.

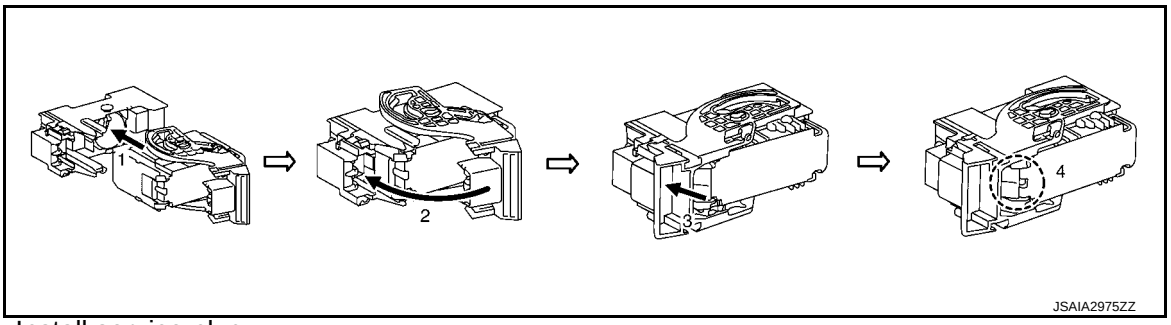
PROCEDURE FOR CONNECTING HIGH VOLTAGE

1. Check that 12V battery negative terminal is disconnected.
2. Install service plug as per the following steps.

DANGER:

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





1. Install service plug.
2. Push down lever.
3. Press pawl to lock lever.
4. Check that lever is locked.

3. Connect 12V battery negative terminal. Refer to PG-128, "Exploded View".

Check Voltage in High Voltage Circuit

INFOID:0000000014844760

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

INSPECTION

WARNING:

Follow the instructions below before starting the procedure.

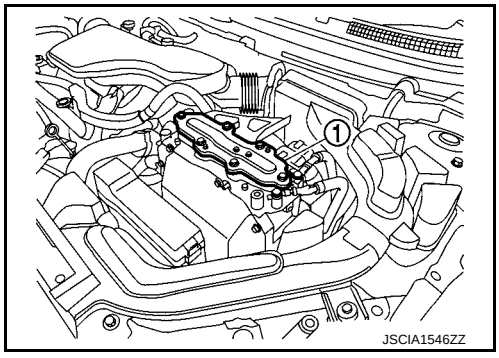
- **Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage"**

1. Remove high voltage cover ① of traction motor inverter.

WARNING:

To prevent electric shock, wear insulated protective gear.





2. Remove high voltage cover gasket ①.

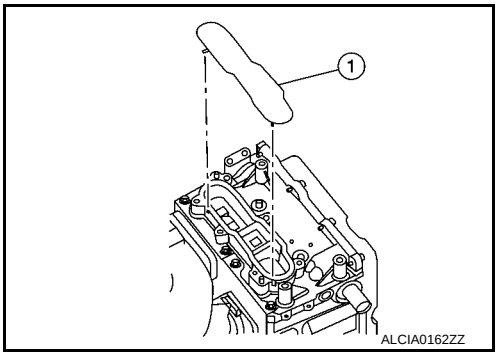
WARNING:

To prevent electric shock, wear insulated protective gear.



CAUTION:

Do not reuse high voltage cover gasket.



3. Measure voltage between high voltage harness terminals and check that the voltage is the specified value or less.

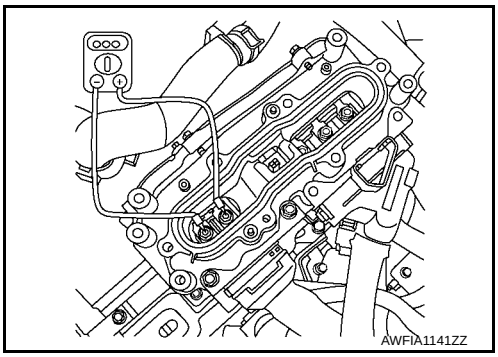
WARNING:

To prevent electric shock, wear insulated protective gear.



CAUTION:

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



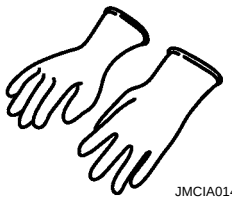
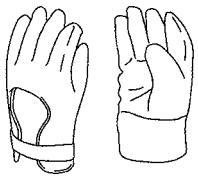
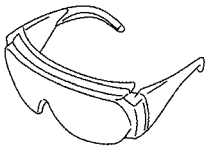
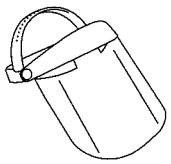
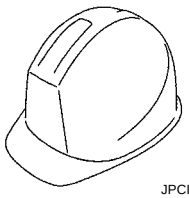
Standard : 5 V or less

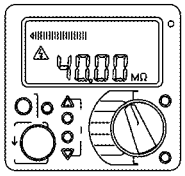
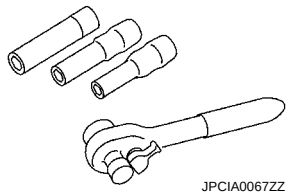
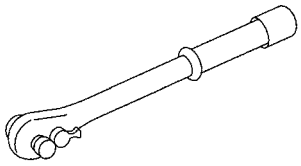
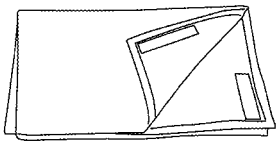
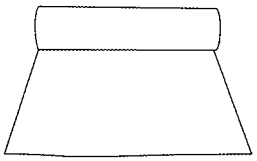
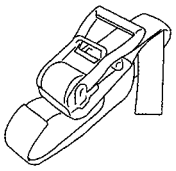
PREPARATION

PREPARATION

Commercial Service Tools

INFOID:0000000014630669

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

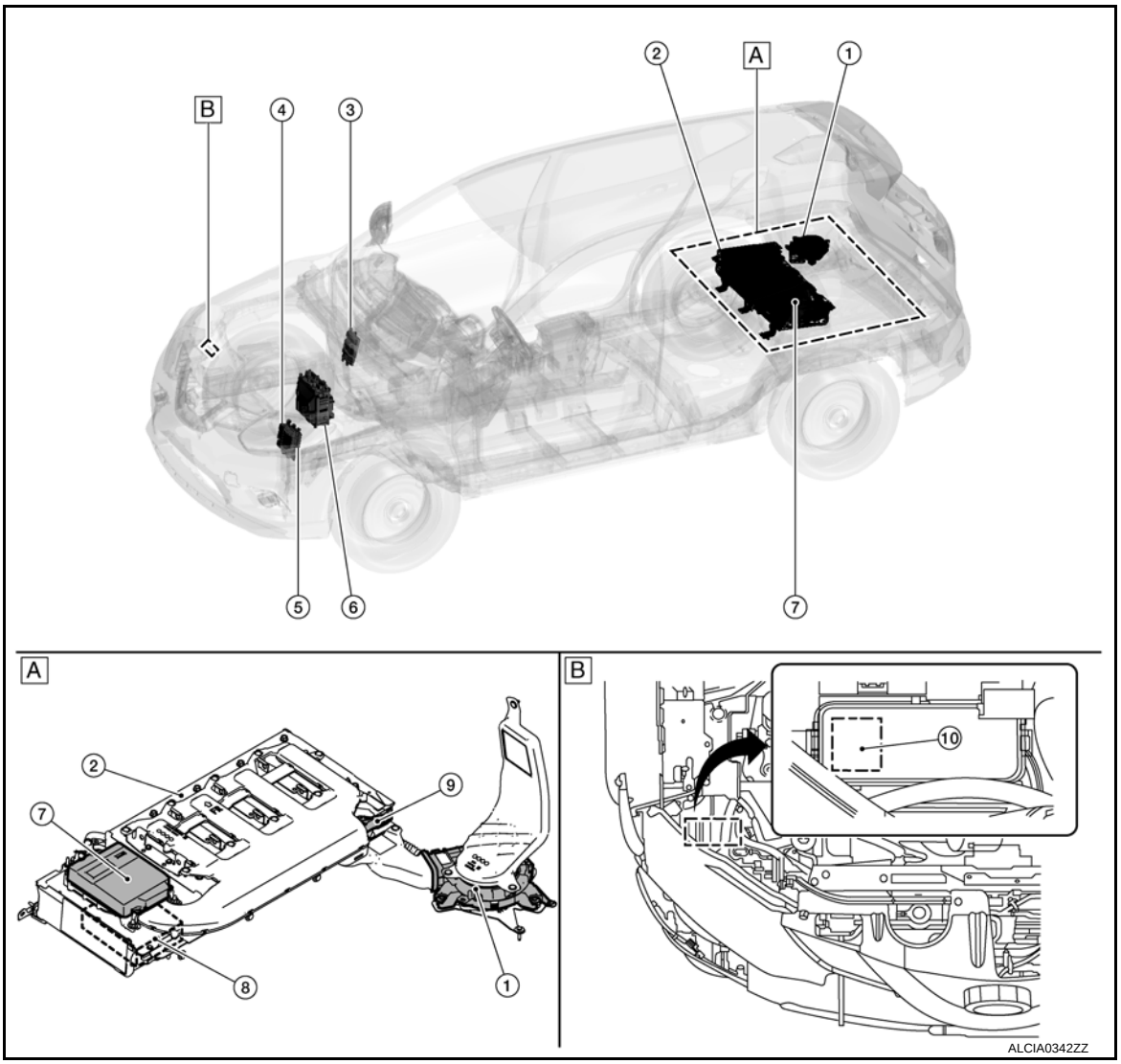
Tool name	Description
Insulation Resistance Tester (Multi tester)  JPCIA0014ZZ	Measuring insulation resistance, voltage, and resistance
Insulated Hand Tools  JPCIA0067ZZ	Removing and installing high voltage components
Insulated Torque Wrench  JPCIA0068ZZ	Removing and installing high voltage components
Insulated Cover Sheet  JPCIA0018ZZ	Removing and installing high voltage components
Insulated Rubber Sheet  JPCIA0019ZZ	Removing and installing high voltage components
Lashing Belt  JPCIA0022ZZ	Removing and installing battery rear module stack

SYSTEM DESCRIPTION

COMPONENT PARTS

Component Parts Location

INFOID:0000000014844761



A Around of Li-ion battery

B Engine room right side

No.	Component	Function
①	Battery cooling fan	Refer to HBB-15, "Battery Cooling Fan".
②	Li-ion battery	Refer to HBB-14, "Li-ion Battery".
③	HPCM	Receives various information which is transmitted from each vehicle control unit, and controls the vehicle comprehensively. Shuts off the main relay when a malfunction is detected in the Li-ion battery. Refer to HBC-12, "Component Parts Location" for detailed installation location.
④	ECM	Transmits the engine control condition to LBC. Refer to EC-17, "Component Parts Location" for detailed installation location.

No.	Component	Function
⑤	TCM	Transmits the transmission control condition to LBC. Refer to TM-15, "CVT CONTROL SYSTEM : Component Parts Location" for detailed installation location.
⑥	Traction motor inverter	Transmits the traction motor condition to LBC. Refer to TMS-11, "Component Parts Location" for detailed installation location.
⑦	DC/DC converter	Refer to HBC-18, "DC/DC Converter".
⑧	Li-ion battery controller (LBC)	Refer to HBB-14, "Li-ion Battery".
⑨	Service plug	Refer to HBB-15, "Service Plug".
⑩	Battery cooling fan relay	Supplies the power to battery cooling fan and is controlled by LBC.

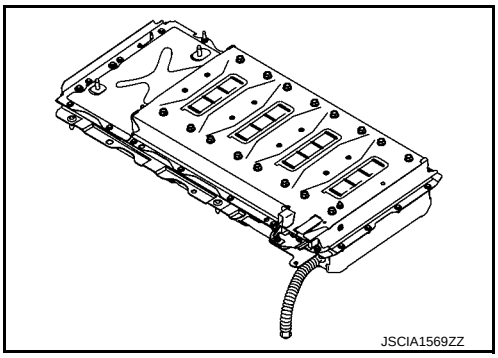
Li-ion Battery

INFOID:0000000014844762

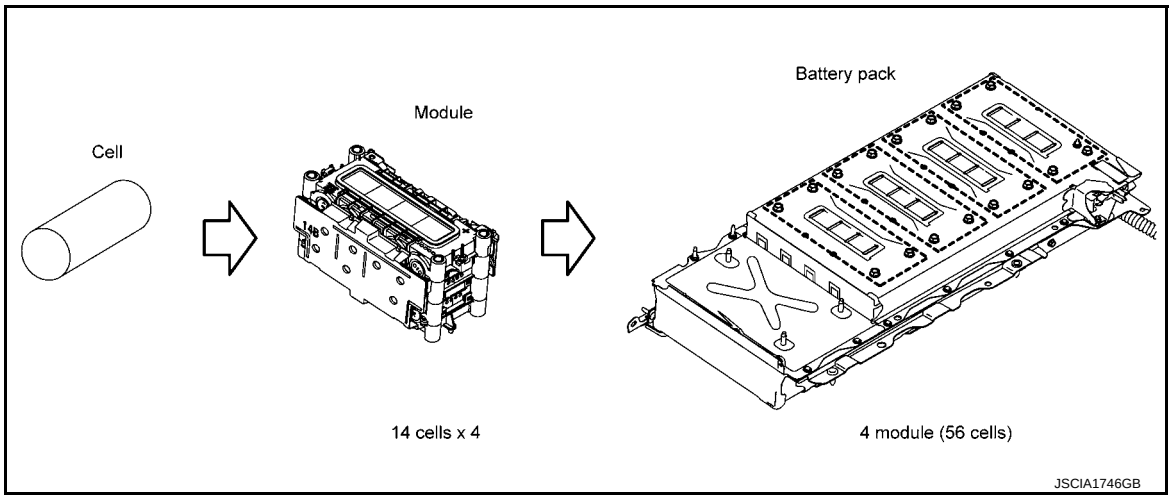
LI-ION BATTERY

- The Li-ion battery is installed under the luggage floor board.
- The LBC and battery junction box are installed in the Li-ion battery.

CAUTION:
Never disassemble the Li-ion battery.



- A module consists of 14 cells connected in series, and the Li-ion battery contains 4 of these modules connected in series.



MODULE

- Each module contains 14 cylindrical cells joined together.
- The Li-ion battery contains 4 modules.

CELL

- The cells that are used have a cylindrical structure.
- The cylindrical structure increases the flexibility in layout.

LI-ION BATTERY CONTROLLER (LBC)

- The LBC is installed inside the Li-ion battery.
- The LBC is the core of battery control. It detects the Li-ion battery voltage and current, temperature inside the Li-ion battery, 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 Li-ion battery status.

Main Role Of LBC

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

BATTERY TEMPERATURE SENSOR

- The battery temperature sensors are installed inside the Li-ion battery. They measure the temperature inside the Li-ion battery.
- 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.

BATTERY JUNCTION BOX

- The battery junction box is installed inside the Li-ion battery.
- 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.

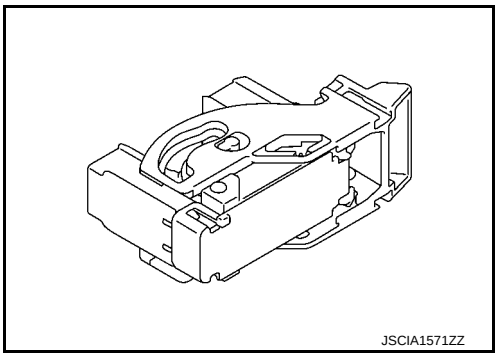
Service Plug

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- A service plug is installed on the Li-ion battery in order to securely shut off the high-voltage circuit during inspection and servicing of high-voltage components.
- A high voltage fuse is installed in the service plug.

CAUTION:

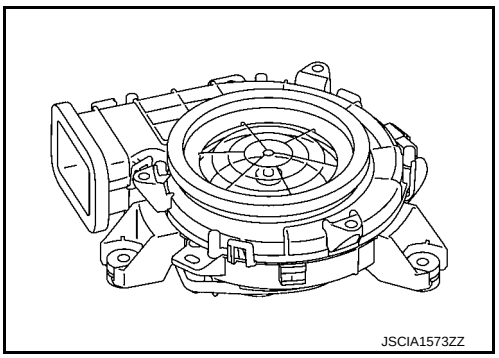
Be sure to use insulated protective gear when removing and installing the service plug.


JSCIA1571ZZ

Battery Cooling Fan

INFOID:0000000014844764

- Battery cooling fan is installed on luggage room right side.
- Battery cooling fan is controlled by LBC and supplies cooling air to the Li-ion battery.


JSCIA1573ZZ

Specifications

Blower unit	Fan	Type		Sirocco fan
	Motor	Type		Brushless motor
		Power consumption	(W)	93*
		Motor drive signal duty ratio	(%)	16 – 75

*:When all of the condition listed below is satisfied;
- Battery cooling fan: On the vehicle
- Applied voltage: 16 V
- Motor drive signal duty ratio: 75%

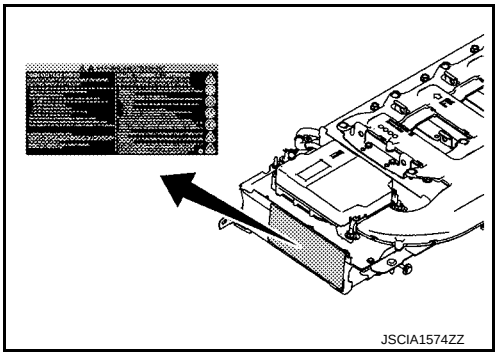
Warning Label

INFOID:0000000014844765

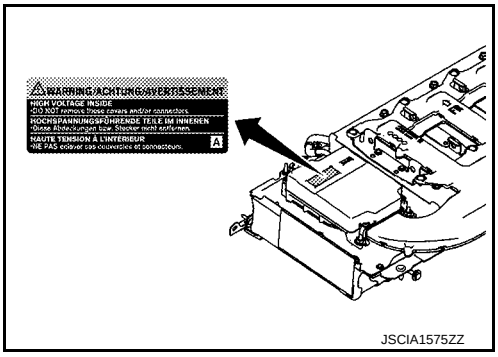
Warning label is affix on each component parts below.
After replacing a part, check that the part is affixed with a label. If the label is not affixed, be sure to affix the label to the original position.

HIGH VOLTAGE WARNING

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

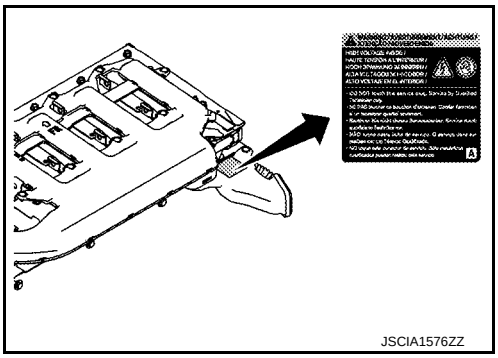

JSCIA1574ZZ

DC/DC converter
The label is affixed on the DC/DC converter.



JSCIA1575ZZ

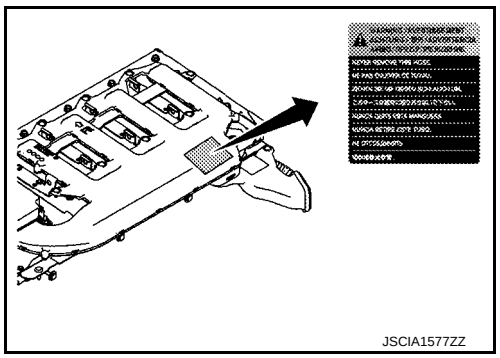
Service Plug
The label is affixed on cooling air duct 2.


JSCIA1576ZZ

EXCEPT HIGH VOLTAGE WARNING

Li-ion Battery Gas Discharge Tube

The label is affixed on cooling air duct 1.

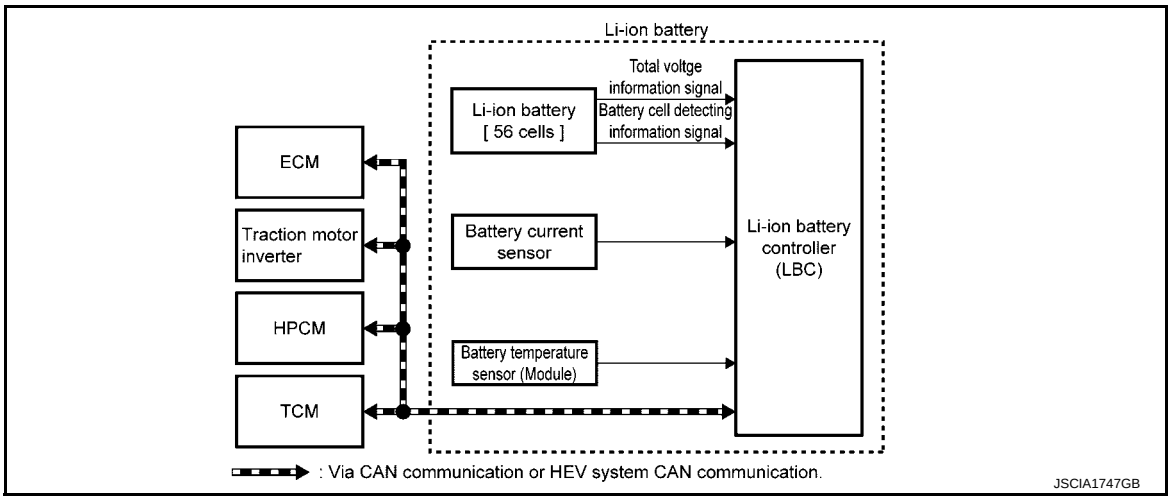


SYSTEM

System Description

INFOID:0000000014844766

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL ITEM

Input signal item

Transmit unit	Signal name		Description
HPCM	HEV system CAN	High voltage harness connector detecting signal	The connection detection signal of the high voltage connector and service plug is received from the HPCM.
ECM		Engine speed signal	Engine speed signal is received from ECM.
TCM		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 inverter.

Output signal item

Receive unit	Signal name		Description
HPCM	HEV system CAN	Li-ion battery temperature signal	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.
		Li-ion battery current signal	The Li-ion battery current signal is transmitted to HPCM.
		Charge control electricity signal	The charge control electricity signal is transmitted to HPCM.
		Discharge control electricity signal	The discharge control electricity signal is transmitted to HPCM.

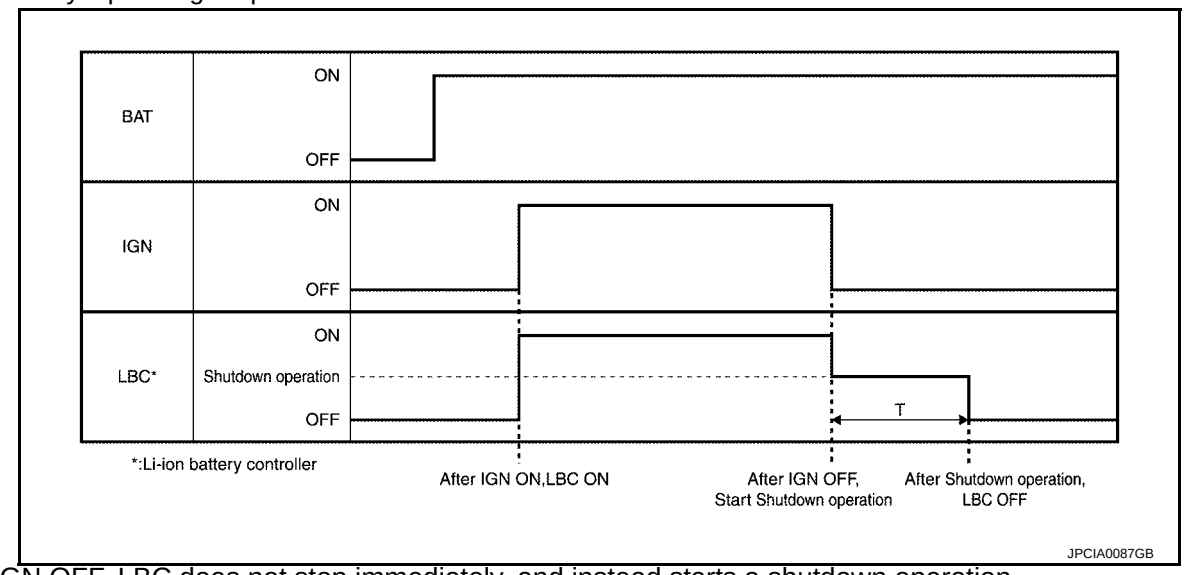
DESCRIPTION

The 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 LBC 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.

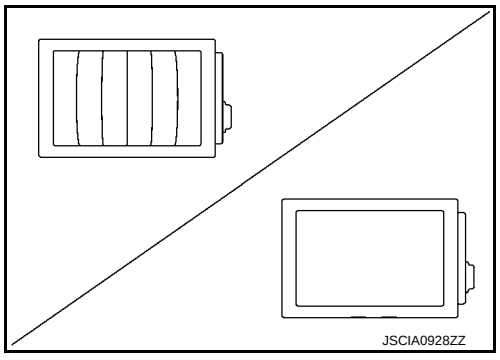
Li-ion Battery Operating Stop Condition



After IGN OFF, LBC does not stop immediately, and instead starts a shutdown operation.

Li-ion Battery State of Charge

The combination meter displays “Li-ion battery state of charge” on the vehicle information display, according to the following signals.



Signal name	Signal path
Ignition signal	—
Li-ion battery state of charge signal	LBC —CAN→ HPCM —CAN→ Combination meter

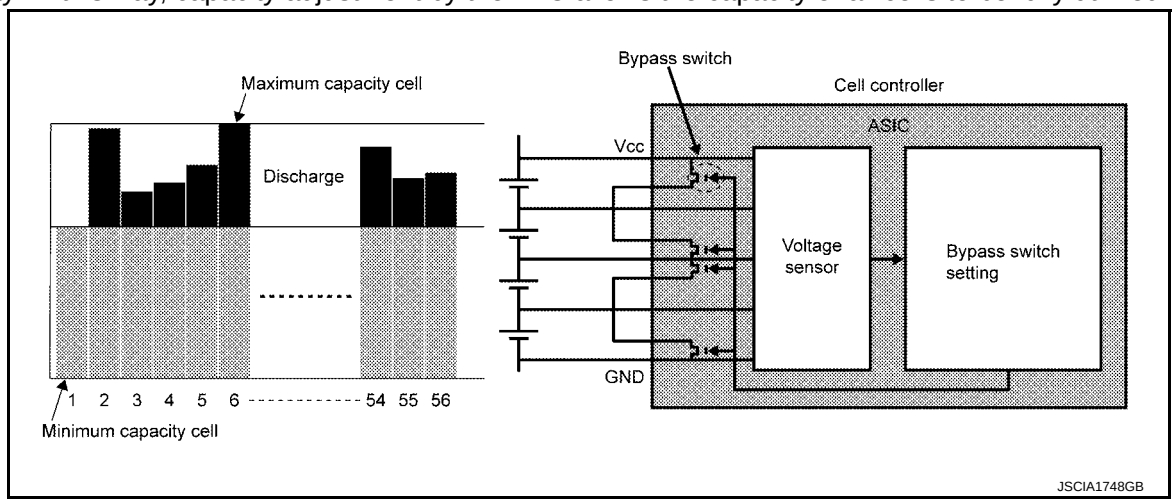
BATTERY PROTECTION

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 LBC 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 protection	Charging energy control	Gradual control of charging energy as the cell voltage approaches the upper limit of the voltage capable of charging.
	System main relay cut	Cell voltage exceeds the voltage judged as overvoltage and maintains the voltage for more than the specified time.
Over discharge protection	Discharging energy control	Gradual control of discharging energy as the cell voltage approaches the lower limit of the voltage capable of discharging.
	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 protection	Charging/discharging energy control	Gradual control of charging/discharging energy as a Li-ion battery temperature approaches the upper limit of the temperature capable of use.
	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

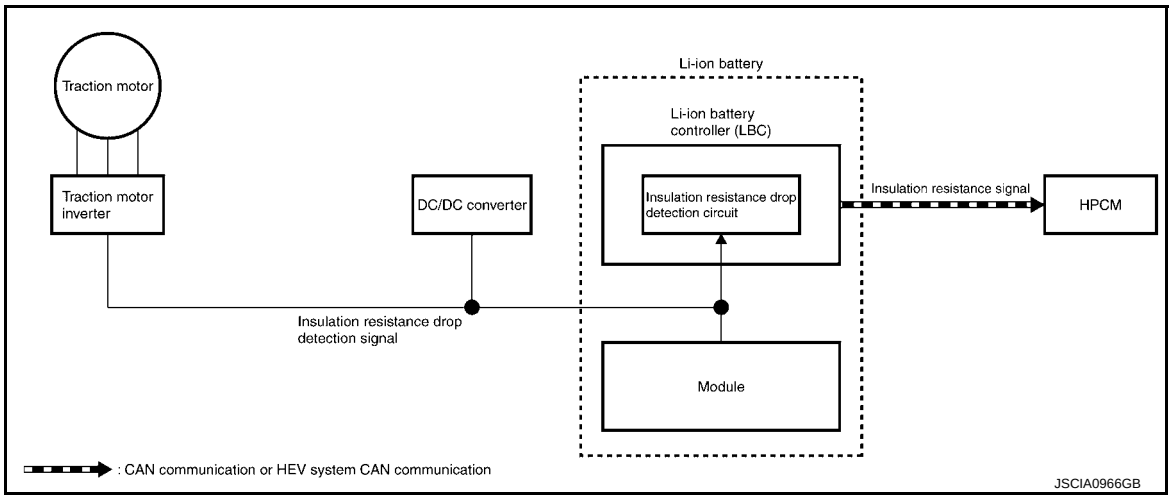
During cell capacity adjustment, the capacity of each cell is estimated based on the no-load voltage when the system starts, and the capacities are adjusted so that they are all at the target level. The voltage of each cell is detected inside the LBC. The bypass switches are then turned ON to discharge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



INSULATION RESISTANCE DROP DETECTION

LBC measures insulation resistance of each high voltage part with insulation resistance drop detection circuit inside LBC and transmits measurement result to HPCM via CAN communication.

HPCM judges a malfunction in insulation resistance of each high voltage part according to insulation resistance values received from LBC.



Battery Cooling Control

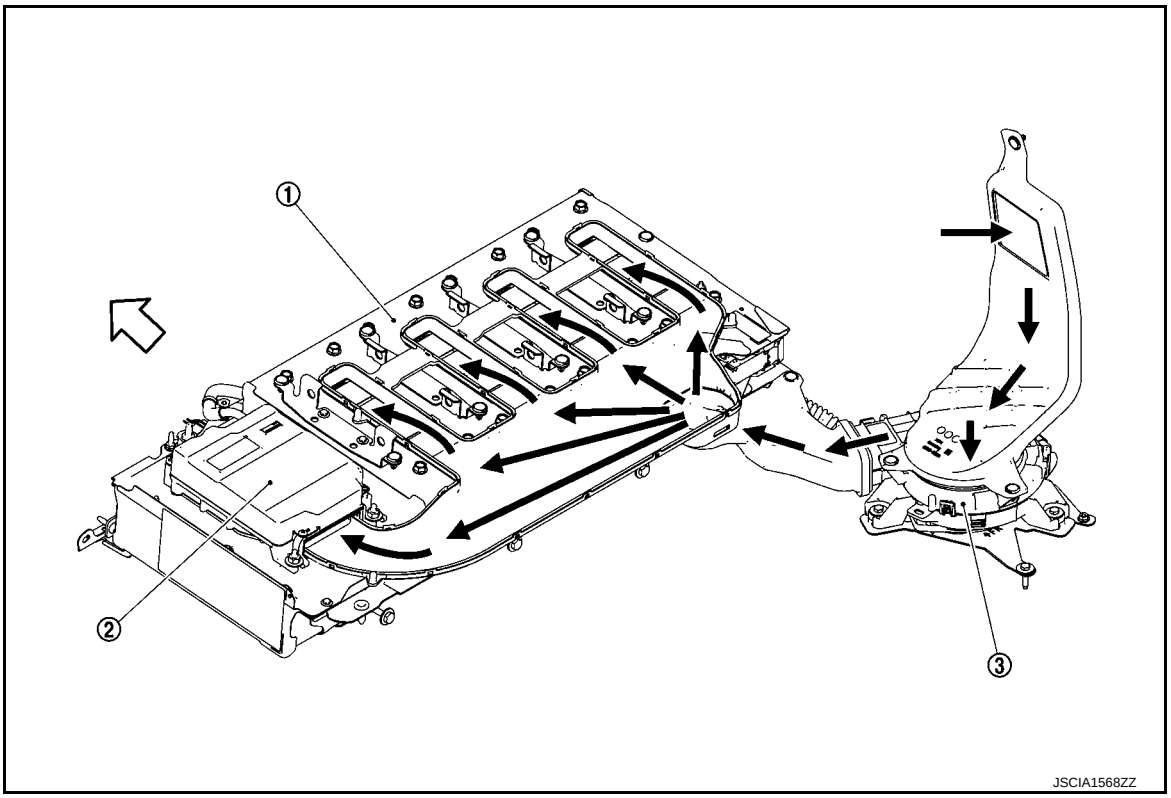
INFOID:0000000014844767

DESCRIPTION

Cooling of the Li-ion battery is performed by delivering cooled air from the passenger compartment.
The air cools the Li-ion battery, maintaining a suitable battery temperature and improving the lifetime of the Li-ion battery.

AIR FLOW

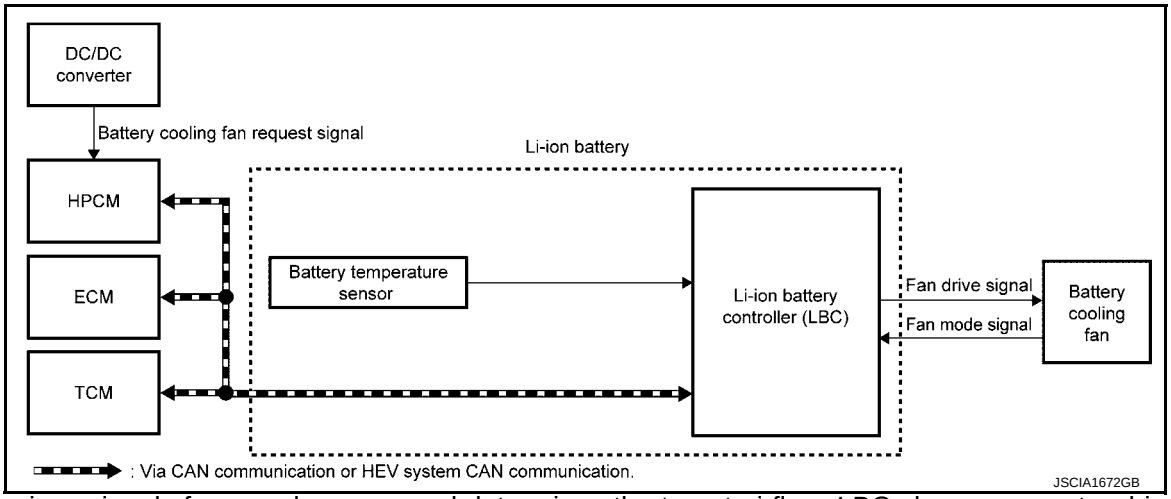
The battery cooling fan sends the cooled air to Li-ion battery and DC/DC converter through a duct from the passenger compartment.



① Li-ion battery ② DC/DC converter ③ Battery cooling fan

⇦ : Vehicle front

CONTROL



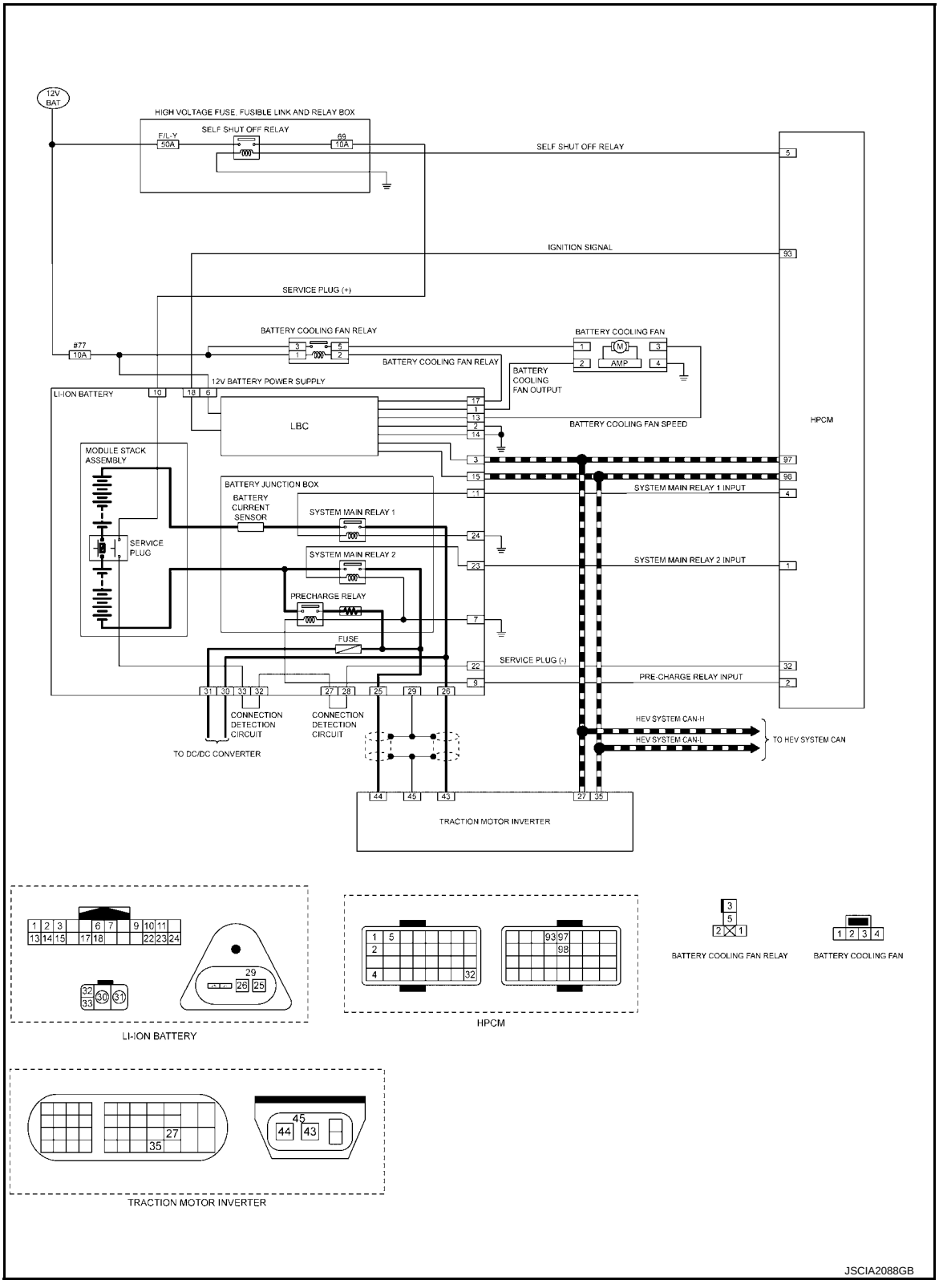
LBC receives signals from each sensor and determines the target airflow. LBC changes a motor drive signal duty ratio based on the target airflow and controls air flow continuously.

The target airflow is calculated based on the module stack highest temperature, vehicle noise condition and battery cooling fan request signal from DC/DC converter.

Transmit unit	Signal name		Description
Battery temperature sensor	—	Battery temperature signal	LBC calculates highest temperature of module stack.
DC/DC converter (via HPCM)	HEV system CAN	Battery cooling fan request signal	Target airflow is revised according to battery cooling fan request signal from DC/DC converter.
TCM		Output shaft revolution signal	LBC calculates vehicle noise condition depending on each signal.
ECM		Engine speed signal	

Circuit Diagram

INFOID:0000000014844768



Fail-safe

INFOID:0000000014844769

When LBC is detected any DTC, the LBC issues a request to HPCM to protect the system. Then HPCM detects the DTC and performs the fail-safe mode depending on detected DTC.

Fail-safe	Description	Symptom	HPCM detected DTC	LBC detected DTC
SYSTEM MAIN RELAY OFF	The system main relay is turned OFF	• The engine cannot be started • Illuminates hybrid system warning lamp	P3182	P0A7E, P0A95, P3030, P30EE, P30F1, P30F2, P30FC, P30FE, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373, P3374
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 traction motor torque becomes limited	• Engine stop control is prohibited • Driving force decreases • Possible to travel by 12V battery remaining quantity • Illuminates hybrid system warning lamp	P3181	P0A7E, P3030, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373, P3374
MOTOR TORQUE OFF	The vehicle travels under the condition that the traction motor torque and the input/output power to the Li-ion battery are limited	• Engine stop control is prohibited • Driving force decreases • Illuminates hybrid system warning lamp	P317F	P0A1F, P0ABF, P0AC0, P0AC1, P0AC2, P30F4, P30F5, P30F6, P30FA, P30FB, P31A5, P31A7, P326E-P3273, P327A-P327F, P3286-P328B, U0110, U0293, U1000
—	The hybrid system warning lamp turns ON	Illuminates hybrid system warning lamp	P3180	P0A7F, P0A84, P0A85, P0C6E, P0C70, P30D0, P30EF, P30F7, P30F8, P30F9, U0100, U0101, U0140, U0155, U1321

NOTE:
• When LBC detects following DTC combination at the same time, the system goes into “MOTOR TORQUE OFF MODE”.
- P0A9D and P0AC7 or P0AC8
- P0A9E and P0AC7 or P0AC8
- P0AC7 and P0A9D or P0A9E
- P0AC8 and P0A9D or P0A9E
- P0ACC and P0AEA or P0AEB
- P0ACD and P0AEA or P0AEB
- P0AEA and P0ACC or P0ACD
- P0AEB and P0ACC or P0ACD

• When LBC detects DTC P0A7E, P3030, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373 and P3374, the system goes into “SYSTEM MAIN RELAY OFF MODE” or “MOTOR TORQUE OFF MODE”.
When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.
- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
• 4,097 mV ≥ Cell voltage > 3,887 mV
• 3,415 mV > Cell voltage ≥ 2,000 mV

WARNING/INDICATOR/CHIME LIST

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

INFOID:0000000014844770

NOTE:
Regarding the arrangement. Refer to MWI-6, "METER SYSTEM : Design".

Item	Design	Function
Hybrid system warning lamp		Regarding the function. Refer to HBC-18, "Warning Lamps and Indicator Lamps".

HANDLING PRECAUTION

Hybrid Battery System

INFOID:0000000014844771

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

Diagnosis Description

INFOID:0000000014844772

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)

INFOID:0000000014844773

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-63, "CONSULT Data Link Connector (DLC) Circuit".

NOTE:

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

DIAGNOSIS SYSTEM (LBC)

DIAGNOSIS DESCRIPTION

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

INFOID:0000000014844774

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

Item	1st trip DTC		DTC		MIL	
	1st trip displaying	2nd trip displaying	1st trip displaying	2nd trip displaying	1st trip Illuminate	2nd trip Illuminate
One trip detection diagnosis (Refer to HBB-37, "DTC Index".)	—	—	×	—	×	—
Two trip detection diagnosis (Refer to HBB-37, "DTC Index".)	×	—	—	×	—	×

DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:0000000014844775

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-29, "CONSULT Function".
Refer to HBB-37, "DTC Index" 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-50, "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 five 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

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 HBB-29, "CONSULT Function".

DIAGNOSIS DESCRIPTION : Counter System

INFOID:0000000014844776

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 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)	B	3
DTC, freeze frame data (no display)	A	40
1st trip DTC (clear)	B	1
1st trip freeze frame data (clear)	B	1

DIAGNOSIS DESCRIPTION : Driving Pattern

INFOID:0000000014844777

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 – 100 km/h (44 – 62 MPH) is maintained for 60 seconds or more under the control of closed loop.

- 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 : Permanent Diagnostic Trouble Code (Permanent DTC)

INFOID:0000000014844778

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.

CONSULT Function

INFOID:0000000014844779

APPLICATION ITEM

CONSULT performs the following functions via CAN communication with LBC.

Item	Function
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.
Configuration	Write the destination data when replacing LBC.

*: 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

ECU IDENTIFICATION

Part number of LBC can be checked.

SELF-DIAGNOSIS RESULT

Self Diagnostic Item
Regarding items of DTC, refer to HBB-37, "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
DIAG TROUBLE CODE SUB TYPE	—	Displays DTC SUB causing factors to record FFD on the CONSULT screen.
CAL/LD VALUE	%	Displays a computational load value.
ENGINE COOLANT TEMP	°C	Displays engine coolant temperature.
ENGINE SPEED	rpm	Displays engine speed.
VEHICLE SPEED	km/h	Displays vehicle speed.
THRTL POS SEN	%	Displays the absolute throttle position.
ENGINE START TIME	Sec	Displays elapsed time after an engine start.
12V BATTERY VOLTAGE	mV	Displays 12 V power supply voltage.
THRTL/P SEN2	%	Displays the absolute throttle position of the other throttle.
SOC	%	Displays the charge status of the Li-ion battery.
TRAVEL AFTER IGN ON	km	Displays a distance traveled from ignition switch ON.
DRIVING PATTERN B COMP STAT	—	Displays the completion status of the driving pattern B.
DRIVING PATTERN A COMP STAT	—	Displays the completion status of the driving pattern A.
MIL ON REQ	—	Displays the ON/OFF status of a MIL request.
READY ON STATUS	—	Displays the ON/OFF status of READY.
TOTAL BATTERY VOLTAGE	V	Displays voltage values of all voltage sensors.
BAT ELECTRIC CURRENT	A	Displays current value of current sensor.
MAXIMUM BATT TEMP	°C	Displays the maximum battery temperature.
MINIMUM BATT TEMP	°C	Displays the minimum battery temperature.
INPUT POSSIBLE POWER	kW	Displays available power input to Li-ion battery.
OUTPUT POSSIBLE POWER	kW	Displays output power available from Li-ion battery.
MAXIMUM VOLTAGE CELL NO.	—	Displays a maximum voltage cell number.
MAXIMUM CELL VOLTAGE	V	Displays the maximum cell voltage.
MINIMUM VOLTAGE CELL NO.	—	Displays a minimum voltage cell number.
MINIMUM CELL VOLTAGE	V	Displays the minimum cell voltage.
IGN ON ACCMLTD TIME	Sec	Displays accumulated operating time at ignition switch ON.
IGN ON TIME	Sec	Displays an elapsed time from ignition switch ON.
ODO/TRIP METER	km	Total driving distance (odometer value) upon DTC detection is displayed.

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
CNTRL MODULE WRT PRTCT	On/Off	Displays the status of write protect to the LBC memory.
NG DETECTION CELL NO. 1	—	Displays the number of a cell that the first error is detected.
CELL/V 1 BEFORE NG DTCTN	mV	Displays the voltage of a cell immediately before the first error is detected.
SOC BEFORE NG DETECTION 1	%	Displays SOC of a cell immediately before the first error is detected.
TOTAL/V 1 BFR NG DTCTN	V	Displays total voltage where the first error is detected.
CELL/V 1 AFTER NG DTCTN	mV	Displays the voltage of a cell that the first error is detected.
IGN ON COUNT 1	—	Displays the number of ignition switch-ONs where the first cell error is detected.
NG DETECTION CELL NO. 2	—	Displays the number of a cell that the second error is detected.
CELL/V 2 BEFORE NG DTCTN	mV	Displays the voltage of a cell immediately before the second error is detected.
SOC BEFORE NG DETECTION 2	%	Displays SOC of a cell immediately before the second error is detected.
TOTAL/V 2 BFR NG DTCTN	V	Displays total voltage where the second error is detected.
CELL/V 2 AFTER NG DTCTN	mV	Displays the voltage of a cell that the second error is detected.
IGN ON COUNT 2	—	Displays the number of ignition switch-ONs where the second cell error is detected.
NG DETECTION CELL NO. 3	—	Displays the number of a cell that the third error is detected.
CELL/V 3 BEFORE NG DTCTN	mV	Displays the voltage of a cell immediately before the third error is detected.
SOC BEFORE NG DETECTION 3	%	Displays SOC of a cell immediately before the third error is detected.
TOTAL/V 3 BFR NG DTCTN	V	Displays total voltage where the third error is detected.
CELL/V 3 AFTER NG DTCTN	mV	Displays the voltage of a cell that the third error is detected.
IGN ON COUNT 3	—	Displays the number of ignition switch-ONs where the third cell error is detected.
NG DETECTION CELL NO. 4	—	Displays the number of a cell that the fourth error is detected.
CELL/V 4 BEFORE NG DTCTN	mV	Displays the voltage of a cell immediately before the fourth error is detected.
SOC BEFORE NG DETECTION 4	%	Displays SOC of a cell immediately before the fourth error is detected.
TOTAL/V 4 BFR NG DTCTN	V	Displays total voltage where the fourth error is detected.
CELL/V 4 AFTER NG DTCTN	mV	Displays the voltage of a cell that the fourth error is detected.
IGN ON COUNT 4	—	Displays the number of ignition switch-ONs where the fourth cell error is detected.
NG DETECTION CELL NO. 5	—	Displays the number of a cell that the fifth error is detected.
CELL/V 5 BEFORE NG DTCTN	mV	Displays the voltage of a cell immediately before the fifth error is detected.
SOC BEFORE NG DETECTION 5	%	Displays SOC of a cell immediately before the fifth error is detected.
TOTAL/V 5 BFR NG DTCTN	V	Displays total voltage where the fifth error is detected.
CELL/V 5 AFTER NG DTCTN	mV	Displays the voltage of a cell that the fifth error is detected.
IGN ON COUNT 5	—	Displays the number of ignition switch-ONs where the fifth cell error is detected.
LBC SERIAL NMBR SAVE STAT	VALID/INVALID	Displays the status of stored LBC serial number by the indication of VALID/INVALID.
BAT SERIAL NMBR SAVE STAT	VALID/INVALID	Displays the status of stored serial number by the indication of VALID/INVALID.
CALIBRATION SAVE STATUS	VALID/INVALID	Displays the status of stored calibration data by the indication of VALID/INVALID.
APPLICATION SAVE STATUS	VALID/INVALID	Displays the status of stored application data by the indication of VALID/INVALID.
MLFNCTN DATA SAVE STAT	VALID/INVALID	Displays the status of stored malfunction data by the indication of VALID/INVALID.

Monitored item	Unit	Description
BATT USE DATA SAVE STAT	VALID/IN-VALID	Displays the status of stored battery use data by the indication of VALID/IN-VALID.
BATTERY STATUS	VALID/IN-VALID	Displays the status of estimated data of battery condition by the indication of VALID/INVALID.
CNTRL MDL ABNRML JDG	VALID/IN-VALID	Displays if LBC is normal or malfunctioning.
CRRNT SEN ABNRML JUDGE	—	Displays error code of current sensor.
SOC	%	Displays the charge status of Li-ion battery.
SOH	%	Displays the level of battery deterioration.
IR SEN ABNORMAL JUDGE	VALID/IN-VALID	Displays if the IR sensor is normal or malfunctioning.
IR SEN CREST VALUE	—	Displays the crest value of IR sensor.
IGNITION SW	On/Off	Displays the input status of ignition.

ACTIVE TEST

Item	Description
HV BATTERY COOLING FAN	Allows the fan to be forcibly stopped and started.

CONFIGURATION

Function		Description
Read / Write Configuration	After Replace ECU	Writes the vehicle configuration with destination data.
Manual Configuration		Writes the vehicle configuration with manual selection.

NOTE:
Since destination data in CONSULT are written into LBC, readout is not necessary.

CAUTION:

Follow the instructions listed below. Failure to do this may cause malfunctions to the LBC:

- **When performing the configuration process, ensure the ignition is ON and the vehicle is not in ready mode. Performing configuration with the vehicle in ready mode may cause additional errors.**
- **The Li-ion battery contains the LBC. When replacing the Li-ion battery, you must perform "Read/ Write Configuration" with CONSULT to reconfigure the LBC.**
- **Complete the procedure of "Read/Write Configuration" in order.**
- **If you set incorrect "Read/Write Configuration," incident may occur.**
- **Configuration is different for each vehicle model. Confirm configuration of each vehicle model.**
- **Never perform "Read/Write Configuration" or "Manual Configuration" except for new LBC.**

ECU DIAGNOSIS INFORMATION

LI-ION BATTERY CONTROLLER (LBC)

Reference Value

INFOID:0000000014844780

VALUES ON THE DIAGNOSIS TOOL

NOTE:

- Specification data are reference values.
- The following table includes information (items) inapplicable to this vehicle. For information (items) applicable to this vehicle, refer to CONSULT display items.

CONSULT MONITOR ITEM

Monitor Item	Condition		Values/Status
CNTRL MODULE WRT PRTCT	Ignition switch: ON	System is normal	Off
		System is malfunctioning	On
NG DETECTION CELL NO. 1	Ignition switch: ON	The first malfunction is detected	Displays the cell number of malfunction-detected cell
		System is normal	0
CELL/V 1 BEFORE NG DTCTN	Ignition switch: ON	First malfunction is detected	1 – 5000 mV
		System is normal	0
SOC BEFORE NG DETECTION 1	Ignition switch: ON	The first malfunction is detected	0.1 – 100 %
		System is normal	0
TOTAL/V 1 BFR NG DTCTN	Ignition switch: ON	The first malfunction is detected	1 – 200 V
		System is normal	0
CELL/V 1 AFTER NG DTCTN	Ignition switch: ON	The first malfunction is detected	1 – 5000 mV
		System is normal	0
IGN ON COUNT 1	Ignition switch: ON	After the first malfunction is detected	Displays the number of IGN ONs after a malfunction is detected
		System is normal	0
NG DETECTION CELL NO. 2	Ignition switch: ON	The second malfunction is detected	Displays the cell number of malfunction-detected cell
		System is normal	0
CELL/V 2 BEFORE NG DTCTN	Ignition switch: ON	The second malfunction is detected	1 – 5000 mV
		System is normal	0
SOC BEFORE NG DETECTION 2	Ignition switch: ON	The second malfunction is detected	0.1 – 100 %
		System is normal	0
TOTAL/V 2 BFR NG DTCTN	Ignition switch: ON	The second malfunction is detected	1 – 200 V
		System is normal	0
CELL/V 2 AFTER NG DTCTN	Ignition switch: ON	The second malfunction is detected	1 – 5000 mV
		System is normal	0
IGN ON COUNT 2	Ignition switch: ON	After the second malfunction is detected	Displays the number of IGN ONs after a malfunction is detected
		System is normal	0
NG DETECTION CELL NO. 3	Ignition switch: ON	The third malfunction is detected	Displays the cell number of malfunction-detected cell
		System is normal	0
CELL/V 3 BEFORE NG DTCTN	Ignition switch: ON	The third malfunction is detected	1 – 5000 mV
		System is normal	0

Monitor Item	Condition		Values/Status
SOC BEFORE NG DETECTION 3	Ignition switch: ON	The third malfunction is detected	0.1 – 100 %
		System is normal	0
TOTAL/V 3 BFR NG DTCTN	Ignition switch: ON	The third malfunction is detected	1 – 200 V
		System is normal	0
CELL/V 3 AFTER NG DTCTN	Ignition switch: ON	The third malfunction is detected	1 – 5000 mV
		System is normal	0
IGN ON COUNT 3	Ignition switch: ON	After the third malfunction is detected	Displays the number of IGN ONs after a malfunction is detected
		System is normal	0
NG DETECTION CELL NO. 4	Ignition switch: ON	The fourth malfunction is detected	Displays the cell number of malfunction-detected cell
		System is normal	0
CELL/V 4 BEFORE NG DTCTN	Ignition switch: ON	The fourth malfunction is detected	1 – 5000 mV
		System is normal	0
SOC BEFORE NG DETECTION 4	Ignition switch: ON	The fourth malfunction is detected	0.1 – 100 %
		System is normal	0
TOTAL/V 4 BFR NG DTCTN	Ignition switch: ON	The fourth malfunction is detected	1 – 200 V
		System is normal	0
CELL/V 4 AFTER NG DTCTN	Ignition switch: ON	The fourth malfunction is detected	1 – 5000 mV
		System is normal	0
IGN ON COUNT 4	Ignition switch: ON	After the fourth malfunction is detected	Displays the number of IGN ONs after a malfunction is detected
		System is normal	0
NG DETECTION CELL NO. 5	Ignition switch: ON	The fifth malfunction is detected	Displays the cell number of malfunction-detected cell
		System is normal	0
CELL/V 5 BEFORE NG DTCTN	Ignition switch: ON	The fifth malfunction is detected	1 – 5000 mV
		System is normal	0
SOC BEFORE NG DETECTION 5	Ignition switch: ON	The fifth malfunction is detected	0.1 – 100 %
		System is normal	0
TOTAL/V 5 BFR NG DTCTN	Ignition switch: ON	The fifth malfunction is detected	1 – 200 V
		System is normal	0
CELL/V 5 AFTER NG DTCTN	Ignition switch: ON	The fifth malfunction is detected	1 – 5000 mV
		System is normal	0
IGN ON COUNT 5	Ignition switch: ON	After the fifth malfunction is detected	Displays the number of IGN ONs after a malfunction is detected
		System is normal	0
LBC SERIAL NMBR SAVE STAT	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
BAT SERIAL NMBR SAVE STAT	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
CALIBRATION SAVE STATUS	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID

Monitor Item	Condition		Values/Status
APPLICATION SAVE STATUS	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
MLFNCTN DATA SAVE STAT	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
BATT USE DATA SAVE STAT	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
BATTERY STATUS	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
CNTRL MDL ABNRML JDG	Ignition switch: ON	System is normal	VALID
		System is malfunctioning	INVALID
CRRNT SEN ABNRML JUDGE	Ignition switch: ON	System is normal	0
		System is malfunctioning	1 – 255
SOC	Ignition switch: ON	SOC 100 %	100 %
		SOC 50 %	50 %
		SOC 0 %	0 %
SOH	Ignition switch: ON	Deterioration: Severer	Approx. 400 %
		Deterioration: Moderate	Approx. 200 %
		Deterioration: Slight	Approx. 50 %
		Deterioration: No	Approx. 0 %
IR SEN ABNORMAL JUDGE	Ignition switch: ON	IR sensor is normal	Off
		IR sensor is malfunctioning	On
IR SEN CREST VALUE	Ignition switch: ON		0 – 1023
IGNITION SW	Ignition switch: ON		On

Fail-safe

INFOID:0000000014844781

When LBC is detected any DTC, the LBC issues a request to HPCM to protect the system. Then HPCM detects the DTC and performs the fail-safe mode depending on detected DTC.

Fail-safe	Description	Symptom	HPCM detected DTC	LBC detected DTC
SYSTEM MAIN RELAY OFF	The system main relay is turned OFF	• The engine cannot be started • Illuminates hybrid system warning lamp	P3182	P0A7E, P0A95, P3030, P30EE, P30F1, P30F2, P30FC, P30FE, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373, P3374
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 traction motor torque becomes limited	• Engine stop control is prohibited • Driving force decreases • Possible to travel by 12V battery remaining quantity • Illuminates hybrid system warning lamp	P3181	P0A7E, P3030, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373, P3374
MOTOR TORQUE OFF	The vehicle travels under the condition that the traction motor torque and the input/output power to the Li-ion battery are limited	• Engine stop control is prohibited • Driving force decreases • Illuminates hybrid system warning lamp	P317F	P0A1F, P0ABF, P0AC0, P0AC1, P0AC2, P30F4, P30F5, P30F6, P30FA, P30FB, P31A5, P31A7, P326E-P3273, P327A-P327F, P3286-P328B, U0110, U0293, U1000
—	The hybrid system warning lamp turns ON	Illuminates hybrid system warning lamp	P3180	P0A7F, P0A84, P0A85, P0C6E, P0C70, P30D0, P30EF, P30F7, P30F8, P30F9, U0100, U0101, U0140, U0155, U1321

NOTE:

- When LBC detects following DTC combination at the same time, the system goes into “MOTOR TORQUE OFF MODE”.
- P0A9D and P0AC7 or P0AC8
- P0A9E and P0AC7 or P0AC8
- P0AC7 and P0A9D or P0A9E
- P0AC8 and P0A9D or P0A9E
- P0ACC and P0AEA or P0AEB
- P0ACD and P0AEA or P0AEB
- P0AEA and P0ACC or P0ACD
- P0AEB and P0ACC or P0ACD
- When LBC detects DTC P0A7E, P3030, P327A-P327F, P3286-P328B, P3292-P3297, P329E-P32A9, P32AA-P32AF, P3300, P3301, P3373 and P3374, the system goes into “SYSTEM MAIN RELAY OFF MODE” or “MOTOR TORQUE OFF MODE”.
  When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.
- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

DTC Inspection Priority Chart

INFOID:0000000014844782

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

Priority	DTC	Detection items
1	P30EE	Cell protection
2	P0A84, P0A85	Battery cooling fan
	P0A9D, P0A9E, P0AC7, P0AC8, P0ACC, P0ACD, P0AEA, P0AEB, P0C70	• Battery temperature sensor • Intake air temperature sensor
	P0AA9, P0AAA	On-board isolation resistance monitoring system
	P0AC0, P0AC1, P0AC2	Battery current sensor
	P30D0	State of charge rationality
	P30EF	Internal resistance
	P30F5	Total voltage sensor
	P30FA, P30FB	Sensor power supply
	P30FE	12V battery voltage
	P31A5, P31A7	Communication error
	P3292 - P3295	Cell controller IC communication error
	P3374	Cell over discharge
	U0100, U0101, U0110, U0293, U1000	CAN communication

Priority	DTC	Detection items
3	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
	P3030	Communication function in Li-ion battery controller
	P30F1	Regeneration control
	P30F2	Discharge control
	P30F4, P30F6	Total voltage sensor
	P30F7	Cell controller IC sleep diagnosis
	P30F9	Control module
	P30FC	Over current
	P326E - P3271	Cell controller IC
	P3300	Total voltage over
	P3373	Total voltage over discharge
4	P0A95	High voltage fuse
	P30F8	Self shut off power supply
	P327A - P327F	Cell control IC voltage
	P3286 - P3289	Cell control IC voltage
	P329E - P32A9	Cell controller IC open
	P3301	Cell over voltage
	U1321	Config unfinish

DTC Index

INFOID:0000000014844783

DTC[*1] CONSULT[*2]	Items (CONSULT screen terms)	Trip	MIL[*3]	Permanent DTC group[*4]	Hybrid system warning lamp	Reference
P0A1F	BATTERY ENERGY CONTROL MODULE	1	ON	B	ON	HBB-57
P0A7E	HYBRID BAT PACK OVER TEMP	1	ON	B	ON	HBB-58
P0A7F	CELL CONTROLLER DIAG	2	ON	B	ON	HBB-60
P0A84	HYBRID BAT PACK COOLING FAN 1	1	—	—	ON	HBB-61
P0A85	HYBRID BAT PACK COOLING FAN 1	1	—	—	ON	HBB-66
P0A95	HIGH VOLTAGE FUSE	1	—	—	ON	HBB-67
P0A9D	HYBRID BAT TEMP SEN A	1	ON	B	ON	HBB-69
P0A9E	HYBRID BAT TEMP SEN A	1	ON	B	ON	HBB-70
P0AA7	HYBRID BAT VOLTAGE ISOLATION SEN	1	—	—	ON	HBB-71
P0AA9	HYBRID BAT VOLTAGE ISOLATION SEN	1	—	—	ON	HBB-72
P0AAA	HYBRID BAT VOLTAGE ISOLATION SEN	1	—	—	ON	HBB-73
P0ABF	HYBRID BAT PACK CURRENT SEN	2	ON	B	ON	HBB-74
P0AC0	HYBRID BAT PACK CURRENT SEN	1	ON	B	ON	HBB-76
P0AC1	HYBRID BAT PACK CURRENT SEN	1	ON	B	ON	HBB-77
P0AC2	HYBRID BAT PACK CURRENT SEN	1	ON	B	ON	HBB-78
P0AC7	HYBRID BAT TEMP SENSOR B	1	ON	B	ON	HBB-79

DTC[*1] CONSULT[*2]	Items (CONSULT screen terms)	Trip	MIL[*3]	Permanent DTC group[*4]	Hybrid system warning lamp	Reference
P0AC8	HYBRID BAT TEMP SENSOR B	1	ON	B	ON	HBB-80
P0ACC	HYBRID BAT TEMP SENSOR C	1	ON	B	ON	HBB-81
P0ACD	HYBRID BAT TEMP SENSOR C	1	ON	B	ON	HBB-82
P0AEA	HYBRID BAT TEMP SENSOR D	1	ON	B	ON	HBB-83
P0AEB	HYBRID BAT TEMP SENSOR D	1	ON	B	ON	HBB-84
P0C6E	HYBRID BAT TEMP SENSOR A/B	2	ON	B	ON	HBB-85
P0C70	HYBRID BAT TEMP SENSOR C/D	2	ON	B	ON	HBB-86
P3030	CELL CONT LIN	1	ON	B	ON	HBB-87
P30D0	SOC RATIONALITY	2	ON	B	ON	HBB-89
P30EE	CELL PROTECTION ON	1	ON	B	ON	HBB-90
P30EF	INTERNAL RESISTANCE	2	ON	B	ON	HBB-91
P30F1	REGENERATION CONTROL	1	—	—	ON	HBB-93
P30F2	DISCHARGE CONTROL	1	—	—	ON	HBB-95
P30F4	TOTAL VOLT SENSOR	1	ON	B	ON	HBB-97
P30F5	TOTAL VOLT SENSOR	2	ON	B	ON	HBB-98
P30F6	TOTAL VOLT SENSOR	1	ON	B	ON	HBB-100
P30F7	CELL CONT IC SLEEP DIAG	1	—	—	ON	HBB-102
P30F8	SELF SHUT OFF POWER SUPPLY	1	—	—	ON	HBB-103
P30F9	CONTROL MODULE	1	ON	B	ON	HBB-104
P30FA	SENSOR POWER SUPPLY	1	ON	B	ON	HBB-105
P30FB	SENSOR POWER SUPPLY	1	ON	B	ON	HBB-106
P30FC	OVER CURRENT	1	ON	B	ON	HBB-107
P30FE	12V BATTERY VOLTAGE	1	—	—	ON	HBB-109
P31A5	CAN ERROR HPCM	1	ON	B	ON	HBB-110
P31A7	CAN ERROR INV/MC	1	ON	B	ON	HBB-112
P326E	CELL CONTROLLER IC1	1	ON	B	ON	HBB-114
P326F	CELL CONTROLLER IC2	1	ON	B	ON	
P3270	CELL CONTROLLER IC3	1	ON	B	ON	
P3271	CELL CONTROLLER IC4	1	ON	B	ON	
P3272	CELL CONTROLLER IC5	1	ON	B	ON	
P3273	CELL CONTROLLER IC6	1	ON	B	ON	
P327A	CELL CONT IC1 VOLTAGE2	1	ON	B	ON	HBB-116
P327B	CELL CONT IC2 VOLTAGE2	1	ON	B	ON	
P327C	CELL CONT IC3 VOLTAGE2	1	ON	B	ON	
P327D	CELL CONT IC4 VOLTAGE2	1	ON	B	ON	
P327E	CELL CONT IC5 VOLTAGE2	1	ON	B	ON	
P327F	CELL CONT IC6 VOLTAGE2	1	ON	B	ON	
P3286	CELL CONT IC1 VOLTAGE1	1	ON	B	ON	HBB-118
P3287	CELL CONT IC2 VOLTAGE1	1	ON	B	ON	
P3288	CELL CONT IC3 VOLTAGE1	1	ON	B	ON	
P3289	CELL CONT IC4 VOLTAGE1	1	ON	B	ON	
P328A	CELL CONT IC5 VOLTAGE1	1	ON	B	ON	
P328B	CELL CONT IC6 VOLTAGE1	1	ON	B	ON	

DTC*1 CONSULT*2	Items (CONSULT screen terms)	Trip	MIL*3	Permanent DTC group*4	Hybrid system warning lamp	Reference
P3292	CELL CONT IC1 COMM ERROR	1	ON	B	ON	HBB-120
P3293	CELL CONT IC2 COMM ERROR	1	ON	B	ON	
P3294	CELL CONT IC3 COMM ERROR	1	ON	B	ON	
P3295	CELL CONT IC4 COMM ERROR	1	ON	B	ON	
P3296	CELL CONT IC5 COMM ERROR	1	ON	B	ON	
P3297	CELL CONT IC6 COMM ERROR	1	ON	B	ON	
P329E	CELL CONT IC1OPEN1	1	ON	B	ON	HBB-122
P329F	CELL CONT IC1OPEN2	1	ON	B	ON	
P32A0	CELL CONT IC1OPEN3	1	ON	B	ON	
P32A1	CELL CONT IC2OPEN1	1	ON	B	ON	
P32A2	CELL CONT IC2OPEN2	1	ON	B	ON	
P32A3	CELL CONT IC2OPEN3	1	ON	B	ON	
P32A4	CELL CONT IC3OPEN1	1	ON	B	ON	
P32A5	CELL CONT IC3OPEN2	1	ON	B	ON	
P32A6	CELL CONT IC3OPEN3	1	ON	B	ON	
P32A7	CELL CONT IC4OPEN1	1	ON	B	ON	
P32A8	CELL CONT IC4OPEN2	1	ON	B	ON	
P32A9	CELL CONT IC4OPEN3	1	ON	B	ON	
P32AA	CELL CONT IC5OPEN1	1	ON	B	ON	HBB-125
P32AB	CELL CONT IC5OPEN2	1	ON	B	ON	
P32AC	CELL CONT IC5OPEN3	1	ON	B	ON	
P32AD	CELL CONT IC6OPEN1	1	ON	B	ON	
P32AE	CELL CONT IC6OPEN2	1	ON	B	ON	
P32AF	CELL CONT IC6OPEN3	1	ON	B	ON	
P3300	TOTAL VOLTAGE OVER	1	ON	B	ON	HBB-127
P3301	CELL VOLTAGE OVER	1	ON	B	ON	HBB-129
P3373	TOTAL VOLTAGE OVER DISCHARGE	1	ON	B	ON	HBB-131
P3374	CELL VOLTAGE OVER DISCHARGE	1	ON	B	ON	HBB-133
U0100	LOST COMM ECM	1	ON	B	ON	HBB-135
U0101	LOST COMM TCM	1	—	—	ON	HBB-137
U0110	LOST COMM INV/MC	1	ON	B	ON	HBB-139
U0140	LOST COMM BCM	1	—	B	ON	HBB-141
U0155	LOST COMM METER	1	—	B	ON	HBB-142
U0293	LOST COMM HPCM	1	ON	B	ON	HBB-143
U1000	CAN COMM CIRCUIT	1	—	—	ON	HBB-145
U1321	CONFIG UNFINISH	1	—	—	ON	HBB-146

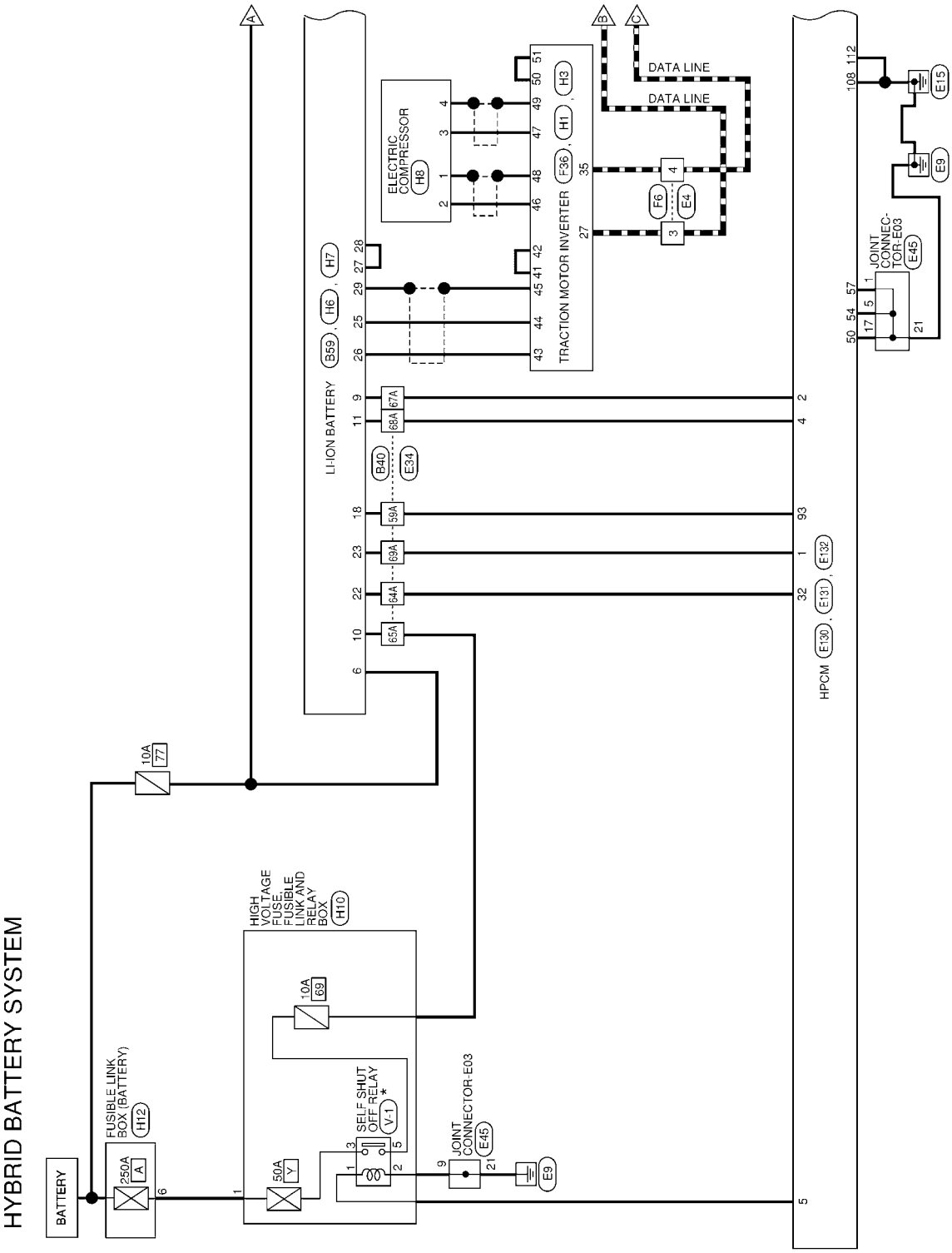
*1: 1st trip DTC No. is the same as DTC No.
*2: These numbers are prescribed by SAE J2012/ISO 15031-6.
*3: Refer to EC-77, "DIAGNOSIS DESCRIPTION : Malfunction Indicator Lamp (MIL)".
*4: Refer to HBB-56, "Description".

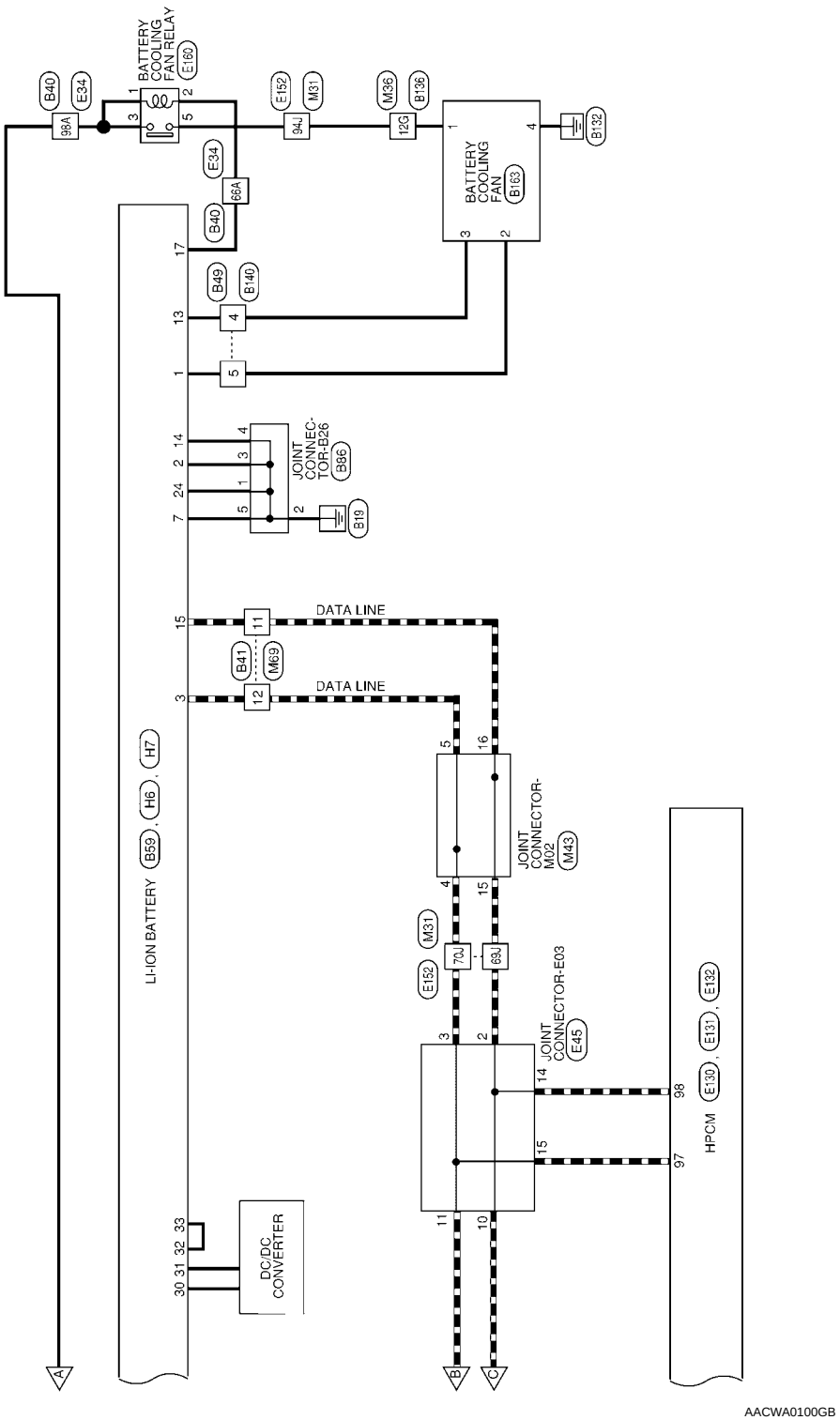
WIRING DIAGRAM

HYBRID BATTERY SYSTEM

Wiring Diagram

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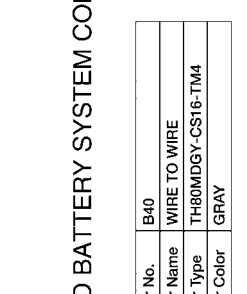



BATTERY COOLING FAN RELAY
E160
B40
E34
98A
E152
M31
94J
M36
B136
12G
BATTERY COOLING FAN
B163
B132
E34
66A
B40
B49
B140
JOINT CONNEC-TOR-B26
B66
B19
DATA LINE
B41
M69
DATA LINE
LI-ION BATTERY
B59
H6
H7
JOINT CONNECTOR-M02
M43
M31
E152
70J
63J
JOINT CONNECTOR-E03
E45
HPCM
E130
E131
E132
DC/DC CONVERTER
A
B
C
AACWA0100GB

HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	B40
Connector Name	WIRE TO WIRE
Connector Type	TH80MDGY-CS16-TM4
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1A	–	TO ENGINE ROOM HARNESS
2A	–	TO ENGINE ROOM HARNESS
3A	–	TO ENGINE ROOM HARNESS
4A	–	TO ENGINE ROOM HARNESS
5A	–	TO ENGINE ROOM HARNESS
6A	LG	TO ENGINE ROOM HARNESS
7A	Y	TO ENGINE ROOM HARNESS
8A	GR	TO ENGINE ROOM HARNESS
9A	BR	TO ENGINE ROOM HARNESS
10A	–	TO ENGINE ROOM HARNESS
11A	–	TO ENGINE ROOM HARNESS
12A	–	TO ENGINE ROOM HARNESS
13A	–	TO ENGINE ROOM HARNESS
14A	–	TO ENGINE ROOM HARNESS
15A	–	TO ENGINE ROOM HARNESS
16A	–	TO ENGINE ROOM HARNESS
17A	–	TO ENGINE ROOM HARNESS
18A	–	TO ENGINE ROOM HARNESS
19A	–	TO ENGINE ROOM HARNESS
20A	–	TO ENGINE ROOM HARNESS
21A	–	TO ENGINE ROOM HARNESS
22A	–	TO ENGINE ROOM HARNESS
23A	–	TO ENGINE ROOM HARNESS
24A	–	TO ENGINE ROOM HARNESS
25A	–	TO ENGINE ROOM HARNESS
26A	–	TO ENGINE ROOM HARNESS
27A	–	TO ENGINE ROOM HARNESS
28A	–	TO ENGINE ROOM HARNESS
29A	–	TO ENGINE ROOM HARNESS
30A	–	TO ENGINE ROOM HARNESS
31A	–	TO ENGINE ROOM HARNESS
32A	–	TO ENGINE ROOM HARNESS
33A	–	TO ENGINE ROOM HARNESS
34A	–	TO ENGINE ROOM HARNESS
35A	–	TO ENGINE ROOM HARNESS
36A	–	TO ENGINE ROOM HARNESS
37A	–	TO ENGINE ROOM HARNESS
38A	–	TO ENGINE ROOM HARNESS
39A	–	TO ENGINE ROOM HARNESS
40A	–	TO ENGINE ROOM HARNESS
41A	–	TO ENGINE ROOM HARNESS
42A	–	TO ENGINE ROOM HARNESS
43A	–	TO ENGINE ROOM HARNESS
44A	–	TO ENGINE ROOM HARNESS
45A	–	TO ENGINE ROOM HARNESS
46A	–	TO ENGINE ROOM HARNESS
47A	–	TO ENGINE ROOM HARNESS
48A	–	TO ENGINE ROOM HARNESS
49A	–	TO ENGINE ROOM HARNESS
50A	–	TO ENGINE ROOM HARNESS
51A	–	TO ENGINE ROOM HARNESS
52A	–	TO ENGINE ROOM HARNESS
53A	–	TO ENGINE ROOM HARNESS
54A	R	TO ENGINE ROOM HARNESS
55A	L	TO ENGINE ROOM HARNESS
56A	BR	TO ENGINE ROOM HARNESS
57A	W	TO ENGINE ROOM HARNESS
58A	B	TO ENGINE ROOM HARNESS
59A	LG	TO ENGINE ROOM HARNESS
60A	B	TO ENGINE ROOM HARNESS
61A	SHIELD	TO ENGINE ROOM HARNESS
62A	–	TO ENGINE ROOM HARNESS
63A	LG	TO ENGINE ROOM HARNESS
64A	Y	TO ENGINE ROOM HARNESS
65A	P	TO ENGINE ROOM HARNESS
66A	R	TO ENGINE ROOM HARNESS
67A	SB	TO ENGINE ROOM HARNESS
68A	BG	TO ENGINE ROOM HARNESS
69A	GR	TO ENGINE ROOM HARNESS
70A	G	TO ENGINE ROOM HARNESS
71A	–	TO ENGINE ROOM HARNESS
72A	–	TO ENGINE ROOM HARNESS
73A	–	TO ENGINE ROOM HARNESS
74A	–	TO ENGINE ROOM HARNESS
75A	B	TO ENGINE ROOM HARNESS
76A	G	TO ENGINE ROOM HARNESS
77A	SB	TO ENGINE ROOM HARNESS
78A	BG	TO ENGINE ROOM HARNESS
79A	Y	TO ENGINE ROOM HARNESS
80A	BR	TO ENGINE ROOM HARNESS
81A	R	TO ENGINE ROOM HARNESS
82A	–	TO ENGINE ROOM HARNESS
83A	–	TO ENGINE ROOM HARNESS
84A	–	TO ENGINE ROOM HARNESS
85A	–	TO ENGINE ROOM HARNESS
86A	–	TO ENGINE ROOM HARNESS
87A	–	TO ENGINE ROOM HARNESS
88A	–	TO ENGINE ROOM HARNESS
89A	–	TO ENGINE ROOM HARNESS
90A	–	TO ENGINE ROOM HARNESS
91A	–	TO ENGINE ROOM HARNESS
92A	–	TO ENGINE ROOM HARNESS
93A	–	TO ENGINE ROOM HARNESS
94A	–	TO ENGINE ROOM HARNESS
95A	–	TO ENGINE ROOM HARNESS
96A	BG	TO ENGINE ROOM HARNESS
97A	–	TO ENGINE ROOM HARNESS
98A	GR	TO ENGINE ROOM HARNESS
99A	LA/BR	TO ENGINE ROOM HARNESS
100A	G	TO ENGINE ROOM HARNESS

Connector No.	B41
Connector Name	WIRE TO WIRE
Connector Type	TH32MW-NH
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	SB	TO MAIN HARNESS
2	SB	TO MAIN HARNESS
3	L	TO MAIN HARNESS
4	L	TO MAIN HARNESS
5	W	TO MAIN HARNESS
6	Y	TO MAIN HARNESS
7	LG	TO MAIN HARNESS
8	BG	TO MAIN HARNESS
9	BR	TO MAIN HARNESS
10	Y	TO MAIN HARNESS
11	G	TO MAIN HARNESS
12	L	TO MAIN HARNESS
13	W	TO MAIN HARNESS
14	GR	TO MAIN HARNESS
15	Y	TO MAIN HARNESS
16	P	TO MAIN HARNESS
17	R	TO MAIN HARNESS
18	W	TO MAIN HARNESS
19	R	TO MAIN HARNESS
20	–	TO MAIN HARNESS
21	–	TO MAIN HARNESS
22	–	TO MAIN HARNESS
23	–	TO MAIN HARNESS
24	P	TO MAIN HARNESS
25	L	TO MAIN HARNESS
26	G	TO MAIN HARNESS
27	R	TO MAIN HARNESS
28	L	TO MAIN HARNESS
29	SHIELD	TO MAIN HARNESS
30	W	TO MAIN HARNESS
31	B	TO MAIN HARNESS
32	R	TO MAIN HARNESS

Connector No.	B49
Connector Name	WIRE TO WIRE
Connector Type	NS16MW-CS
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	SB	TO BODY NO. 2 HARNESS
2	W	TO BODY NO. 2 HARNESS
3	LA/W	TO BODY NO. 2 HARNESS
4	V	TO BODY NO. 2 HARNESS
5	SB	TO BODY NO. 2 HARNESS
6	LA/BR	TO BODY NO. 2 HARNESS
7	P	TO BODY NO. 2 HARNESS
8	LA/W	TO BODY NO. 2 HARNESS
9	LA/BR	TO BODY NO. 2 HARNESS
10	R	TO BODY NO. 2 HARNESS
11	LA/G	TO BODY NO. 2 HARNESS
12	LA/P	TO BODY NO. 2 HARNESS
13	–	TO BODY NO. 2 HARNESS
14	–	TO BODY NO. 2 HARNESS
15	G	TO BODY NO. 2 HARNESS
16	V	TO BODY NO. 2 HARNESS

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HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	B59
Connector Name	LI-ION BATTERY
Connector Type	TH24FW-NH
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	SB	SIO
2	B	GND1
3	L	CAN-H
4	–	–
5	–	–
6	P	BAT
7	B	RLY2 GND
8	–	–
9	SB	PRE CHG RLY V
10	P	SDSW (+)
11	BG	RLY1 V
12	–	–
13	V	VM0
14	B	GND2
15	G	CAN-L
16	–	–
17	R	FCTL
18	LG	VIGN
19	–	–
20	–	–
21	–	–
22	Y	SDSW (-)
23	GR	RLY2 V
24	B	RLY1 GND

Connector No.	B86
Connector Name	JOINT CONNECTOR-B26
Connector Type	SAC08JW
Connector Color	WHITE

H.S.

8	7	6	5	4	3	2	1

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

Connector No.	B136
Connector Name	WIRE TO WIRE
Connector Type	TH80MW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	LA/GR	TO MAIN HARNESS
2G	LA/P	TO MAIN HARNESS

3G	Y	TO MAIN HARNESS
4G	L	TO MAIN HARNESS
5G	G	TO MAIN HARNESS
6G	LA/BR	TO MAIN HARNESS
7G	BR	TO MAIN HARNESS
8G	LA/L	TO MAIN HARNESS
9G	LA/R	TO MAIN HARNESS
10G	R	TO MAIN HARNESS
11G	G	TO MAIN HARNESS
12G	Y	TO MAIN HARNESS
13G	BR	TO MAIN HARNESS
14G	–	TO MAIN HARNESS
15G	Y	TO MAIN HARNESS
16G	–	TO MAIN HARNESS
17G	–	TO MAIN HARNESS
18G	R	TO MAIN HARNESS
19G	R	TO MAIN HARNESS
20G	W	TO MAIN HARNESS
21G	P	TO MAIN HARNESS
22G	P	TO MAIN HARNESS
23G	L	TO MAIN HARNESS
24G	W	TO MAIN HARNESS
25G	L	TO MAIN HARNESS
26G	–	TO MAIN HARNESS
27G	–	TO MAIN HARNESS
28G	–	TO MAIN HARNESS
29G	SB	TO MAIN HARNESS
30G	–	TO MAIN HARNESS
31G	–	TO MAIN HARNESS
32G	–	TO MAIN HARNESS
33G	–	TO MAIN HARNESS
34G	V	TO MAIN HARNESS
35G	BR	TO MAIN HARNESS
36G	SHIELD	TO MAIN HARNESS
37G	LG	TO MAIN HARNESS
38G	V	TO MAIN HARNESS
39G	SHIELD	TO MAIN HARNESS
40G	G	TO MAIN HARNESS
41G	R	TO MAIN HARNESS
42G	–	TO MAIN HARNESS
43G	–	TO MAIN HARNESS
44G	BG	TO MAIN HARNESS
45G	SHIELD	TO MAIN HARNESS
46G	W	TO MAIN HARNESS
47G	R	TO MAIN HARNESS
48G	SHIELD	TO MAIN HARNESS
49G	L	TO MAIN HARNESS
50G	Y	TO MAIN HARNESS
51G	–	TO MAIN HARNESS
52G	–	TO MAIN HARNESS
53G	–	TO MAIN HARNESS
54G	–	TO MAIN HARNESS
55G	–	TO MAIN HARNESS

56G	–	TO MAIN HARNESS
57G	–	TO MAIN HARNESS
58G	–	TO MAIN HARNESS
59G	–	TO MAIN HARNESS
60G	GR	TO MAIN HARNESS
61G	V	TO MAIN HARNESS
62G	–	TO MAIN HARNESS
63G	–	TO MAIN HARNESS
64G	–	TO MAIN HARNESS
65G	–	TO MAIN HARNESS
66G	–	TO MAIN HARNESS
67G	–	TO MAIN HARNESS
68G	–	TO MAIN HARNESS
69G	–	TO MAIN HARNESS
70G	–	TO MAIN HARNESS
71G	–	TO MAIN HARNESS
72G	–	TO MAIN HARNESS
73G	–	TO MAIN HARNESS
74G	–	TO MAIN HARNESS
75G	–	TO MAIN HARNESS
76G	–	TO MAIN HARNESS
77G	–	TO MAIN HARNESS
78G	LA/R	TO MAIN HARNESS
79G	LA/V	TO MAIN HARNESS
80G	LA/B	TO MAIN HARNESS
81G	LA/L	TO MAIN HARNESS
82G	–	TO MAIN HARNESS
83G	–	TO MAIN HARNESS
84G	–	TO MAIN HARNESS
85G	–	TO MAIN HARNESS
86G	–	TO MAIN HARNESS
87G	–	TO MAIN HARNESS
88G	–	TO MAIN HARNESS
89G	–	TO MAIN HARNESS
90G	–	TO MAIN HARNESS
91G	R	TO MAIN HARNESS
92G	BR	TO MAIN HARNESS
93G	W	TO MAIN HARNESS
94G	LA/V	TO MAIN HARNESS
95G	V	TO MAIN HARNESS
96G	G	TO MAIN HARNESS
97G	P	TO MAIN HARNESS
98G	GR	TO MAIN HARNESS
99G	LA/Y	TO MAIN HARNESS
100G	Y	TO MAIN HARNESS

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HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	B140
Connector Name	WIRE TO WIRE
Connector Type	NS16FW-CS
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	GR	TO BODY HARNESS
2	W	TO BODY HARNESS
3	LA/Y	TO BODY HARNESS
4	V	TO BODY HARNESS
5	SB	TO BODY HARNESS
6	LA/BR	TO BODY HARNESS
7	LA/V	TO BODY HARNESS
8	L	TO BODY HARNESS
9	Y	TO BODY HARNESS
10	R	TO BODY HARNESS
11	V	TO BODY HARNESS
12	LG	TO BODY HARNESS
13	L	TO BODY HARNESS
14	Y	TO BODY HARNESS
15	LA/GR	TO BODY HARNESS
16	LA/LG	TO BODY HARNESS

Connector No.	B163
Connector Name	BATTERY COOLING FAN
Connector Type	NS04FW-CS
Connector Color	WHITE

H.S.

1	2	3	4

Terminal No.	Color of Wire	Signal Name
1	Y	IGN
2	SB	SI
3	V	VM
4	B	GND

Connector No.	E4
Connector Name	WIRE TO WIRE
Connector Type	RS08MGY-PR
Connector Color	GRAY

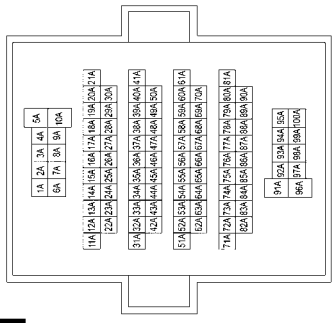
H.S.

1	2	3	4
5	6	7	8

Terminal No.	Color of Wire	Signal Name
1	Y	TO ENGINE CONTROL HARNESS
2	–	TO ENGINE CONTROL HARNESS
3	L	TO ENGINE CONTROL HARNESS
4	G	TO ENGINE CONTROL HARNESS
5	–	TO ENGINE CONTROL HARNESS
6	–	TO ENGINE CONTROL HARNESS
7	–	TO ENGINE CONTROL HARNESS
8	–	TO ENGINE CONTROL HARNESS

Connector No.	E34
Connector Name	WIRE TO WIRE
Connector Type	TH80FDGY-CS16-TM4
Connector Color	GRAY

H.S.



Terminal No.	Color of Wire	Signal Name
1A	–	TO BODY HARNESS

2A	–	TO BODY HARNESS
3A	–	TO BODY HARNESS
4A	–	TO BODY HARNESS
5A	–	TO BODY HARNESS
6A	L	TO BODY HARNESS
7A	R	TO BODY HARNESS
8A	GR	TO BODY HARNESS
9A	BR	TO BODY HARNESS
10A	–	TO BODY HARNESS
11A	–	TO BODY HARNESS
12A	–	TO BODY HARNESS
13A	–	TO BODY HARNESS
14A	–	TO BODY HARNESS
15A	–	TO BODY HARNESS
16A	–	TO BODY HARNESS
17A	–	TO BODY HARNESS
18A	–	TO BODY HARNESS
19A	–	TO BODY HARNESS
20A	–	TO BODY HARNESS
21A	–	TO BODY HARNESS
22A	–	TO BODY HARNESS
23A	–	TO BODY HARNESS
24A	–	TO BODY HARNESS
25A	–	TO BODY HARNESS
26A	–	TO BODY HARNESS
27A	–	TO BODY HARNESS
28A	–	TO BODY HARNESS
29A	–	TO BODY HARNESS
30A	–	TO BODY HARNESS
31A	–	TO BODY HARNESS
32A	–	TO BODY HARNESS
33A	–	TO BODY HARNESS
34A	–	TO BODY HARNESS
35A	–	TO BODY HARNESS
36A	–	TO BODY HARNESS
37A	–	TO BODY HARNESS
38A	–	TO BODY HARNESS
39A	–	TO BODY HARNESS
40A	–	TO BODY HARNESS
41A	–	TO BODY HARNESS
42A	–	TO BODY HARNESS
43A	–	TO BODY HARNESS
44A	–	TO BODY HARNESS
45A	–	TO BODY HARNESS
46A	–	TO BODY HARNESS
47A	–	TO BODY HARNESS
48A	–	TO BODY HARNESS
49A	–	TO BODY HARNESS
50A	–	TO BODY HARNESS
51A	–	TO BODY HARNESS
52A	–	TO BODY HARNESS
53A	–	TO BODY HARNESS
54A	R	TO BODY HARNESS

55A	L	TO BODY HARNESS
56A	BR	TO BODY HARNESS
57A	W	TO BODY HARNESS
58A	V	TO BODY HARNESS
59A	Y	TO BODY HARNESS
60A	B	TO BODY HARNESS
61A	SHIELD	TO BODY HARNESS
62A	–	TO BODY HARNESS
63A	L	TO BODY HARNESS
64A	Y	TO BODY HARNESS
65A	P	TO BODY HARNESS
66A	R	TO BODY HARNESS
67A	SB	TO BODY HARNESS
68A	BG	TO BODY HARNESS
69A	GR	TO BODY HARNESS
70A	LG	TO BODY HARNESS
71A	–	TO BODY HARNESS
72A	–	TO BODY HARNESS
73A	–	TO BODY HARNESS
74A	–	TO BODY HARNESS
75A	B	TO BODY HARNESS
76A	G	TO BODY HARNESS
77A	SB	TO BODY HARNESS
78A	BG	TO BODY HARNESS
79A	LG	TO BODY HARNESS
80A	BR	TO BODY HARNESS
81A	G	TO BODY HARNESS
82A	–	TO BODY HARNESS
83A	–	TO BODY HARNESS
84A	–	TO BODY HARNESS
85A	–	TO BODY HARNESS
86A	–	TO BODY HARNESS
87A	–	TO BODY HARNESS
88A	–	TO BODY HARNESS
89A	–	TO BODY HARNESS
90A	–	TO BODY HARNESS
91A	–	TO BODY HARNESS
92A	–	TO BODY HARNESS
93A	–	TO BODY HARNESS
94A	–	TO BODY HARNESS
95A	–	TO BODY HARNESS
96A	G	TO BODY HARNESS
97A	–	TO BODY HARNESS
98A	GR	TO BODY HARNESS
99A	W	TO BODY HARNESS
100A	G	TO BODY HARNESS

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HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	E45
Connector Name	JOINT CONNECTOR-E03
Connector Type	NH24FW-J
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	B	GROUND
2	G	CAN-L
3	L	CAN-H
4	–	–
5	B	GROUND
6	G	HEV CAN-L
7	L	HEV CAN-H
8	–	–
9	B	GROUND
10	G	CAN-L
11	L	CAN-H
12	–	–
13	SHIELD	SHIELD
14	G	CAN-L
15	L	CAN-H
16	–	–
17	B	GROUND
18	G	HEV CAN-L
19	L	HEV CAN-H
20	–	–
21	B	GROUND
22	–	–
23	–	–
24	–	–

Connector No.	E130
Connector Name	HPCM
Connector Type	RH24FB-RZ8-L-RH
Connector Color	BLACK

H.S.

81	85	89	93	97	101	105	109
82	86	90	94	98	102	106	110
83	87	91	95	99	103	107	111
84	88	92	96	100	104	108	112

Terminal No.	Color of Wire	Signal Name
81	R	12V BATTERY VOLTAGE
82	–	–
83	P	CAN-L
84	L	CAN-H
85	–	–
86	–	–
87	–	–
88	B	DC/DC CONVERTER VOLTAGE STABILIZER SIGNAL
89	–	–
90	–	–
91	–	–
92	–	–
93	Y	IGNITION SIGNAL
94	G	ASCD STEERING SWITCH
95	BR	ASCD STEERING SWITCH GROUND
96	–	–
97	L	HEV SYSTEM CAN-H
98	G	HEV SYSTEM CAN-L
99	R	STOP LAMP SWITCH
100	W	BRAKE PEDAL POSITION SWITCH
101	–	–
102	SB	SENSOR POWER SUPPLY
103	BR	ACCELERATOR PEDAL POSITION SENSOR 2
104	LG	SENSOR GROUND
105	BR	POWER SUPPLY FOR HPCM
106	V	SENSOR POWER SUPPLY
107	–	–
108	B	HPCM GND
109	–	–
110	GR	ACCELERATOR PEDAL POSITION SENSOR 1
111	R	SENSOR GROUND
112	GR	HPCM GND

Connector No.	E131
Connector Name	HPCM
Connector Type	RH24FGY-RZ8-R-RH
Connector Color	GRAY

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	GR	SYSTEM MAIN RELAY 2
2	SB	PRE-CHARGE SIGNAL
3	–	–
4	BG	SYSTEM MAIN RELAY 1
5	V	SELF SHUT OFF RELAY
6	–	–
7	–	–
8	–	–
9	–	–
10	–	–
11	–	–
12	–	–
13	–	–
14	–	–
15	–	–
16	–	–
17	–	–
18	W	ELECTRIC WATER PUMP
19	–	–
20	–	–
21	B	ELECTRIC WATER PUMP (FEED BACK)
22	–	–
23	–	–
24	R	HIGH VOLTAGE COOLING WATER TEMPERATURE SENSOR
25	LG	SENSOR GROUND
26	–	–
27	–	–
28	–	–
29	–	–
30	W	CONNECTION DETECTING CIRCUIT
31	–	–
32	Y	SERVICE PLUG

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HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	E132
Connector Name	HPCM
Connector Type	RH40FBR-RZ8-L-RH
Connector Color	BROWN

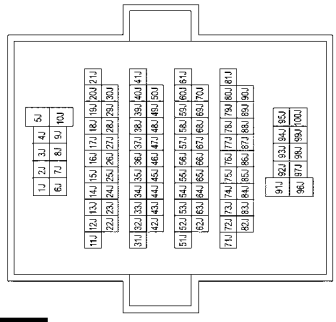
H.S.

33	37	41	45	49	53	57	61	65	69	73	77
34	38	42	46	50	54	58	62	66	70	74	78
35	39	43	47	51	55	59	63	67	71	75	79
36	40	44	48	52	56	60	64	68	72	76	80

Terminal No.	Color of Wire	Signal Name
33	–	–
34	–	–
35	–	–
36	SB	P/N SIGNAL
37	–	–
38	–	–
39	–	–
40	–	–
41	–	–
42	–	–
43	–	–
44	–	–
45	–	–
46	–	–
47	–	–
48	–	–
49	–	–
50	B	HPCM GROUND
51	SHIELD	SHIELD
52	–	–
53	–	–
54	B	HPCM GROUND
55	–	–
56	–	–
57	B	HPCM GROUND
58	–	–
59	–	–
60	–	–
61	–	–
62	–	–
63	LG	12V BATTERY TEMPERATURE SENSOR
64	–	–
65	–	–
66	–	–
67	–	–
68	–	–
69	V	12V BATTERY CURRENT SENSOR
70	W	SENSOR GROUND
71	–	–
72	BR	SENSER POWER SUPPLY
73	–	–
74	–	–
75	–	–
76	–	–
77	L	POWER SUPPLY FOR HPCM
78	–	–
79	GR	SHIFT LOCK SOLENOID
80	–	–

Connector No.	E152
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.



Terminal No.	Color of Wire	Signal Name
1J	–	TO MAIN HARNESS
2J	Y	TO MAIN HARNESS
3J	–	TO MAIN HARNESS
4J	–	TO MAIN HARNESS
5J	–	TO MAIN HARNESS
6J	–	TO MAIN HARNESS
7J	–	TO MAIN HARNESS
8J	–	TO MAIN HARNESS
9J	BR	TO MAIN HARNESS
10J	–	TO MAIN HARNESS
11J	–	TO MAIN HARNESS
12J	–	TO MAIN HARNESS
13J	–	TO MAIN HARNESS
14J	–	TO MAIN HARNESS
15J	–	TO MAIN HARNESS
16J	–	TO MAIN HARNESS
17J	–	TO MAIN HARNESS
18J	–	TO MAIN HARNESS
19J	–	TO MAIN HARNESS
20J	–	TO MAIN HARNESS
21J	GR	TO MAIN HARNESS
22J	SHIELD	TO MAIN HARNESS
23J	LG	TO MAIN HARNESS
24J	V	TO MAIN HARNESS
25J	L	TO MAIN HARNESS
26J	BR	TO MAIN HARNESS
27J	G	TO MAIN HARNESS
28J	R	TO MAIN HARNESS
29J	L	TO MAIN HARNESS
30J	V	TO MAIN HARNESS
31J	–	TO MAIN HARNESS
32J	–	TO MAIN HARNESS
33J	R	TO MAIN HARNESS
34J	L	TO MAIN HARNESS
35J	BG	TO MAIN HARNESS
36J	LG	TO MAIN HARNESS
37J	GR	TO MAIN HARNESS
38J	BR	TO MAIN HARNESS
39J	–	TO MAIN HARNESS
40J	–	TO MAIN HARNESS
41J	G	TO MAIN HARNESS
42J	W	TO MAIN HARNESS
43J	L	TO MAIN HARNESS
44J	B	TO MAIN HARNESS
45J	SB	TO MAIN HARNESS
46J	BR	TO MAIN HARNESS
47J	W	TO MAIN HARNESS
48J	W	TO MAIN HARNESS
49J	L	TO MAIN HARNESS
50J	P	TO MAIN HARNESS
51J	W	TO MAIN HARNESS
52J	R	TO MAIN HARNESS
53J	SB	TO MAIN HARNESS
54J	LG	TO MAIN HARNESS
55J	W	TO MAIN HARNESS
56J	BG	TO MAIN HARNESS
57J	R	TO MAIN HARNESS
58J	V	TO MAIN HARNESS
59J	BR	TO MAIN HARNESS
60J	P	TO MAIN HARNESS
61J	L	TO MAIN HARNESS
62J	P	TO MAIN HARNESS
63J	L	TO MAIN HARNESS
64J	R	TO MAIN HARNESS
65J	L	TO MAIN HARNESS
66J	BG	TO MAIN HARNESS
67J	–	TO MAIN HARNESS
68J	–	TO MAIN HARNESS
69J	G	TO MAIN HARNESS
70J	L	TO MAIN HARNESS
71J	–	TO MAIN HARNESS
72J	–	TO MAIN HARNESS
73J	–	TO MAIN HARNESS
74J	–	TO MAIN HARNESS
75J	–	TO MAIN HARNESS
76J	–	TO MAIN HARNESS
77J	–	TO MAIN HARNESS
78J	–	TO MAIN HARNESS
79J	SHIELD	TO MAIN HARNESS
80J	B	TO MAIN HARNESS
81J	W	TO MAIN HARNESS
82J	–	TO MAIN HARNESS
83J	–	TO MAIN HARNESS
84J	–	TO MAIN HARNESS
85J	–	TO MAIN HARNESS
86J	–	TO MAIN HARNESS
87J	–	TO MAIN HARNESS
88J	–	TO MAIN HARNESS
89J	–	TO MAIN HARNESS
90J	–	TO MAIN HARNESS
91J	–	TO MAIN HARNESS
92J	LG	TO MAIN HARNESS
93J	L	TO MAIN HARNESS
94J	L	TO MAIN HARNESS
95J	BR	TO MAIN HARNESS
96J	–	TO MAIN HARNESS
97J	GR	TO MAIN HARNESS
98J	P	TO MAIN HARNESS
99J	W	TO MAIN HARNESS
100J	Y	TO MAIN HARNESS

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HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	E160
Connector Name	BATTERY COOLING FAN RELAY
Connector Type	MS02FL-M2-LC
Connector Color	BLUE

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	BATTERY
2	R	FCTL
3	GR	BATTERY
5	L	IGNITION

Connector No.	F6
Connector Name	WIRE TO WIRE
Connector Type	RS08FGY-PR
Connector Color	GRAY

H.S.

Terminal No.	Color of Wire	Signal Name
1	P	TO ENGINE ROOM HARNESS
2	–	TO ENGINE ROOM HARNESS
3	L	TO ENGINE ROOM HARNESS
4	G	TO ENGINE ROOM HARNESS
5	–	TO ENGINE ROOM HARNESS
6	–	TO ENGINE ROOM HARNESS
7	–	TO ENGINE ROOM HARNESS
8	–	TO ENGINE ROOM HARNESS

Connector No.	F36
Connector Name	TRACTION MOTOR INVERTER
Connector Type	SAZ36FB-HS4-1V-LH
Connector Color	BLACK

H.S.

Terminal No.	Color of Wire	Signal Name
1	–	–
2	V	TRACTION MOTOR RESOLVER SIGNAL S1
3	–	–
4	G	TRACTION MOTOR RESOLVER SIGNAL R1
5	–	–
6	–	–
7	R	POWER SUPPLY (IGN)
8	–	–
9	P	CONNECTION DETECTION (+)
10	LG	TRACTION MOTOR RESOLVER SIGNAL S3
11	–	–
12	Y	TRACTION MOTOR RESOLVER SIGNAL R2
13	–	–
14	–	–
15	–	–
16	–	–
17	W	CONNECTION DETECTION (-)
18	–	–
19	–	–
20	W	TRACTION MOTOR RESOLVER SIGNAL S2
21	–	–
22	–	–
23	–	–
24	–	–
25	–	–
26	–	–
27	L	HEV SYSTEM CAN-H
28	B	TRACTION MOTOR RESOLVER SIGNAL S4
29	–	–
30	–	–
31	–	–
32	–	–
33	–	–
34	–	–
35	G	HEV SYSTEM CAN-L
36	–	–
37	B	GND
38	P	POWER SUPPLY (BAT)
39	B	GND
40	P	POWER SUPPLY (BAT)

Connector No.	H1
Connector Name	TRACTION MOTOR INVERTER
Connector Type	24340_3JV1A
Connector Color	ORANGE

H.S.

Terminal No.	Color of Wire	Signal Name
41	–	CONNECTION DETECTION
42	–	CONNECTION DETECTION
43	O	HIGH VOLTAGE (+)
44	O	HIGH VOLTAGE (-)
45	SHIELD	SHIELD

Connector No.	H3
Connector Name	TRACTION MOTOR INVERTER
Connector Type	TM02FOR-3V
Connector Color	ORANGE

H.S.

Terminal No.	Color of Wire	Signal Name
46	O	AC COMP N
47	O	AC COMP P
48	SHIELD	SHIELD
49	SHIELD	SHIELD
50	B	CONNECTION DETECTION
51	B	CONNECTION DETECTION

Connector No.	H6
Connector Name	LI-ION BATTERY
Connector Type	24342-3JV1A
Connector Color	ORANGE

H.S.

Terminal No.	Color of Wire	Signal Name
25	O	HIGH VOLTAGE (-)
26	O	HIGH VOLTAGE (+)
27	–	CONNECTION DETECTION
28	–	CONNECTION DETECTION
29	SHIELD	SHIELD

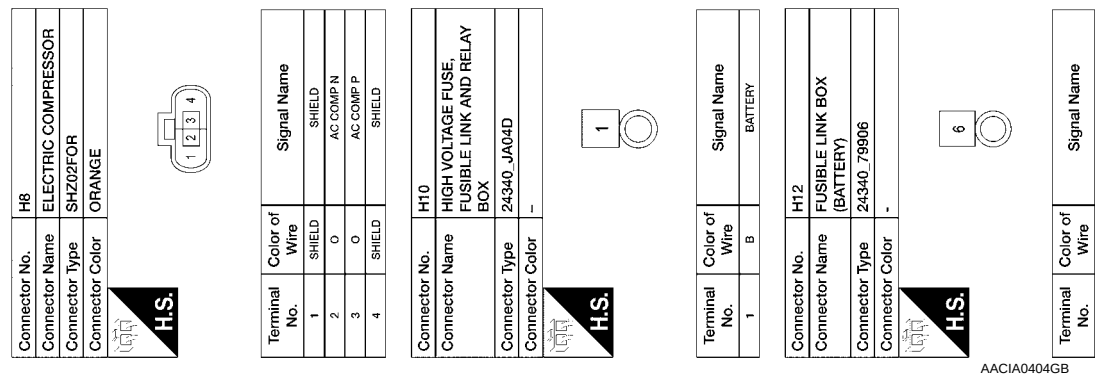
Connector No.	H7
Connector Name	LI-ION BATTERY
Connector Type	TM02FOR-2V
Connector Color	ORANGE

H.S.

Terminal No.	Color of Wire	Signal Name
30	–	HIGH VOLTAGE (+)
31	–	HIGH VOLTAGE (-)
32	–	CONNECTION DETECTION
33	–	CONNECTION DETECTION

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HYBRID BATTERY SYSTEM CONNECTORS



HYBRID BATTERY SYSTEM CONNECTORS

Connector No.	M36
Connector Name	WIRE TO WIRE
Connector Type	TH80FW-CS16-TM4
Connector Color	WHITE

H.S.

Terminal No.	Color of Wire	Signal Name
1G	LA/R	TO BODY NO. 2 HARNESS
2G	W	TO BODY NO. 2 HARNESS
3G	Y	TO BODY NO. 2 HARNESS
4G	BG	TO BODY NO. 2 HARNESS
5G	G	TO BODY NO. 2 HARNESS
6G	SB	TO BODY NO. 2 HARNESS
7G	P	TO BODY NO. 2 HARNESS
8G	LA/Y	TO BODY NO. 2 HARNESS
9G	LA/W	TO BODY NO. 2 HARNESS
10G	R	TO BODY NO. 2 HARNESS
11G	G	TO BODY NO. 2 HARNESS
12G	L	TO BODY NO. 2 HARNESS
13G	BR	TO BODY NO. 2 HARNESS
14G	–	TO BODY NO. 2 HARNESS
15G	Y	TO BODY NO. 2 HARNESS
16G	–	TO BODY NO. 2 HARNESS
17G	–	TO BODY NO. 2 HARNESS
18G	R	TO BODY NO. 2 HARNESS
19G	LA/R	TO BODY NO. 2 HARNESS
20G	W	TO BODY NO. 2 HARNESS
21G	BR	TO BODY NO. 2 HARNESS
22G	P	TO BODY NO. 2 HARNESS
23G	L	TO BODY NO. 2 HARNESS
24G	W	TO BODY NO. 2 HARNESS
25G	L	TO BODY NO. 2 HARNESS
26G	–	TO BODY NO. 2 HARNESS
27G	–	TO BODY NO. 2 HARNESS
28G	–	TO BODY NO. 2 HARNESS
29G	–	TO BODY NO. 2 HARNESS
30G	–	TO BODY NO. 2 HARNESS
31G	–	TO BODY NO. 2 HARNESS
32G	–	TO BODY NO. 2 HARNESS
33G	–	TO BODY NO. 2 HARNESS
34G	V	TO BODY NO. 2 HARNESS
35G	BR	TO BODY NO. 2 HARNESS
36G	SHIELD	TO BODY NO. 2 HARNESS
37G	LG	TO BODY NO. 2 HARNESS
38G	V	TO BODY NO. 2 HARNESS
39G	SHIELD	TO BODY NO. 2 HARNESS
40G	G	TO BODY NO. 2 HARNESS
41G	R	TO BODY NO. 2 HARNESS
42G	–	TO BODY NO. 2 HARNESS
43G	–	TO BODY NO. 2 HARNESS
44G	BG	TO BODY NO. 2 HARNESS
45G	SHIELD	TO BODY NO. 2 HARNESS
46G	L	TO BODY NO. 2 HARNESS
47G	Y	TO BODY NO. 2 HARNESS
48G	SHIELD	TO BODY NO. 2 HARNESS
49G	W	TO BODY NO. 2 HARNESS
50G	R	TO BODY NO. 2 HARNESS
51G	–	TO BODY NO. 2 HARNESS
52G	–	TO BODY NO. 2 HARNESS
53G	–	TO BODY NO. 2 HARNESS
54G	–	TO BODY NO. 2 HARNESS
55G	–	TO BODY NO. 2 HARNESS
56G	–	TO BODY NO. 2 HARNESS
57G	–	TO BODY NO. 2 HARNESS
58G	–	TO BODY NO. 2 HARNESS
59G	–	TO BODY NO. 2 HARNESS
60G	GR	TO BODY NO. 2 HARNESS
61G	BR	TO BODY NO. 2 HARNESS
62G	–	TO BODY NO. 2 HARNESS
63G	–	TO BODY NO. 2 HARNESS
64G	–	TO BODY NO. 2 HARNESS
65G	–	TO BODY NO. 2 HARNESS
66G	–	TO BODY NO. 2 HARNESS
67G	–	TO BODY NO. 2 HARNESS
68G	–	TO BODY NO. 2 HARNESS
69G	–	TO BODY NO. 2 HARNESS
70G	–	TO BODY NO. 2 HARNESS
71G	–	TO BODY NO. 2 HARNESS
72G	–	TO BODY NO. 2 HARNESS
73G	–	TO BODY NO. 2 HARNESS
74G	–	TO BODY NO. 2 HARNESS
76G	–	TO BODY NO. 2 HARNESS
77G	–	TO BODY NO. 2 HARNESS
78G	LA/Y	TO BODY NO. 2 HARNESS
79G	LA/V	TO BODY NO. 2 HARNESS
80G	LA/B	TO BODY NO. 2 HARNESS
81G	LA/L	TO BODY NO. 2 HARNESS
82G	–	TO BODY NO. 2 HARNESS
83G	–	TO BODY NO. 2 HARNESS
84G	–	TO BODY NO. 2 HARNESS
85G	–	TO BODY NO. 2 HARNESS
86G	–	TO BODY NO. 2 HARNESS
87G	–	TO BODY NO. 2 HARNESS
88G	–	TO BODY NO. 2 HARNESS
89G	–	TO BODY NO. 2 HARNESS
90G	–	TO BODY NO. 2 HARNESS
91G	R	TO BODY NO. 2 HARNESS
92G	LA/L	TO BODY NO. 2 HARNESS
93G	W	TO BODY NO. 2 HARNESS
94G	LG	TO BODY NO. 2 HARNESS
95G	GR	TO BODY NO. 2 HARNESS
96G	SB	TO BODY NO. 2 HARNESS
97G	LA/BR	TO BODY NO. 2 HARNESS
98G	GR	TO BODY NO. 2 HARNESS
99G	Y	TO BODY NO. 2 HARNESS
100G	V	TO BODY NO. 2 HARNESS

Connector No.	M43
Connector Name	JOINT CONNECTOR-M02
Connector Type	NH20FG-DC
Connector Color	GREEN

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	–	–
2	–	–
3	L	CAN-H
4	L	CAN-H
5	L	CAN-H
6	–	–
7	L	CAN-H
8	L	CAN-H
9	L	CAN-H
10	–	–
11	–	–
12	–	–
13	–	–
14	G	CAN-L
15	G	CAN-L
16	G	CAN-L

17	–	–
18	P	CAN-L
19	P	CAN-L
20	P	CAN-L

Connector No.	M69
Connector Name	WIRE TO WIRE
Connector Type	TH32FW-NH
Connector Color	WHITE

H.S.

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

Terminal No.	Color of Wire	Signal Name
1	SB	TO BODY HARNESS
2	BR	TO BODY HARNESS
3	L	TO BODY HARNESS
4	L	TO BODY HARNESS
5	W	TO BODY HARNESS
6	Y	TO BODY HARNESS
7	LG	TO BODY HARNESS
8	BG	TO BODY HARNESS
9	BR	TO BODY HARNESS
10	Y	TO BODY HARNESS
11	G	TO BODY HARNESS
12	L	TO BODY HARNESS
13	W	TO BODY HARNESS
14	GR	TO BODY HARNESS
15	Y	TO BODY HARNESS
16	P	TO BODY HARNESS
17	R	TO BODY HARNESS
18	W	TO BODY HARNESS
19	R	TO BODY HARNESS
20	–	TO BODY HARNESS
21	–	TO BODY HARNESS
22	–	TO BODY HARNESS
23	–	TO BODY HARNESS
24	P	TO BODY HARNESS
25	L	TO BODY HARNESS
26	BR	TO BODY HARNESS
27	R	TO BODY HARNESS
28	L	TO BODY HARNESS
29	SHIELD	TO BODY HARNESS
30	W	TO BODY HARNESS
31	B	TO BODY HARNESS
32	R	TO BODY HARNESS

AACIA0405GB

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:0000000014844784

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to HBB-51, "Diagnostic Work Sheet" 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 HBB-29, "CONSULT Function".)
- 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 hybrid system warning lamp reported by the customer.
Check if the behavior results from fail-safe operation. (Refer to HBB-35, "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.

Is a malfunction symptom reproduced?

YES >> GO TO 5.
NO >> Check GI-54, "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 HBB-36, "DTC Inspection Priority Chart" and then determine the order for performing the diagnosis.

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

Is DTC detected?

YES >> GO TO 5.
NO >> Check GI-54, "Intermittent Incident".

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 GI-56, "Circuit Inspection" for details.

>> GO TO 6.

6.REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.

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 HBB-29, "CONSULT Function".)

>> 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 HBB-29, "CONSULT Function".)

Diagnostic Work Sheet

INFOID:0000000014844785

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.

KEY POINTS

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

SEF907L

EXAMPLE OF QUESTION SHEET

Question sheet					
Customer's name	MR/MS	Registration number		Initial year registration	Year Month Day
		Vehicle type		Chassis No.	
Storage date	Year Month Day	Engine		Mileage	km/mile
Symptom	☐Warning lamp activated ( ) ☐Vehicle not READY ☐Poor starting ☐Engine stall ☐Rough idle ☐Idling stop does not occur. ☐Poor driving control ☐Overheating ☐Abnormal noise, gear noise ☐Shock ☐Vibration (judder) ☐Slipping ☐Poor shifting ☐Fixed shift position ☐Poor operating feel ☐Does not shift. ☐Shifting is heavy. ☐Gear slipout ☐Switch malfunction ☐Driving not possible ☐Other				
Details of problem					
Noise description					
Date of malfunction	☐>From when car is new ☐Recent (approx. date: , km/mile)				
Frequency of occurrence	☐Always ☐Once only ☐Occasionally (times in past) ☐Other ( )				
Location of malfunction	☐Not applicable ☐Ordinary road ☐Expressway ☐Mountain road (ascending / descending) ☐Rough road ☐Flat road ☐Turning (right / left) ☐Other ( )				
Engine speed	☐Not applicable ☐Cold ☐During warm-up ☐Warm ☐Other ( )				
Climate conditions	☐Not applicable				
Weather	☐Clear ☐Overcast ☐Rain ☐Snow ☐Other ( )				

Question sheet		
	Temperature	☐Hot ☐Warm ☐Cool ☐Cold ☐Temp. (approx. °C/°F)
	Relative humidity	☐ High ☐ Medium ☐ Low
Selector lever position		☐Not applicable ☐P ☐ R ☐N ☐D ☐L ☐S ☐3 ☐2 ☐1 ☐ M mode ( ) ☐1st ☐2nd ☐3rd ☐4th ☐5th ☐6th ☐ 7th
Condition of shift lever operation		☐Not applicable ☐ AT select ( ) → ( ) ☐ MT shift operation ( ) → ( ) ☐Shift-up ( ) → ( ) ☐Shift down ( ) → ( ) ☐Other ( )
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 ☐Vehicle speed: km/h (MPH) ☐TH position:
When is malfunction corrected?		☐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 conditions		
Customer comments		

ADDITIONAL SERVICE WHEN REPLACING LI-ION BATTERY CONTROLLER

Description

INFOID:0000000014844786

When replacing Li-ion battery (With LBC), always perform LBC configuration. Refer to HBB-53, "Work Procedure" for details.

Work Procedure

INFOID:0000000014844787

1.REPLACE LI-ION BATTERY

Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

>> GO TO 2.

2.WRITING VEHICLE SPECIFICATION

CONSULT Configuration
Perform “After Replace ECU” of “Read / Write Configuration” or “Manual Configuration” to write destination data. Refer to HBB-54, "Work Procedure".

>> WORK END

CONFIGURATION (LI-ION BATTERY CONTROLLER)

Description

INFOID:0000000014844788

- Since vehicle specifications are not included in the LBC after replacement, it is required to write vehicle specifications with CONSULT.
- Configuration has three functions as follows.

Function		Description
Read / Write Configuration	After Replace ECU	Writes the vehicle configuration with destination data.
Manual Configuration		Writes the vehicle configuration with manual selection.

Refer to HBB-54, "Work Procedure" for detail of work procedure.

NOTE:

Since destination data in CONSULT are written into LBC, readout is not necessary.

CAUTION:

- **The Li-ion battery contains the LBC. When replacing the Li-ion battery, you must perform "Read/ Write Configuration" with CONSULT to reconfigure the LBC.**
- **Never perform "Read/Write Configuration" or "Manual Configuration" except for new LBC.**

Work Procedure

INFOID:0000000014844789

CAUTION:

- **When performing the procedure below, ensure the ignition is ON.**
- **When performing the procedure below, ensure the vehicle is not in ready mode. Performing the actions below with the vehicle in ready mode may cause additional errors.**

1. WRITING MODE SELECTION

CONSULT Configuration

1. Turn ignition switch ON.
   CAUTION:
   Never bring the vehicle into the READY status.
2. Select “Re/programming, Configuration” of LBC.

When writing destination data>>GO TO 2.
When writing manually>>GO TO 3.

2. PERFORM “AFTER REPLACE ECU” OF “READ / WRITE CONFIGURATION”

CONSULT Configuration

Perform “After Replace ECU” of “Read / Write Configuration”.

>> GO TO 4.

3. PERFORM “MANUAL CONFIGURATION”

CONSULT Configuration

1. Select “Manual Configuration”.
2. Touch “Next”.
3. Touch “OK”.
4. Check that the configuration has been successfully written and touch “End”.

>> GO TO 4.

4. CHECK ALL ECU SELF-DIAGNOSIS RESULTS

1. Erase all ECU self-diagnosis results using CONSULT.
2. Turn the ignition switch OFF.
3. Turn ignition switch ON.
   CAUTION:
   Never bring the vehicle into the READY status.
4. Check that no DTC is detected.

>> WORK END

HOW TO ERASE PERMANENT DTC

Description

INFOID:0000000014844790

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 HBC-107, "Description".

DTC/CIRCUIT DIAGNOSIS

P0A1F BATTERY ENERGY CONTROL MODULE

DTC Description

INFOID:0000000014844791

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A1F	BATTERY ENERGY CONTROL MODULE (Battery energy control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the function of LBC electronic circuit
		Diagnosis delay time	4 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0A1F detected?

YES >> Refer to HBB-57, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844792

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-57, "DTC Description".

Is P0A1F detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0A7E HYBRID BATTERY PACK OVER TEMPERATURE

DTC Description

INFOID:0000000014844793

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A7E	HYBRID BAT PACK OVER TEMP (Hybrid battery pack over temperature)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the temperature of either battery temperature sensor 1, 2, 3 or 4 remains 70°C (158°F) or higher
		Diagnosis delay time	5 seconds or more

POSSIBLE CAUSES

- Cell/module malfunction (Slight short circuit or large insulation resistance)
- External heating
- Overcharge
- Overdischarge
- Traction motor inverter
- HPCM

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:

- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern"

Is P0A7E detected?

YES >> Refer to HBB-58, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844794

1. PERFORM SELF-DIAGNOSIS OF LI-ION BATTERY CONTROLLER

WITH CONSULT

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

2. Check if the “P0C6E” is detected in “Self Diagnostic Result”.

Is P0C6E detected?

YES >> Perform diagnosis procedure of “P0C6E”. Refer to HBB-85, "Diagnosis Procedure".
NO >> GO TO 2.

2. PERFORM ALL DTC READING

WITH CONSULT

1. Perform “All DTC Reading” with CONSULT.
2. Check “Self Diagnostic Result” of “EV/HEV” or “MOTOR CONTROL”.

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P0A7E by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

YES >> Perform diagnosis procedure for each system. Replace Li-ion battery after repairing malfunctioning parts.
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

P0A7F CELL CONTROLLER DIAGNOSIS

DTC Description

INFOID:0000000014844795

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A7F	CELL CONTROLLER DIAG (Cell controller diagnosis)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the difference between the maximum and minimum values of cell voltage is beyond the tolerance (200 mV) of cell variations
		Diagnosis delay time	When LBC is activated

POSSIBLE CAUSE

- LBC (Bypass switch)
- Module

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

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 P0A7F detected?

YES >> Refer to HBB-60, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844796

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-60, "DTC Description".

Is P0A7F detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0A84 HYBRID BAT PACK COOLING FAN 1

DTC Description

INFOID:0000000014844797

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A84	HYBRID BAT PACK COOLING FAN 1 (Hybrid battery pack cooling fan 1)	Diagnosis condition	When the ignition switch is turned ON while a fan drive signal is transmitted from LBC to battery cooling fan
		Signal (terminal)	—
		Threshold	When the battery cooling fan speed is outside the upper/lower limit of target speed
		Diagnosis delay time	25 seconds or more

POSSIBLE CAUSES

- Battery cooling fan
- Battery cooling fan relay
- Harness between battery cooling fan and Li-ion battery
- LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.CHECK BATTERY COOLING FAN OPERATION

Ⓔ 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” using CONSULT.

Is P0A84 detected?

YES >> Refer to HBB-61, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844798

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1.CHECK BATTERY COOLING FAN OPERATION

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 7.

2.CHECK BATTERY COOLING FAN SPEED SIGNAL CIRCUIT

WITH CONSULT
1. Perform “HV BATTERY COOLING FAN” with the “ACTIVE TEST” mode and operate the battery cooling fan.
2. Check voltage between battery cooling fan harness connector and ground, using an oscilloscope or a multi tester (Frequency).

+		-	Voltage
Battery cooling fan			
Connector	Terminal		
B163	3	Ground	Changes the pulse cycle according to the battery cooling fan operation

Is the inspection result normal?

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

3.PRECONDITIONING-1

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 4.

4.CHECK BATTERY COOLING FAN SPEED SIGNAL CIRCUIT FOR OPEN

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

Battery cooling fan		Li-ion battery		Continuity
Connector	Terminal	Connector	Terminal	
B163	3	B59	13	Existed

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Repair harness or connector.

5.PRECONDITIONING-2

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 6.

6. CHECK BATTERY COOLING FAN SPEED SIGNAL CIRCUIT FOR SHORT

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

Battery cooling fan		—	Continuity
Connector	Terminal		
B163	3	Ground	Not existed

Is the inspection result normal?

YES >> Replace battery cooling fan. Refer to HBB-154, "BATTERY COOLING FAN : Removal and Installation".
NO >> Repair harness or connector.

7. CHECK FUSE

1. Turn ignition switch OFF.
2. Pull out 10A fuse (No.2) and check that the fuse is not open.

Is the inspection result normal?

YES >> GO TO 8.
NO >> Replace the fuse after repairing the applicable circuit.

8. CHECK BATTERY COOLING FAN POWER SUPPLY

1. Turn ignition switch ON.
2. Check voltage between battery cooling fan harness connector and ground.

+		-	Voltage
Battery cooling fan			
Connector	Terminal	Ground	Battery voltage
B163	1		

Is the inspection result normal?

YES >> GO TO 9.
NO >> GO TO 13.

9. CHECK BATTERY COOLING FAN GROUND CIRCUIT

Check continuity between battery cooling fan harness connector and ground.

Battery cooling fan		—	Continuity
Connector	Terminal		
B163	4	Ground	Existed

Is the inspection result normal?

YES >> GO TO 10.
NO >> Repair harness or connector.

10. CHECK BATTERY COOLING FAN OUTPUT SIGNAL

WITH CONSULT
1. Turn ignition switch ON.
2. Perform “HV BATTERY COOLING FAN” with the “ACTIVE TEST” mode and operate the battery cooling fan.
3. Check voltage between battery cooling fan harness connector and ground, using an oscilloscope or a multi tester (Frequency).

+		-	Voltage
Battery cooling fan			
Connector	Terminal		
B163	2	Ground	Changes the pulse cycle according to the battery cooling fan operation

Is the inspection result normal?

YES >> Replace battery cooling fan. Refer to HBB-154, "BATTERY COOLING FAN : Removal and Installation".
NO >> GO TO 11.

11. PRECONDITIONING-3

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 12.

12. CHECK BATTERY COOLING FAN OUTPUT SIGNAL CIRCUIT

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

Battery cooling fan		Li-ion battery		Continuity
Connector	Terminal	Connector	Terminal	
B163	2	B59	1	Existed

4. Also check harness for short to ground.

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Repair harness or connector.

13. CHECK BATTERY COOLING FAN RELAY POWER SUPPLY

1. Remove battery cooling fan relay.
2. Check voltage between battery cooling fan relay harness connector and ground.

+		-	Voltage
Battery cooling fan relay			
Connector	Terminal		
E160	1	Ground	Battery voltage
	3		

Is the inspection result normal?

YES >> GO TO 14.
NO >> Repair harness between fuse and battery cooling fan relay.

14. CHECK BATTERY COOLING FAN RELAY

Check battery cooling fan relay.

Is the inspection result normal?

YES >> GO TO 15.
NO >> Replace battery cooling fan relay.

15. CHECK BATTERY COOLING FAN POWER SUPPLY CIRCUIT FOR OPEN

1. Disconnect battery cooling fan harness connector.
2. Check continuity between battery cooling fan relay harness connector and battery cooling fan harness connector.

Battery cooling fan relay		Battery cooling fan		Continuity
Connector	Terminal	Connector	Terminal	
E160	5	B163	1	Existed

Is the inspection result normal?

YES >> GO TO 16.
NO >> Repair harness or connector.

16. PRECONDITIONING-4

WARNING:
Follow the instructions below before starting the procedure.

1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 17.

17. CHECK BATTERY COOLING FAN RELAY SIGNAL CIRCUIT

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

Battery cooling fan relay		Li-ion battery		Continuity
Connector	Terminal	Connector	Terminal	
E160	2	B59	17	Existed

3. Also check harness for short to ground.

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Repair harness or connector.

P0A85 HYBRID BAT PACK COOLING FAN 1

DTC Description

INFOID:0000000014844799

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A85	HYBRID BAT PACK COOLING FAN 1 (Hybrid battery pack fan 1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When battery cooling fan speed is outside the threshold of fan speed set at each level
		Diagnosis delay time	25 seconds or more

POSSIBLE CAUSES

- Battery cooling fan
- LBC
- The mixing of noise into signal line

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

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 pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern"

Is P0A85 detected?

YES >> Refer to HBB-66, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844800

When this DTC is detected, replace battery cooling fan and Li-ion battery. Refer to HBB-154, "BATTERY COOLING FAN : Removal and Installation" (Battery cooling fan) and HBB-155, "Removal and Installation" (Li-ion battery).

P0A95 HIGH VOLTAGE FUSE

DTC Description

INFOID:0000000014844801

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A95	HIGH VOLTAGE FUSE (High voltage fuse)	Diagnosis condition	When the following conditions are satisfied • When ignition switch is ON • When service plug is connected • Total voltage: 112 - 243.6 V • Current value: ± 5 A
		Signal (terminal)	• Total voltage • Current value • High voltage harness connector detecting signal
		Threshold	2 V or less
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- High voltage detection circuit
- System main relay 1, 2
- Pre-charge relay
- Traction motor inverter
- LBC
- High voltage fuse
- DC/DC converter
- Service plug

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)

- The engine cannot be started
- Illuminate hybrid system warning lamp

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 P0A95 detected?

YES >> Refer to HBB-67, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844802

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**

- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0A95 detected again?

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

2.PRECONDITIONING

WARNING:

Follow the instructions below before starting the procedure.

1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 3.

3.CHECK HIGH VOLTAGE FUSE

Check high voltage fuse (service plug integrated). Refer to HBB-68, "Component Inspection".

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Replace service plug.

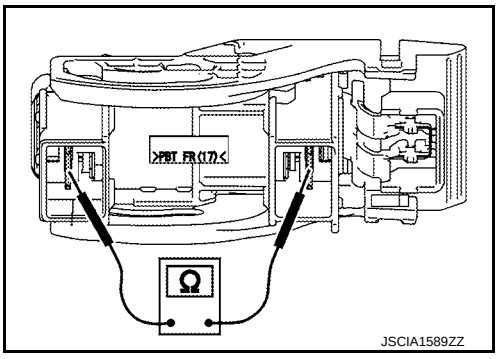
Component Inspection

INFOID:0000000014844803

1.CHECK HIGH VOLTAGE FUSE (SERVICE PLUG INTEGRATED)

Check the continuity between terminals in the figure.

Value: Approx. 0 Ω



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace service plug.

P0A9D HYBRID BATTERY TEMPERATURE SENSOR A

DTC Description

INFOID:0000000014844804

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A9D	HYBRID BAT TEMP SEN A (Hybrid battery temperature sensor A)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 1 signal
		Threshold	When a voltage input value of the battery temperature sensor to the LBC remains extremely low
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Battery temperature sensor 1
- Harness between LBC and battery temperature sensor 1
- LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

P0AC7 or P0AC8 is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0A9D detected?

YES >> Refer to HBB-69, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844805

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0A9D detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0A9E HYBRID BATTERY TEMPERATURE SENSOR A

DTC Description

INFOID:0000000014844806

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0A9E	HYBRID BAT TEMP SEN A (Hybrid battery temperature sensor A)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 1 signal
		Threshold	When a voltage input value of the battery temperature sensor to the LBC remains extremely high
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Battery temperature sensor 1
- Harness between LBC and battery temperature sensor 1
- LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

P0AC7 or P0AC8 is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0A9E detected?

YES >> Refer to HBB-70, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844807

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0A9E detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AA7 HYBRID BATTERY VOLTAGE ISOLATION SENSOR

DTC Description

INFOID:0000000014844808

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AA7	HYBRID BAT VOLTAGE ISOLATION SEN (Hybrid battery voltage isolation sensor)	Diagnosis condition	When ignition switch is ON and IR sensor circuit open is detected.
		Signal (terminal)	—
		Threshold	When there is no amplitude fluctuation in signal voltage of the insulation resistance loss monitoring system
		Diagnosis delay time	40 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

None

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

1. Turn ignition switch ON and wait at least 40 seconds.
2. Select “Self Diagnostic Result” mode of “HV BAT”.

Is P0AA7 detected?

YES >> Refer to HBB-71, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844809

1.PERFORM SELF-DIAGNOSIS

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 TMS-38, "DTC Index".
YES-2 >> When detected simultaneously with “P0AA9”, Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

P0AA9 HYBRID BATTERY VOLTAGE ISOLATION SENSOR

DTC Description

INFOID:0000000014844810

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AA9	HYBRID BAT VOLTAGE ISOLATION SEN (Hybrid battery voltage isolation sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the signal voltage of the insulation resistance loss monitoring system is too low
		Diagnosis delay time	120 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

None

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

Ⓔ WITH CONSULT

1. Turn ignition switch ON and wait at least 120 seconds.
2. Select “Self Diagnostic Result” mode of “HV BAT” using CONSULT.

Is P0AA9 detected?

YES >> Refer to HBB-72, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844811

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-72, "DTC Description".

Is P0AA9 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AAA HYBRID BATTERY VOLTAGE ISOLATION SENSOR

DTC Description

INFOID:0000000014844812

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AAA	HYBRID BAT VOLTAGE ISOLATION SEN (Hybrid battery voltage isolation sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the signal voltage of the insulation resistance loss monitoring system is too high
		Diagnosis delay time	120 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

None

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

1. Turn ignition switch ON and wait at least 120 seconds.
2. Select “Self Diagnostic Result” mode of “HV BAT” using CONSULT.

Is P0AAA detected?

YES >> Refer to HBB-73, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844813

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AAA detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0ABF HYBRID BATTERY PACK CURRENT SENSOR

DTC Description

INFOID:0000000014844814

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0ABF	HYBRID BAT PACK CURRENT SEN (Hybrid battery pack current sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When there is difference between a battery input/output current detected by the LBC and a consumption/regenerative current detected by the drive motor inverter
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Current sensor
- Traction motor inverter

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0ABF detected?

YES >> Refer to HBB-74, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844815

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

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

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P0ABF by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0ABF detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AC0 HYBRID BATTERY PACK CURRENT SENSOR

DTC Description

INFOID:0000000014844816

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AC0	HYBRID BAT PACK CURRENT SEN (Hybrid battery pack current sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a current sensor offset voltage learned at IGN ON is outside the range of 2.37 V- 2.63 V
		Diagnosis delay time	1 second or less

POSSIBLE CAUSES

- LBC
- Current sensor
- Harness between LBC and current sensor
- System main relay stuck at ON

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0AC0 detected?

YES >> Refer to HBB-76, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844817

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

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

Is DTC detected?

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

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AC0 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AC1 HYBRID BATTERY PACK CURRENT SENSOR

DTC Description

INFOID:0000000014844818

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AC1	HYBRID BAT PACK CURRENT SEN (Hybrid battery pack current sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Current sensor signal
		Threshold	When a current sensor input voltage to the LBC remains extremely low
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Current sensor
- Harness between LBC and current sensor

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 HBB-77, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844819

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

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

Is DTC detected?

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

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AC1 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AC2 HYBRID BATTERY PACK CURRENT SENSOR

DTC Description

INFOID:0000000014844820

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AC2	HYBRID BAT PACK CURRENT SEN (Hybrid battery pack current sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Current sensor signal
		Threshold	When a current sensor input voltage to the LBC remains extremely high
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Current sensor
- Harness between LBC and current sensor

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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-78, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to .GI-54, "Intermittent Incident"
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844821

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

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

Is DTC detected?

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

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AC2 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AC7 HYBRID BATTERY TEMPERATURE SENSOR B

DTC Description

INFOID:0000000014844822

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AC7	HYBRID BAT TEMP SENSOR B (Hybrid battery temperature sensor B)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 2 signal
		Threshold	When the voltage input value of the battery temperature sensor to the LBC remains extremely low
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 2
- Harness between LBC and battery temperature sensor 2

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

P0A9D or P0A9E is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0AC7 detected?

YES >> Refer to HBB-79, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844823

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AC7 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AC8 HYBRID BATTERY TEMPERATURE SENSOR B

DTC Description

INFOID:0000000014844824

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AC8	HYBRID BAT TEMP SENSOR B (Hybrid battery temperature sensor B)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 2 signal
		Threshold	When the voltage input value of the battery temperature sensor to the LBC remains extremely high
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 2
- Harness between LBC and battery temperature sensor 2

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

P0A9D or P0A9E is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0AC8 detected?

YES >> Refer to HBB-80, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844825

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AC8 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0ACC HYBRID BATTERY TEMPERATURE SENSOR C

DTC Description

INFOID:0000000014844826

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0ACC	HYBRID BAT TEMP SEN C (Hybrid battery temperature sensor C)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 3 signal
		Threshold	When a voltage input value of the battery temperature sensor to the LBC remains extremely low
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 3
- Harness between LBC and battery temperature sensor 3

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

P0AEA or P0AEB is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0ACC detected?

YES >> Refer to HBB-81, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844827

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0ACC detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0ACD HYBRID BATTERY TEMPERATURE SENSOR C

DTC Description

INFOID:0000000014844828

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0ACD	HYBRID BAT TEMP SEN C (Hybrid battery temperature sensor C)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 3 signal
		Threshold	When a voltage input value of the battery temperature sensor to the LBC remains extremely high
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 3
- Harness between LBC and battery temperature sensor 3

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

P0AEA or P0AEB is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0ACD detected?

YES >> Refer to HBB-82, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844829

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0ACD detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AEA HYBRID BATTERY TEMPERATURE SENSOR D

DTC Description

INFOID:0000000014844830

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AEA	HYBRID BAT TEMP SENSOR D (Hybrid battery temperature sensor D)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 4 signal
		Threshold	When the voltage input value of the battery temperature sensor to the LBC remains extremely low
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 4
- Harness between LBC and battery temperature sensor 4

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

P0ACC or P0ACD is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0AEA detected?

YES >> Refer to HBB-83, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844831

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AEA detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0AEB HYBRID BATTERY TEMPERATURE SENSOR D

DTC Description

INFOID:0000000014844832

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0AEB	HYBRID BAT TEMP SENSOR D (Hybrid battery temperature sensor D)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Battery temperature sensor 4 signal
		Threshold	When the voltage input value of the battery temperature sensor to the LBC remains extremely high
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 4
- Harness between LBC and battery temperature sensor 4

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

P0ACC or P0ACD is detected at the same time.

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P0AEB detected?

YES >> Refer to HBB-84, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844833

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0AEB detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0C6E HYBRID BATTERY TEMPERATURE SENSOR A/B

DTC Description

INFOID:0000000014844834

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0C6E	HYBRID BAT TEMP SENSOR A/B (Hybrid battery temperature sensor A/B)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• Battery temperature sensor 1 signal • Battery temperature sensor 2 signal
		Threshold	When there is a considerable temperature difference between battery temperature sensor 1 and 2 remains 20°C (32°F) or higher
		Diagnosis delay time	5 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 1
- Battery temperature sensor 2
- Clogged battery cooling path
- Harness between LBC and battery temperature sensor 1
- Harness between LBC and battery temperature sensor 2

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

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 P0C6E detected?

YES >> Refer to HBB-85, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844835

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0C6E detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P0C70 HYBRID BATTERY TEMPERATURE SENSOR C/D

DTC Description

INFOID:0000000014844836

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P0C70	HYBRID BAT TEMP SENSOR C/D (Hybrid battery temperature sensor C/D)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• Battery temperature sensor 3 signal • Battery temperature sensor 4 signal
		Threshold	When there is a considerable temperature difference between battery temperature sensor 3 and 4 remains 20°C (32°F) or higher
		Diagnosis delay time	5 seconds or more

POSSIBLE CAUSES

- LBC
- Battery temperature sensor 3
- Battery temperature sensor 4
- Clogged battery cooling path
- Harness between LBC and battery temperature sensor 3
- Harness between LBC and battery temperature sensor 4

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

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 P0C70 detected?

YES >> Refer to HBB-86, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844837

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P0C70 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3030 CELL CONTROLLER LIN

DTC Description

INFOID:0000000014844838

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3030	CELL CONT LIN (Cell controller local interconnect network)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction occurs in the communication system of the LBC
		Diagnosis delay time	2.5 seconds or more

POSSIBLE CAUSES

- LBC
- Cell overdischarge
- Harness or connector between LBC and cell

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P3030 detected?

YES >> Refer to HBB-87, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844839

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”.

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P3030 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2. PERFORM SELF-DIAGNOSIS-2

WITH CONSULT
Check if the “P3374” is detected in “Self Diagnostic Result” of “HV BAT”

Is P3374 detected?

YES >> Perform diagnosis procedure of “P3374”. Refer to HBB-133, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P3030 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30D0 SOC RATIONALITY

DTC Description

INFOID:0000000014844840

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30D0	SOC RATIONALITY (State of charge rationality)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• SOC value • Current value
		Threshold	The difference between the amount of change in the integrated current value and in SOC exceeds the specified value
		Diagnosis delay time	15 seconds or more

POSSIBLE CAUSES

Li-ion battery ((Malfunction in SOC arithmetic logic)

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

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 pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern"

Is P30D0 detected?

YES >> Refer to HBB-89, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844841

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

WITH CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-89, "DTC Description".

Is P30D0 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30EE CELL PROTECTION ON

DTC Description

INFOID:0000000014844842

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30EE	CELL PROTECTION ON (Cell protection on)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	Extremely high SOC of Li-ion battery
		Diagnosis delay time	When LBC is activated

POSSIBLE CAUSES

- Li-ion battery
- LBC
- HPCM
- Traction motor inverter

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)

- The engine cannot be started
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1. PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

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

Is P30EE detected?

YES >> Refer to HBB-90, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844843

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P30EE detected again?

YES >> Replace the following.
- Li-ion battery: Refer to HBB-155, "Removal and Installation".
- HPCM: Refer to HBC-335, "Removal and Installation".
- Traction motor inverter: Refer to TMS-132, "Removal and Installation".

NO >> INSPECTION END

P30EF INTERNAL RESISTANCE

DTC Description

INFOID:0000000014844844

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30EF	INTERNAL RESISTANCE (Internal resistance)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	SOC value
		Threshold	When the Li-ion battery internal resistance becomes high
		Diagnosis delay time	100 ms or more

POSSIBLE CAUSES

- LBC
- Li-ion battery
- DC/DC junction box
- Service plug

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

1. 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 HBB-91, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844845

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1.PRECONDITIONING

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> 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 service plug.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P30EF detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30F1 REGENERATION CONTROL

DTC Description

INFOID:0000000014844846

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F1	REGENERATION CONTROL (Regeneration control)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• SOC value • Current value
		Threshold	When exceeding the SOC usage range with continuous regeneration (charge)
		Diagnosis delay time	—

POSSIBLE CAUSES

- DC/DC junction box
- LBC
- HPCM
- Traction motor inverter
- Harness between DC/DC junction box and LBC

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)

- The engine cannot be started
- Illuminate hybrid system warning lamp

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 HBB-93, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844847

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”.
   NOTE:
   Some HPCM DTCs may be detected as a result of the detection of P30F1 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2.PERFORM SELF-DIAGNOSIS-2

WITH CONSULT

Check if the “P0AC0”, “P0AC1” or “P0AC2” is detected in “Self Diagnostic Result” of “HV BAT”.

Is DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.
- P0AC0: Refer to HBB-76, "DTC Description".
- P0AC1: Refer to HBB-77, "DTC Description".
- P0AC2: Refer to HBB-78, "DTC Description".

NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

P30F2 DISCHARGE CONTROL

DTC Description

INFOID:0000000014844848

DTC DETECTION LOGIC

NOTE:
Prolonged cranking due to running out of gasoline may cause the detection of this DTC.

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F2	DISCHARGE CONTROL (Discharge control)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• SOC value • Current value
		Threshold	When SOC usage range is not satisfied and the output (discharge) continues
		Diagnosis delay time	—

POSSIBLE CAUSES

- DC/DC junction box
- LBC
- HPCM
- Traction motor inverter
- Harness between DC/DC junction box and LBC
- Out of gasoline

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)
- The engine cannot be started
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P0AC0, P0AC1 or P0AC2 is displayed with DTC P30F2, first perform the confirmation procedure (trouble diagnosis) for DTC P0AC0, P0AC1 or P0AC2.

Is applicable DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.
- P0AC0: Refer to HBB-76, "DTC Description".
- P0AC1: Refer to HBB-77, "DTC Description".
- P0AC2: Refer to HBB-78, "DTC Description".

NO >> GO TO 2.

2.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 P30F2 detected?

YES >> Refer to HBB-95, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844849

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT
1. Perform “All DTC Reading” with CONSULT.
2. Check “Self Diagnostic Result” of “EV/HEV” or “MOTOR CONTROL”.

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P30F2 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

P30F4 TOTAL VOLTAGE SENSOR

DTC Description

INFOID:0000000014844850

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F4	TOTAL VOLT SENSOR (Total voltage sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Total voltage
		Threshold	When a total voltage exceeds the available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Li-ion battery over charge

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P30F4 detected?

YES >> Refer to HBB-97, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844851

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

1. Select “Self Diagnostic Result” mode of “HV BAT” using CONSULT.
2. Check if the “P3301” is detected in “Self Diagnostic Result” of “HV BAT”.

Is P3301 detected?

YES >> Perform diagnosis procedure of “P3301”. Refer to HBB-129, "Diagnosis Procedure".
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

P30F5 TOTAL VOLTAGE SENSOR

DTC Description

INFOID:0000000014844852

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F5	TOTAL VOLT SENSOR (Total voltage sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	• Total voltage • Current value
		Threshold	When there is a difference large than 11 V between a total voltage measured by the total voltage detection circuit and the sum of measured cell voltages
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- High voltage fuse (Service plug integrated)

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P30F5 detected?

YES >> Refer to HBB-98, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844853

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1.PRECONDITIONING

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 2.

2.CHECK HIGH VOLTAGE FUSE

Check high voltage fuse (service plug integrated). Refer to HBB-99, "Component Inspection".

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Replace service plug.

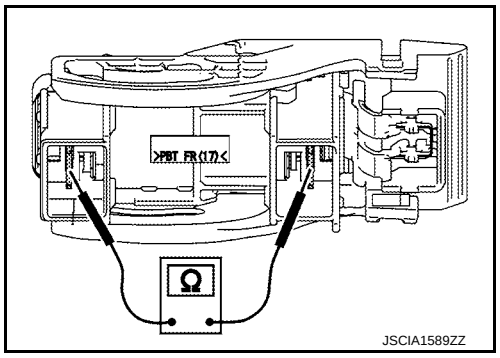
Component Inspection

INFOID:0000000014844854

1.CHECK HIGH VOLTAGE FUSE (SERVICE PLUG INTEGRATED)

Check the continuity between terminals in the figure.

Value: Approx. 0 Ω



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace service plug.

P30F6 TOTAL VOLTAGE SENSOR

DTC Description

INFOID:0000000014844855

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F6	TOTAL VOLT SENSOR (Total voltage sensor)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Total voltage
		Threshold	When a total voltage is below the range of available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- LBC
- Harness or connector between LBC and cell
- Li-ion battery overdischarge
- High voltage fuse (Service plug integrated)

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P30F6 detected?

YES >> Refer to HBB-100, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844856

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

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 “P3374”. Refer to HBB-133, "DTC Description".
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 service plug.

3.PRECONDITIONING

WARNING:
Follow the instructions below before starting the procedure.
1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

>> GO TO 4.

4.CHECK HIGH VOLTAGE FUSE

Check high voltage fuse (service plug integrated). Refer to HBB-101, "Component Inspection".

Is the inspection result normal?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> Replace service plug.

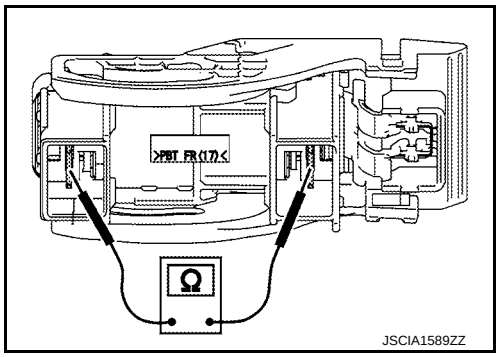
Component Inspection

INFOID:0000000014844857

1.CHECK HIGH VOLTAGE FUSE (SERVICE PLUG INTEGRATED)

Check the continuity between terminals in the figure.

Value: Approx. 0 Ω



Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace service plug.

P30F7 CELL CONT IC SLEEP DIAG

DTC Description

INFOID:0000000014844858

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F7	CELL CONT IC SLEEP DIAG (Cell controller sleep diagnosis)	Diagnosis condition	When ignition switch is OFF
		Signal (terminal)	—
		Threshold	When turning the ignition switch OFF, the LBC does not sleep normally
		Diagnosis delay time	When LBC is deactivated

POSSIBLE CAUSES

LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

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 P30F7 detected?

YES >> Refer to HBB-102, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844859

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-103, "DTC Description".

Is P30F7 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30F8 SELF SHUT OFF POWER SUPPLY

DTC Description

INFOID:0000000014844860

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F8	SELF SHUT OFF POWER SUPPLY (Self shut off power supply)	Diagnosis condition	When ignition switch is OFF
		Signal (terminal)	—
		Threshold	LBC power supply is not OFF even during the self shut down operation
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

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 P30F8 detected?

YES >> Refer to HBB-103, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844861

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P30F8 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30F9 CONTROL MODULE

DTC Description

INFOID:0000000014844862

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30F9	CONTROL MODULE (Control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the LBC
		Diagnosis delay time	When LBC is activated or deactivated

POSSIBLE CAUSES

LBC

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

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 P30F9 detected?

YES >> Refer to HBB-103, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844863

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓔ With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P30F9 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30FA SENSOR POWER SUPPLY

DTC Description

INFOID:0000000014844864

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30FA	SENSOR POWER SUPPLY (Sensor power supply)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Power supply voltage of the battery current sensor
		Threshold	5.27 V or more
		Diagnosis delay time	1 second or more

POSSIBLE CAUSES

- Battery current sensor
- LBC
- Harness or connector between LBC and battery current sensor

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P30FA detected?

YES >> Refer to HBB-105, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844865

1.CHECK LBC POWER SUPPLY

Check LBC power supply. Refer to HBB-149, "LI-ION BATTERY CONTROLLER : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-105, "DTC Description".

Is P30FA detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30FB SENSOR POWER SUPPLY

DTC Description

INFOID:0000000014844866

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30FB	SENSOR POWER SUPPLY (Sensor power supply)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Power supply voltage of the battery current sensor
		Threshold	4.73 V or less
		Diagnosis delay time	1 second or more

POSSIBLE CAUSES

- Battery current sensor
- LBC
- Harness or connector between LBC and battery current sensor

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P30FB detected?

YES >> Refer to HBB-105, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844867

1.CHECK LBC POWER SUPPLY

Check LBC power supply. Refer to HBB-149, "LI-ION BATTERY CONTROLLER : Diagnosis Procedure".

Is the inspection result normal?

YES >> GO TO 2.
NO >> Repair or replace malfunctioning parts.

2.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

Ⓔ With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-106, "DTC Description".

Is P30FB detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30FC OVER CURRENT

DTC Description

INFOID:0000000014844868

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30FC	OVER CURRENT (Over current)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Current value
		Threshold	When the high voltage harness temperature estimated from a current value increases 120°C or more
		Diagnosis delay time	5 seconds or more

POSSIBLE CAUSES

- Traction motor
- Traction motor inverter
- HPCM
- Battery current sensor
- LBC

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)

- The engine cannot be started
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P0AC0, P0AC1 or P0AC2 is displayed with DTC P30FC, first perform the confirmation procedure (trouble diagnosis) for DTC P0AC0, P0AC1 or P0AC2.

Is applicable DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.
- P0AC0: Refer to HBB-76, "DTC Description".
- P0AC1: Refer to HBB-77, "DTC Description".
- P0AC2: Refer to HBB-78, "DTC Description".

NO >> GO TO 2.

2.PERFORM DTC CONFIRMATION PROCEDURE

WITH CONSULT

1. Select “DATA MONITOR” mode of “HV BAT” using CONSULT.“
2. Drive the vehicle, according to driving pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern"

Is P30FC detected?

YES >> Refer to HBB-107, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844869

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”.

NOTE:

Some HPCM DTCs may be detected as a result of the detection of P30FC by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

YES >> Perform diagnosis procedure of applicable DTC. Refer to HBC-71, "DTC Index".
NO >> GO TO 2.

2. PERFORM SELF-DIAGNOSIS-2

WITH CONSULT

1. Select “Self Diagnostic Result” mode of “HV BAT” using CONSULT.
2. Check if the DTC is detected in “Self Diagnostic Result” of “HV BAT”.

Is DTC detected except for P30FC?

YES >> After perform diagnosis procedure of applicable DTC, GO TO 3.
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-107, "DTC Description".

Is P30FC detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P30FE 12V BATTERY VOLTAGE

DTC Description

INFOID:0000000014844870

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P30FE	12V BATTERY VOLTAGE (12Volt battery voltage)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the 12 V battery voltage drops to 8 V or less
		Diagnosis delay time	1 second or more

POSSIBLE CAUSES

- 12V battery
- LBC
- Harness or connector

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)

- The engine cannot be started
- Illuminate hybrid system warning lamp

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 P30FE detected?

YES >> Refer to HBB-109, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844871

When this DTC is detected, check the power supply and ground circuit of LBC. Refer to HBB-149, "LI-ION BATTERY CONTROLLER : Diagnosis Procedure".

P31A5 CAN ERROR HPCM

DTC Description

INFOID:0000000014844872

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P31A5	CAN ERROR HPCM (CAN error hybrid power train control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the LBC detects an error in CAN data
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- ECM
- LBC
- Traction motor inverter
- HPCM

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P31A5 is displayed with DTC UXXXX, first perform the confirmation procedure (trouble diagnosis) for DTC UXXXX.

Is applicable DTC detected?

YES >> Perform diagnosis of applicable. Refer to HBB-37, "DTC Index"
NO >> GO TO 2.

2.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 P31A5 detected?

YES >> Refer to HBB-110, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844873

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

1. Perform “All DTC Reading” with CONSULT.
2. Check “Self Diagnostic Result”.

DTC	DTC detected control module	malfunction parts
P31A5	Only in “ENGINE”	• ECM • HPCM
	Only in “HV BAT”	• LBC • HPCM
	Only in “MOTOR CONTROL”	• Traction motor inverter • HPCM
	• “ENGINE” • “MOTOR CONTROL”	HPCM
	• “ENGINE” • “HV BAT”	
	• “MOTOR CONTROL” • “HV BAT”	
	• “ENGINE” • “HV BAT” • “MOTOR CONTROL”	

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

P31A7 CAN ERROR INV/MC

DTC Description

INFOID:0000000014844874

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P31A7	CAN ERROR INV/MC (CAN error inverter/ motor control)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the LBC detects an error in CAN data
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- HPCM
- Traction motor inverter
- LBC

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.CHECK DTC PRIORITY

If DTC P31A7 is displayed with DTC UXXXX, first perform the confirmation procedure (trouble diagnosis) for DTC UXXXX.

Is applicable DTC detected?

YES >> Perform diagnosis procedure of applicable DTC. Refer to HBB-37, "DTC Index"
NO >> GO TO 2.

2.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 P31A7 detected?

YES >> Refer to HBB-112, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844875

1.PERFORM SELF-DIAGNOSIS

WITH CONSULT

1. Perform “All DTC Reading” with CONSULT.
2. Check “Self Diagnostic Result”.

DTC	DTC detected control module	malfunction parts
P31A7	Only in “EV/HEV”	• HPCM • Traction motor inverter
	Only in “HV BAT”	LBC
	• “EV/HEV” • “HV BAT”	Traction motor inverter

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

P326E - P3273 CELL CONTROLLER IC

DTC Description

INFOID:0000000014844876

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P326E	CELL CONTROLLER IC1 (Cell controller IC1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC1 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P326F	CELL CONTROLLER IC2 (Cell controller IC2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC2 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3270	CELL CONTROLLER IC3 (Cell controller IC3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC3 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3271	CELL CONTROLLER IC4 (Cell controller IC4)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC4 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3272	CELL CONTROLLER IC5 (Cell controller IC5)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC5 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3273	CELL CONTROLLER IC6 (Cell controller IC6)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the electronic circuit of the cell controller IC6 inside the LBC
		Diagnosis delay time	2.5 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

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 P326E – P3273 detected?

YES >> Refer to HBB-115, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844877

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-114, "DTC Description".

Is P326E - P3273 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P327A - P327F CELL CONT IC VOLTAGE2

DTC Description

INFOID:0000000014844878

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P327A	CELL CONT IC1 VOLTAGE2 (Cell controller IC1 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC1 inside the LBC
		Diagnosis delay time	3 seconds or more
P327B	CELL CONT IC2 VOLTAGE2 (Cell controller IC2 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC2 inside the LBC
		Diagnosis delay time	3 seconds or more
P327C	CELL CONT IC3 VOLTAGE2 (Cell controller IC3 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC3 inside the LBC
		Diagnosis delay time	3 seconds or more
P327D	CELL CONT IC4 VOLTAGE2 (Cell controller IC4 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC4 inside the LBC
		Diagnosis delay time	3 seconds or more
P327E	CELL CONT IC5 VOLTAGE2 (Cell controller IC5 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC5 inside the LBC
		Diagnosis delay time	3 seconds or more
P327F	CELL CONT IC6 VOLTAGE2 (Cell controller IC6 voltage2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC6 inside the LBC
		Diagnosis delay time	3 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

Any of the fail-safe modes listed below operates according to a malfunctioning area and the status of malfunction of LBC.

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases

• Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.
• 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
• Any cell voltage satisfies one of the following conditions:
- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)
• Engine stop control is prohibited
• Driving force decreases
• Possible to travel by 12 V battery remaining quantity
• Illuminate hybrid system warning lamp

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 P327A – P327F detected?

YES >> Refer to HBB-117, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844879

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-116, "DTC Description".

Is P327A - P327F detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3286 - P328B CELL CONT IC VOLTAGE1

DTC Description

INFOID:0000000014844880

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3286	CELL CONT IC1 VOLTAGE1 (Cell controller IC1 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC1 inside the LBC
		Diagnosis delay time	4 seconds or more
P3287	CELL CONT IC2 VOLTAGE1 (Cell controller IC2 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC2 inside the LBC
		Diagnosis delay time	4 seconds or more
P3288	CELL CONT IC3 VOLTAGE1 (Cell controller IC3 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC3 inside the LBC
		Diagnosis delay time	4 seconds or more
P3289	CELL CONT IC4 VOLTAGE1 (Cell controller IC4 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC4 inside the LBC
		Diagnosis delay time	4 seconds or more
P328A	CELL CONT IC5 VOLTAGE1 (Cell controller IC5 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC5 inside the LBC
		Diagnosis delay time	4 seconds or more
P328B	CELL CONT IC6 VOLTAGE1 (Cell controller IC6 voltage1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the power supply circuit of the cell controller IC6 inside the LBC
		Diagnosis delay time	4 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

Any of the fail-safe modes listed below operates according to a malfunctioning area and the status of malfunction of LBC.

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*
- The engine cannot be started
- Illuminate hybrid system warning lamp

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases

• Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.
• 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
• Any cell voltage satisfies one of the following conditions:
- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)
• Engine stop control is prohibited
• Driving force decreases
• Possible to travel by 12 V battery remaining quantity
• Illuminate hybrid system warning lamp

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 P3286 – P328B detected?

YES >> Refer to HBB-119, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844881

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”.
   NOTE:
   Some HPCM DTCs may be detected as a result of the detection of P3286 - P328B by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM.
   Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2.PERFORM SELF-DIAGNOSIS-2

WITH CONSULT
Check if the “P3374 ” is detected in “Self Diagnostic Result” of “HV BAT”

Is P3374 detected?

YES >> Perform diagnosis procedure of “P3374 ”. Refer to HBB-133, "Diagnosis Procedure".
NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-118, "DTC Description".

Is P3286 - P328B detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3292 - P3297 CELL CONT IC COMM ERROR

DTC Description

INFOID:0000000014844882

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3292	CELL CONT IC1 COMM ERROR (Cell controller IC1 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC1 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3293	CELL CONT IC2 COMM ERROR (Cell controller IC2 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC2 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3294	CELL CONT IC3 COMM ERROR (Cell controller IC3 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC3 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3295	CELL CONT IC4 COMM ERROR (Cell controller IC4 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC4 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3296	CELL CONT IC5 COMM ERROR (Cell controller IC5 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC5 inside the LBC
		Diagnosis delay time	2.5 seconds or more
P3297	CELL CONT IC6 COMM ERROR (Cell controller IC6 communication error)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When a malfunction is detected in the communication system of the cell controller IC6 inside the LBC
		Diagnosis delay time	2.5 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
  - 4,097 mV ≥ Cell voltage > 3,887 mV
  - 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P3292 – P3297 detected?

YES >> Refer to HBB-121, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844883

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-120, "DTC Description".

Is P3292 - P3297 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P329E - P32A9 CELL CONT IC OPEN

DTC Description

INFOID:0000000014844884

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P329E	CELL CONT IC1OPEN1 (Cell controller IC1open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 1 is open
		Diagnosis delay time	2 seconds or more
P329F	CELL CONT IC1OPEN2 (Cell controller IC1 open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 2, 3, or 4 is open
		Diagnosis delay time	2 seconds or more
P32A0	CELL CONT IC1OPEN3 (Cell controller IC1 open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 6, 7, 8, or 9 is open
		Diagnosis delay time	2 seconds or more
P32A1	CELL CONT IC2OPEN1 (Cell controller IC2 open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 10 or 11 is open
		Diagnosis delay time	2 seconds or more
P32A2	CELL CONT IC2OPEN2 (Cell controller IC2 open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 13 or 14 is open
		Diagnosis delay time	2 seconds or more
P32A3	CELL CONT IC2OPEN3 (Cell controller IC2 open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 15, 16, 17, 18, or 19 is open
		Diagnosis delay time	2 seconds or more
P32A4	CELL CONT IC3OPEN1 (Cell controller IC3 open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 20 is open
		Diagnosis delay time	2 seconds or more
P32A5	CELL CONT IC3OPEN2 (Cell controller IC3 open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 21, 22, or 23 is open
		Diagnosis delay time	2 seconds or more

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P32A6	CELL CONT IC3OPEN3 (Cell controller IC3 open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 25, 26, 27, or 28 is open
		Diagnosis delay time	2 seconds or more
P32A7	CELL CONT IC4OPEN1 (Cell controller IC4 open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 29 is open
		Diagnosis delay time	2 seconds or more
P32A8	CELL CONT IC4OPEN2 (Cell controller IC4 open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 30, 31,32 or 33 is open
		Diagnosis delay time	2 seconds or more
P32A9	CELL CONT IC4OPEN3 (Cell controller IC4 open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 34, 35, 36, or 37 is open
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
  - 4,097 mV ≥ Cell voltage > 3,887 mV
  - 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P329E – P32A9 detected?

YES >> Refer to HBB-124, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844885

1. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

WITH CONSULT

1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-122, "DTC Description".

Is P329E - P32A9 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P32AA - P32AF CELL CONT IC OPEN

DTC Description

INFOID:0000000014844886

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P32AA	CELL CONT IC5OPEN1 (Cell controller IC5open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 38 or 39 is open
		Diagnosis delay time	2 seconds or more
P32AB	CELL CONT IC5OPEN2 (Cell controller IC5open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 41 or 42 is open
		Diagnosis delay time	2 seconds or more
P32AC	CELL CONT IC5OPEN3 (Cell controller IC5open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 43, 44, 45, 46 or 47 is open
		Diagnosis delay time	2 seconds or more
P32AD	CELL CONT IC6OPEN1 (Cell controller IC6open circuit1)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 48 is open
		Diagnosis delay time	2 seconds or more
P32AE	CELL CONT IC6OPEN2 (Cell controller IC6open circuit2)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 49, 50 or 51 is open
		Diagnosis delay time	2 seconds or more
P32AF	CELL CONT IC6OPEN3 (Cell controller IC6open circuit3)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	When the voltage detection circuit between the LBC and cell 53, 54, 55 or 56 is open
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

LBC

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:

- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P32AA – P32AF detected?

YES >> Refer to HBB-126, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844887

1.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

WITH CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-127, "DTC Description".

Is P32AA - P32AF detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3300 TOTAL VOLTAGE OVER

DTC Description

INFOID:0000000014844888

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3300	TOTAL VOLTAGE OVER (Total voltage over)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Total voltage
		Threshold	When a total voltage exceeds the available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Li-ion battery
- LBC
- HPCM
- Traction motor inverter

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:

- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P3300 detected?

YES >> Refer to HBB-127, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844889

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”.

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P3300 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2. PERFORM SELF-DIAGNOSIS-2

WITH CONSULT
1. Select “Self Diagnostic Result” mode of “HV BAT” using CONSULT.

Is DTC detected?

YES >> Perform diagnosis procedure of applicable DTC.
- P30EF: Refer to HBB-91, "DTC Description".
- P3374: Refer to HBB-133, "DTC Description".

NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P3300 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3301 CELL VOLTAGE OVER

DTC Description

INFOID:0000000014844890

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3301	CELL VOLTAGE OVER (Cell voltage over)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Cell voltage
		Threshold	When a cell voltage exceeds the range of available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Li-ion battery
- LBC
- HPCM
- Traction motor

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:

- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 P3301 detected?

YES >> Refer to HBB-129, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844891

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”.

NOTE:
Some HPCM DTCs may be detected as a result of the detection of P3301 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

Is DTC detected?

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

2. PERFORM SELF-DIAGNOSIS-2

WITH CONSULT
Check if the “P3300” is detected in “Self Diagnostic Result” of “HV BAT”.

Is P3300 detected?

YES >> Perform diagnosis procedure of “P3300”. Refer to HBB-127, "Diagnosis Procedure".
NO >> GO TO 3.

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P3301 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3373 TOTAL VOLTAGE OVER DISCHARGE

DTC Description

INFOID:0000000014844892

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3373	TOTAL VOLTAGE OVER DISCHARGE (Total voltage over discharge)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Total voltage
		Threshold	When a total voltage is below the range of available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Li-ion battery
- LBC
- HPCM
- Traction motor

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:
- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern".

Is P3373 detected?

YES >> Refer to HBB-131, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844893

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”.

NOTE:

Some HPCM DTCs may be detected as a result of the detection of P3373 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

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 >> Perform diagnosis procedure of applicable DTC.
- P30EF: Refer to HBB-91, "DTC Description".
- P3374: Refer to HBB-133, "DTC Description".

NO >> GO TO 3.

3.PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-131, "DTC Description".

Is P3373 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

P3374 CELL VOLTAGE OVER DISCHARGE

DTC Description

INFOID:0000000014844894

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
P3374	CELL VOLTAGE OVER DISCHARGE (Cell voltage over discharge)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	Cell voltage
		Threshold	When a cell voltage is below the range of available voltage
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Li-ion battery
- LBC
- HPCM
- Traction motor

FAIL-SAFE

SYSTEM MAIN RELAY OFF MODE (P3182 is detected in HPCM)*

- The engine cannot be started
- Illuminate hybrid system warning lamp

*: When the following condition is satisfied at the next IGN ON, the system goes into “BATTERY LESS MODE”.

- 70°C (158°F) ≥ Battery temperature > 60°C (140°F)
- Any cell voltage satisfies one of the following conditions:

- 4,097 mV ≥ Cell voltage > 3,887 mV
- 3,415 mV > Cell voltage ≥ 2,000 mV

BATTERY LESS MODE (P3181 is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Possible to travel by 12V battery remaining quantity
- Illuminate hybrid system warning lamp

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 pattern A.

Driving pattern A : HBB-28, "DIAGNOSIS DESCRIPTION : Driving Pattern".

Is P3374 detected?

YES >> Refer to HBB-133, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844895

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”.

NOTE:

Some HPCM DTCs may be detected as a result of the detection of P3374 by LBC. If a DTC detected by HPCM is applicable to the above mentioned DTCs, then judge that DTCs are not detected by HPCM. Refer to HBB-35, "Fail-safe" for details.

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?

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

3. PERFORM DTC CONFIRMATION PROCEDURE AGAIN

With CONSULT
1. Turn ignition switch ON.
2. Erase DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-73, "DTC Description".

Is P3374 detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

U0100 LOST COMMUNICATION ECM

DTC Description

INFOID:0000000014844896

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0100	LOST COMMUNICATION ECM (Lost communication engine control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from ECM
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

Harness or connector
(CAN communication line open or short)

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation Procedure is performed immediately before this procedure, turn the ignition switch OFF 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 HBC-115, "Work Procedure (Inspection Mode 5)".
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 >> DTC U0100, U0101, U0111 or U0293 is stored in “Motor Control” at the time of receiving: GO TO 3.
NO-2 >> Confirmation after repair: INSPECTION END

3.PERFORM CAN DIAGNOSIS

WITH CONSULT
1. Perform “CAN DIAGNOSIS”
2. Check diagnosis result.

>> Refer to HBB-135, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014844897

CAUTION:
- **To perform diagnosis, observe the cautions in performing diagnoses. Refer to LAN-32, "Precautions for Trouble Diagnosis".**
- **To repair harnesses, observe the cautions in repairing harnesses. Refer to LAN-32, "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-26, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2. IDENTIFY MALFUNCTIONING PART

WITH CONSULT
Check “Self Diagnostic Result” of “MOTOR CONTROL”.

Detected DTC	Root cause
DTC U0100, U0101, U0111 and U0293	• CAN communication system (Short circuit, traction motor inverter branch line*1, or HPCM branch line) • ECM • HPCM • TCM • LBC • Traction motor inverter
DTC U0100	• ECM branch line*2 • ECM
DTC U0101	• TCM branch line • TCM
DTC U0111	• LBC branch line • LBC
DTC U0293	• HPCM branch line • HPCM*3

NOTE:
*1: If “EV/HEV” detects DTC U0110, check the traction motor inverter branch line first.
*2: If “ENGINE” detects DTC U0293, check the ECM branch line first.
*3: When replacing HPCM, replace Li-ion battery together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-54, "Intermittent Incident".

U0101 LOST COMMUNICATION TCM

DTC Description

INFOID:0000000014844898

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0101	LOST COMMUNICATION TCM (Lost communication transmission control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from TCM
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

Harness or connector
(CAN communication line open or short)

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation procedure is performed immediately before this procedure, turn the ignition switch OFF 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 HBC-115, "Work Procedure (Inspection Mode 5)".
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 >> DTC U0100, U0101, U0111 or U0293 is stored in “Motor Control” at the time of receiving: GO TO 3.
NO-2 >> Confirmation after repair: INSPECTION END

3.PERFORM CAN DIAGNOSIS

WITH CONSULT
1. Perform “CAN DIAGNOSIS”
2. Check diagnosis result.

>> Refer to HBB-137, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014844899

CAUTION:
- **To perform diagnosis, observe the cautions in performing diagnoses. Refer to LAN-32, "Precautions for Trouble Diagnosis".**
- **To repair harnesses, observe the cautions in repairing harnesses. Refer to LAN-32, "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-26, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2. IDENTIFY MALFUNCTIONING PART

WITH CONSULT
Check “Self Diagnostic Result” of “MOTOR CONTROL”.

Detected DTC	Root cause
DTC U0100, U0101, U0111 and U0293	• CAN communication system (Short circuit, traction motor inverter branch line*1, or HPCM branch line) • ECM • HPCM • TCM • LBC • Traction motor inverter
DTC U0100	• ECM branch line*2 • ECM
DTC U0101	• TCM branch line • TCM
DTC U0111	• LBC branch line • LBC
DTC U0293	• HPCM branch line • HPCM*3

NOTE:
*1: If “EV/HEV” detects DTC U0110, check the traction motor inverter branch line first.
*2: If “ENGINE” detects DTC U0293, check the ECM branch line first.
*3: When replacing HPCM, replace Li-ion battery together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-54, "Intermittent Incident".

U0110 LOST COMMUNICATION INV/MC

DTC Description

INFOID:0000000014844900

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0110	LOST COMMUNICATION INV/MC (Lost communication inverter/motor control)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from traction motor inverter
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

Harness or connector
(CAN communication line open or short)

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation procedure is performed immediately before this procedure, turn the ignition switch OFF 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 HBC-115, "Work Procedure (Inspection Mode 5)".
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 >> DTC U0100, U0101, U0111 or U0293 is stored in “Motor Control” at the time of receiving: GO TO 3.
NO-2 >> Confirmation after repair: INSPECTION END

3.PERFORM CAN DIAGNOSIS

WITH CONSULT
1. Perform “CAN DIAGNOSIS”
2. Check diagnosis result.

>> Refer to HBB-139, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014844901

CAUTION:
- **To perform diagnosis, observe the cautions in performing diagnoses. Refer to LAN-32, "Precautions for Trouble Diagnosis".**

- **To repair harnesses, observe the cautions in repairing harnesses. Refer to LAN-32, "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-26, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2. IDENTIFY MALFUNCTIONING PART

WITH CONSULT
Check “Self Diagnostic Result” of “MOTOR CONTROL”.

Detected DTC	Root cause
DTC U0100, U0101, U0111 and U0293	• CAN communication system (Short circuit, traction motor inverter branch line*1, or HPCM branch line) • ECM • HPCM • TCM • LBC • Traction motor inverter
DTC U0100	• ECM branch line*2 • ECM
DTC U0101	• TCM branch line • TCM
DTC U0111	• LBC branch line • LBC
DTC U0293	• HPCM branch line • HPCM*3

NOTE:
*1: If “EV/HEV” detects DTC U0110, check the traction motor inverter branch line first.
*2: If “ENGINE” detects DTC U0293, check the ECM branch line first.
*3: When replacing HPCM, replace Li-ion battery together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-54, "Intermittent Incident".

U0140 LOST COMMUNICATION BCM

DTC Description

INFOID:0000000014844902

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0140	LOST COMM BCM (Lost communication body control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from BCM
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- BCM
- Harness or connector
  (CAN communication line open or short)

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation procedure is performed immediately before this procedure, turn the ignition switch OFF and wait at least 10 seconds to start the next test.

>> GO TO 2.

2.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 10 seconds or more.
2. Check “Self Diagnostic Result” of “HV BAT” with CONSULT.
3. Check DTC.

Is DTC “U0140” detected?

YES >> Refer to HBB-141, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844903

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON.
2. Erases DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-141, "DTC Description".

Is “U0140” detected again?

YES >> Perform the trouble diagnosis for CAN communication system. Refer to LAN-26, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U0155 LOST COMMUNICATION METER

DTC Description

INFOID:0000000014844904

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0155	LOST COMM METER (Lost communication meter)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from combination meter
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

- Combination meter
- Harness or connector
  (CAN communication line open or short)

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)

- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation procedure is performed immediately before this procedure, turn the ignition switch OFF and wait at least 10 seconds to start the next test.

>> GO TO 2.

2.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 10 seconds or more.
2. Check “Self Diagnostic Result” of “HV BAT” with CONSULT.
3. Check DTC.

Is DTC “U0155” detected?

YES >> Refer to HBB-142, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844905

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON.
2. Erases DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-142, "DTC Description".

Is “U0155” detected again?

YES >> Perform the trouble diagnosis for CAN communication system. Refer to LAN-26, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U0293 LOST COMMUNICATION HPCM

DTC Description

INFOID:0000000014844906

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U0293	LOST COMMUNICATION HPCM (Lost communication hybrid powertrain control module)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal from HPCM
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSES

Harness or connector
(CAN communication line open or short)

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)
- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation Procedure is performed immediately before this procedure, turn the ignition switch OFF 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 HBC-115, "Work Procedure (Inspection Mode 5)".
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 >> DTC U0100, U0101, U0111 or U0293 is stored in “Motor Control” at the time of receiving: GO TO 3.
NO-2 >> Confirmation after repair: INSPECTION END

3.PERFORM CAN DIAGNOSIS

WITH CONSULT
1. Perform “CAN DIAGNOSIS”
2. Check diagnosis result.

>> Refer to HBB-143, "Diagnosis Procedure".

Diagnosis Procedure

INFOID:0000000014844907

CAUTION:
- **To perform diagnosis, observe the cautions in performing diagnoses. Refer to LAN-32, "Precautions for Trouble Diagnosis".**

- **To repair harnesses, observe the cautions in repairing harnesses. Refer to LAN-32, "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-26, "Trouble Diagnosis Flow Chart".
NO >> GO TO 2.

2. IDENTIFY MALFUNCTIONING PART

WITH CONSULT
Check “Self Diagnostic Result” of “MOTOR CONTROL”.

Detected DTC	Root cause
DTC U0100, U0101, U0111 and U0293	• CAN communication system (Short circuit, traction motor inverter branch line*1, or HPCM branch line) • ECM • HPCM • TCM • LBC • Traction motor inverter
DTC U0100	• ECM branch line*2 • ECM
DTC U0101	• TCM branch line • TCM
DTC U0111	• LBC branch line • LBC
DTC U0293	• HPCM branch line • HPCM*3

NOTE:
*1: If “EV/HEV” detects DTC U0110, check the traction motor inverter branch line first.
*2: If “ENGINE” detects DTC U0293, check the ECM branch line first.
*3: When replacing HPCM, replace Li-ion battery together with HPCM.

>> Because of intermittent malfunction, check malfunctioning parts, based on the intermittent incident. Refer to GI-54, "Intermittent Incident".

U1000 CAN COMM CIRCUIT

DTC Description

INFOID:0000000014844908

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 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-44, "CAN COMMUNICATION SYSTEM : CAN Communication Signal Chart".

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U1000	CAN COMM CIRCUIT (CAN communication circuit)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	CAN communication signal
		Threshold	LBC cannot receive a CAN communication signal
		Diagnosis delay time	2 seconds or more

POSSIBLE CAUSE

CAN communication system

FAIL-SAFE

MOTOR TORQUE OFF MODE (P317F is detected in HPCM)

- Engine stop control is prohibited
- Driving force decreases
- Illuminate hybrid system warning lamp

DTC CONFIRMATION PROCEDURE

1.PREPARATION BEFORE STARTING OPERATIONS

If other DTC confirmation Procedure is performed immediately before this procedure, turn the ignition switch OFF and wait at least 10 seconds to start the next test.

>> GO TO 2.

2.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON and wait for 10 seconds or more.
2. Check “Self Diagnostic Result” of “HV BAT” with CONSULT.
3. Check DTC.

Is DTC “U1000” detected?

YES >> Refer to HBB-145, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844909

1.PERFORM SELF DIAGNOSTIC

1. Turn ignition switch ON.
2. Erases DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-145, "DTC Description".

Is “U1000” detected again?

YES >> Perform the trouble diagnosis for CAN communication system. Refer to LAN-26, "Trouble Diagnosis Flow Chart".
NO >> INSPECTION END

U1321 CONFIG UNFINISH

DTC Description

INFOID:0000000014844910

DTC DETECTION LOGIC

DTC	Trouble diagnosis (Trouble diagnosis contents)	Detecting condition	
U1321	CONFIG UNFINISH (Configuration unfinish)	Diagnosis condition	When ignition switch is ON
		Signal (terminal)	—
		Threshold	The writing of configuration data is incomplete
		Diagnosis delay time	10 seconds or more

POSSIBLE CAUSES

The writing of configuration data is not performed.

FAIL-SAFE

WARNING LAMP ON (P3180 is detected in HPCM)
- Illuminate hybrid system warning lamp

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 U1321 detected?

YES >> Refer to HBB-146, "Diagnosis Procedure".
NO-1 >> To check malfunction symptom before repair: Refer to GI-54, "Intermittent Incident".
NO-2 >> Confirmation after repair: INSPECTION END

Diagnosis Procedure

INFOID:0000000014844911

1.PERFORM THE WRITING OF CONFIGURATION DATA

1. Write configuration data with CONSULT. Refer to HBB-54, "Description".
2. Erases DTC.
3. Perform DTC confirmation procedure again. Refer to HBB-146, "DTC Description".

Is “U1321” detected again?

YES >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".
NO >> INSPECTION END

INSULATION RESISTANCE

Component Inspection

INFOID:0000000014844912

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1. PRECONDITIONING

WARNING:

Follow the instructions below before starting the procedure.

1. Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".
2. Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".

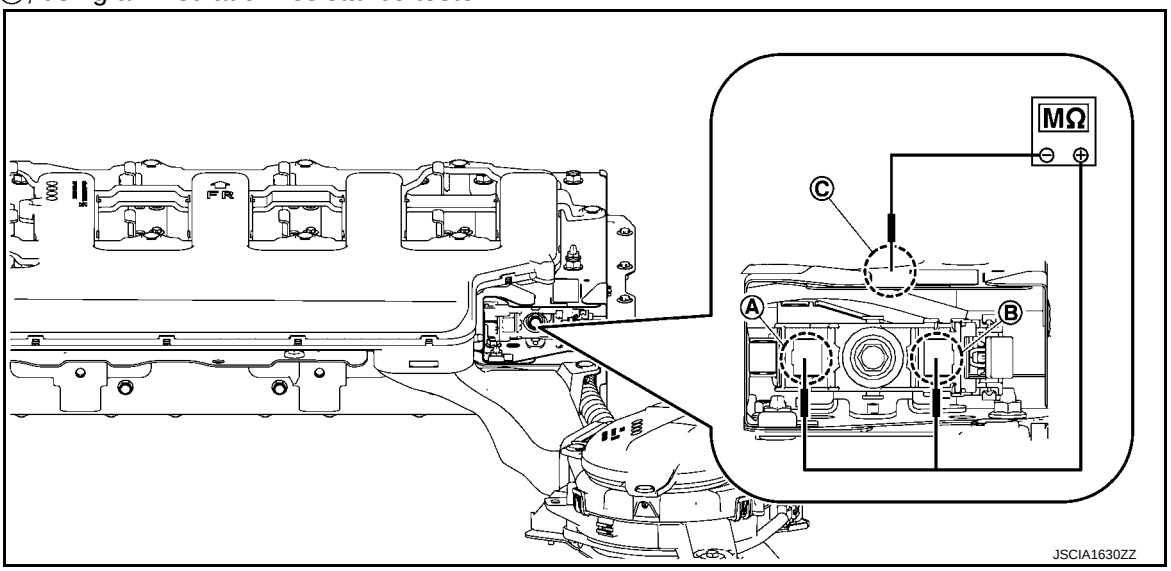
>> GO TO 2.

2. CHECK LI-ION BATTERY INSULATION RESISTANCE (SERVICE PLUG SIDE)

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.

Check insulation resistance between Li-ion battery harness connector terminals Ⓐ/Ⓑ and Li-ion battery metallic part Ⓒ, using an insulation resistance tester.



+	–	
Li-ion battery terminals		Resistance
Positive terminal Ⓐ	Lower battery cover metallic part Ⓒ	21 MΩ or more
Negative terminal Ⓑ		

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.**
- **Check the usage directions for the insulation resistance tester to place the positive electric potential-applied probe to the service plug terminal.**

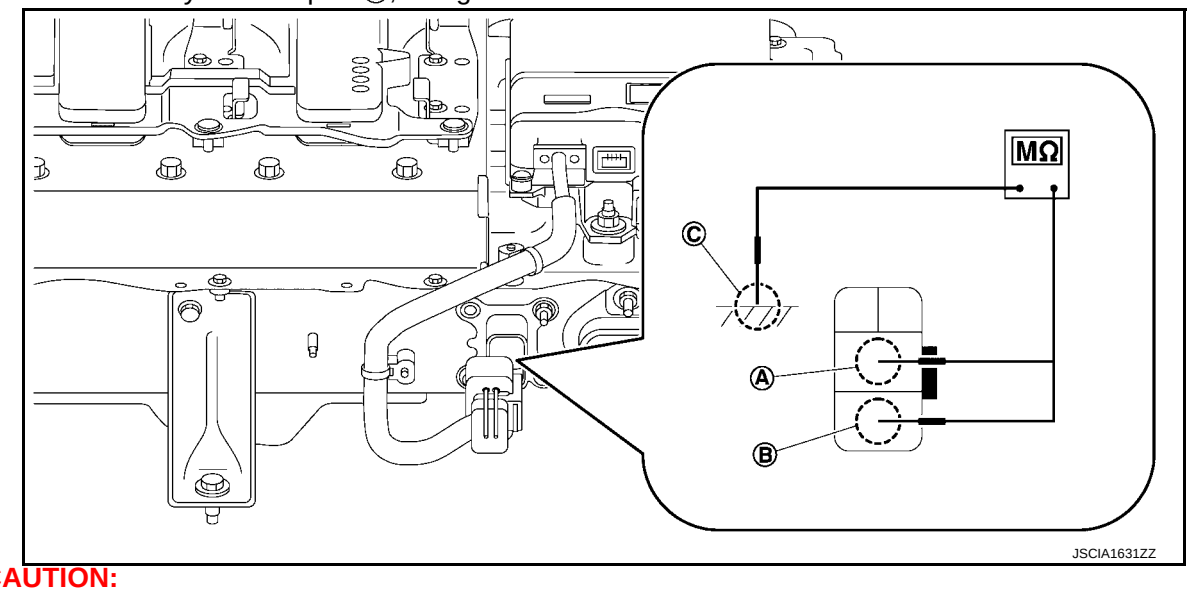
Is the inspection result normal?

YES >> GO TO 3.
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

3. CHECK LI-ION BATTERY INSULATION RESISTANCE (DC/DC CONVERTER SIDE)

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. Remove center console assembly. Refer to IP-18, "Removal and Installation".
2. Check insulation resistance between DC/DC converter high voltage harness connector terminals Ⓐ/Ⓑ and Li-ion battery metallic part Ⓒ, 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.**

DC/DC converter high voltage harness connector terminals	Ground	Resistance
30 Ⓐ	Lower battery cover metallic part Ⓒ	1 MΩ or more
31 Ⓑ		

Is the inspection result normal?

YES >> INSPECTION END
NO >> Replace Li-ion battery. Refer to HBB-155, "Removal and Installation".

POWER SUPPLY AND GROUND CIRCUIT
LI-ION BATTERY CONTROLLER
LI-ION BATTERY CONTROLLER : Diagnosis Procedure

INFOID:0000000014844913

DANGER:

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

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **The removed service plug must always be carried in a pocket of the responsible worker or placed in the tool box during the procedure to prevent the plug from being connected by mistake.**
- **Be sure to wear insulating protective equipment before beginning work on the high voltage system.**
- **Never allow workers other than the responsible person to touch the vehicle containing high voltage parts. To keep others from touching the high voltage parts, these parts must be covered with an insulating sheet except when using them.**
- **Refer to HBB-6, "High Voltage Precautions".**

CAUTION:

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

1.CHECK FUSE

Check that the 10A fuse (No.77) is not open.

Is the fuse open?

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.

+		–		Voltage
Li-ion battery				
Connector	Terminal	Connector	Terminal	
B59	6	B59	2	Battery voltage
			14	

Is the inspection result normal?

YES >> INSPECTION END
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.

+		–	Voltage
Li-ion battery			
Connector	Terminal		
B59	6	Ground	Battery voltage

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace error-detected parts.

4.CHECK GROUND

Check installation status of ground (B19). Refer to GI-56, "Circuit Inspection".

Is the inspection result normal?

YES >> GO TO 5.
NO >> Recover the installation status of Ground.

5.CHECK GROUND CIRCUIT

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

Li-ion battery		–	Continuity
Connector	Terminal		
B59	2	Ground	Existed
	14		

Is the inspection result normal?

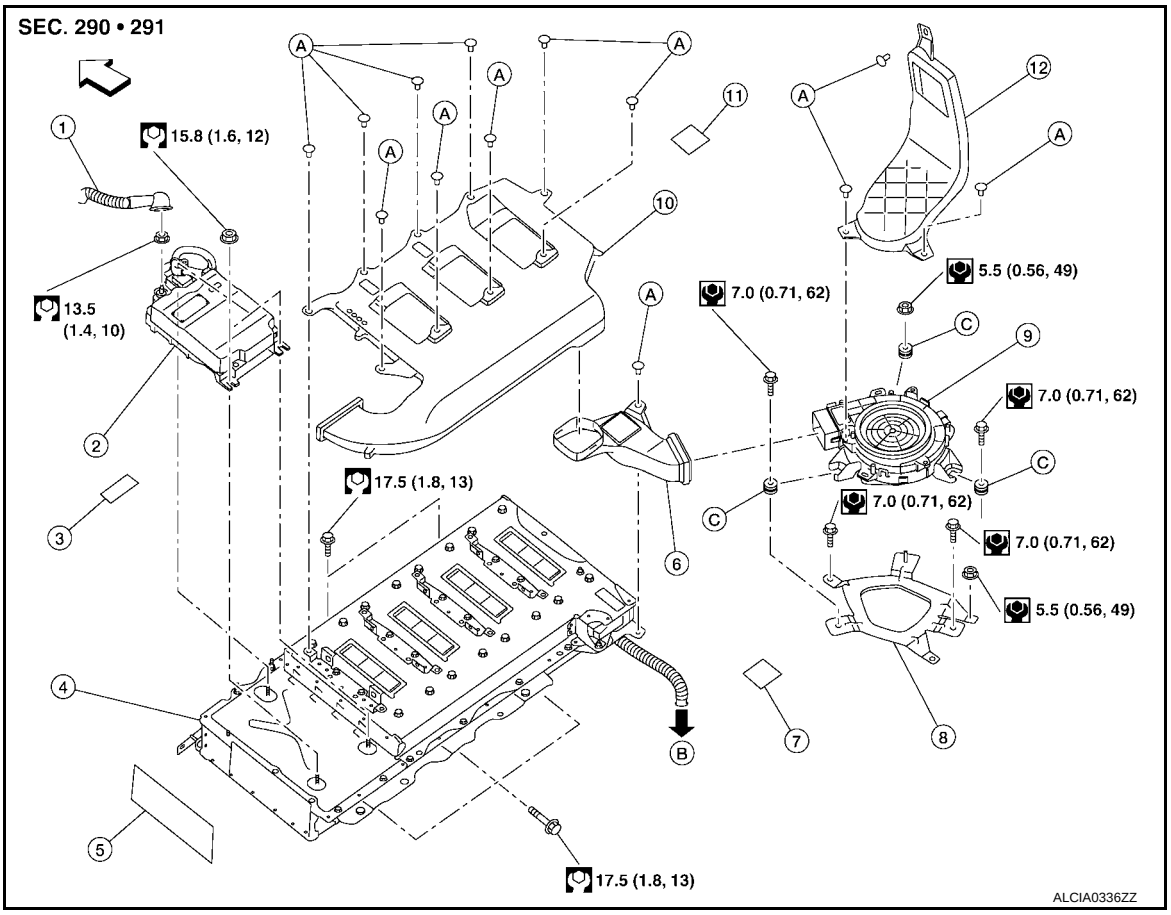
YES >> Check intermittent incident. Refer to GI-54, "Intermittent Incident".
NO >> Repair or replace error-detected parts.

REMOVAL AND INSTALLATION

COOLING SYSTEM

Exploded View

INFOID:0000000014630806



1. 12V battery positive terminal
2. DC/DC converter
3. High voltage warning label
4. Li-ion battery
5. High voltage warning label
6. Air duct B
7. High voltage warning label
8. Battery cooling fan bracket
9. Battery cooling fan
10. Air duct A
11. Gas vent hose warning label
12. Air duct C

A. Clip
B. To floor
C. Bushing

⇦ : Front

AIR DUCT A

AIR DUCT A : Removal and Installation

INFOID:0000000014630807

DANGER:

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.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**

- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and make sure that others 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.

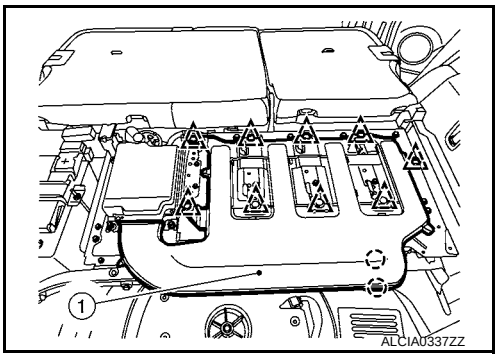
AIR DUCT A

Removal

1. Remove luggage floor box. Refer to INT-32, "Exploded View".
2. Release clips and pawls, then remove air duct A (1).

: Clip

: Pawl

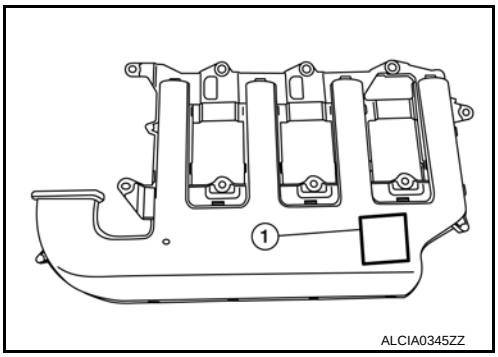


Installation

Installation is in the reverse order of removal.

NOTE:

When replacing air duct A, apply gas vent hose warning label (1) as shown.



AIR DUCT B

AIR DUCT B : Removal and Installation

INFOID:0000000014749803

DANGER:

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.

WARNING:

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

- **Clearly identify the persons responsible for high voltage work and make sure that others 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".**

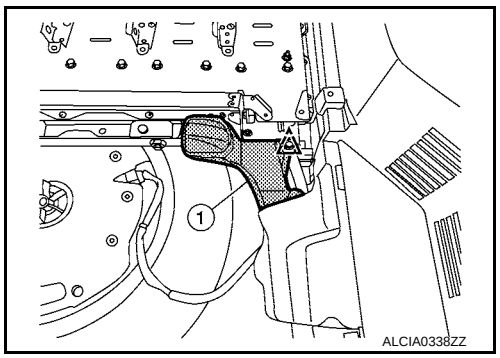
CAUTION:

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.

REMOVAL

1. Remove air duct A. Refer to HBB-151, "AIR DUCT A : Removal and Installation".
2. Release clip and remove air duct B (1).

: Clip

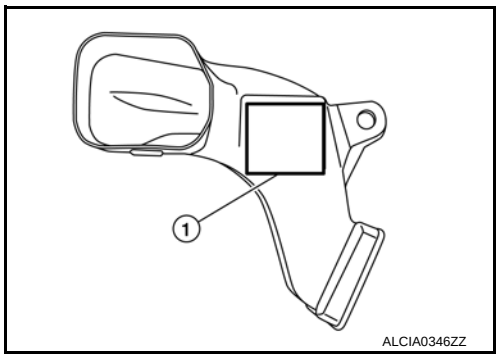


INSTALLATION

Installation is in the reverse order of removal.

NOTE:

When replacing air duct B, apply high voltage warning label (1) as shown.



AIR DUCT C

AIR DUCT C : Removal and Installation

INFOID:0000000014749804

DANGER:

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.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.**
- **Be sure to wear insulating protective equipment consisting of glove, shoes, face shield, and glasses before beginning work on the high voltage system.**
- **Clearly identify the persons responsible for high voltage work and make sure that others 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".**

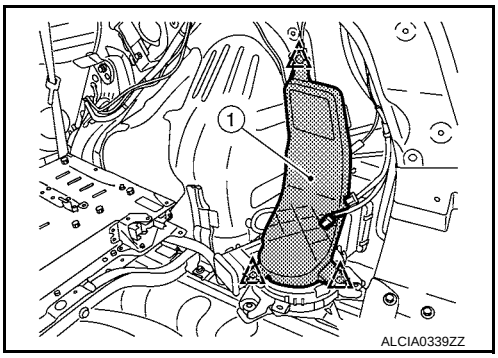
CAUTION:

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.

REMOVAL

1. Remove luggage side lower finisher. Refer to INT-32, "LUGGAGE SIDE LOWER FINISHER : Removal and Installation".
2. Release clips and remove air duct C (1).

: Clip



INSTALLATION

Installation is in the reverse order of removal.

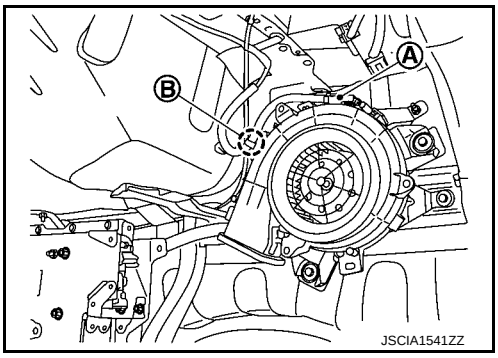
BATTERY COOLING FAN

BATTERY COOLING FAN : Removal and Installation

INFOID:0000000014749805

REMOVAL

1. Remove air duct C. Refer to HBB-153, "AIR DUCT C : Removal and Installation".
2. Disconnect harness connector (A) from battery cooling fan, then release harness clip (B).



3. Remove bolts and nut, then remove battery cooling fan. Refer to HBB-151, "Exploded View".
4. Remove bolts and nut, then remove battery cooling fan bracket (if necessary). Refer to HBB-151, "Exploded View".

INSTALLATION

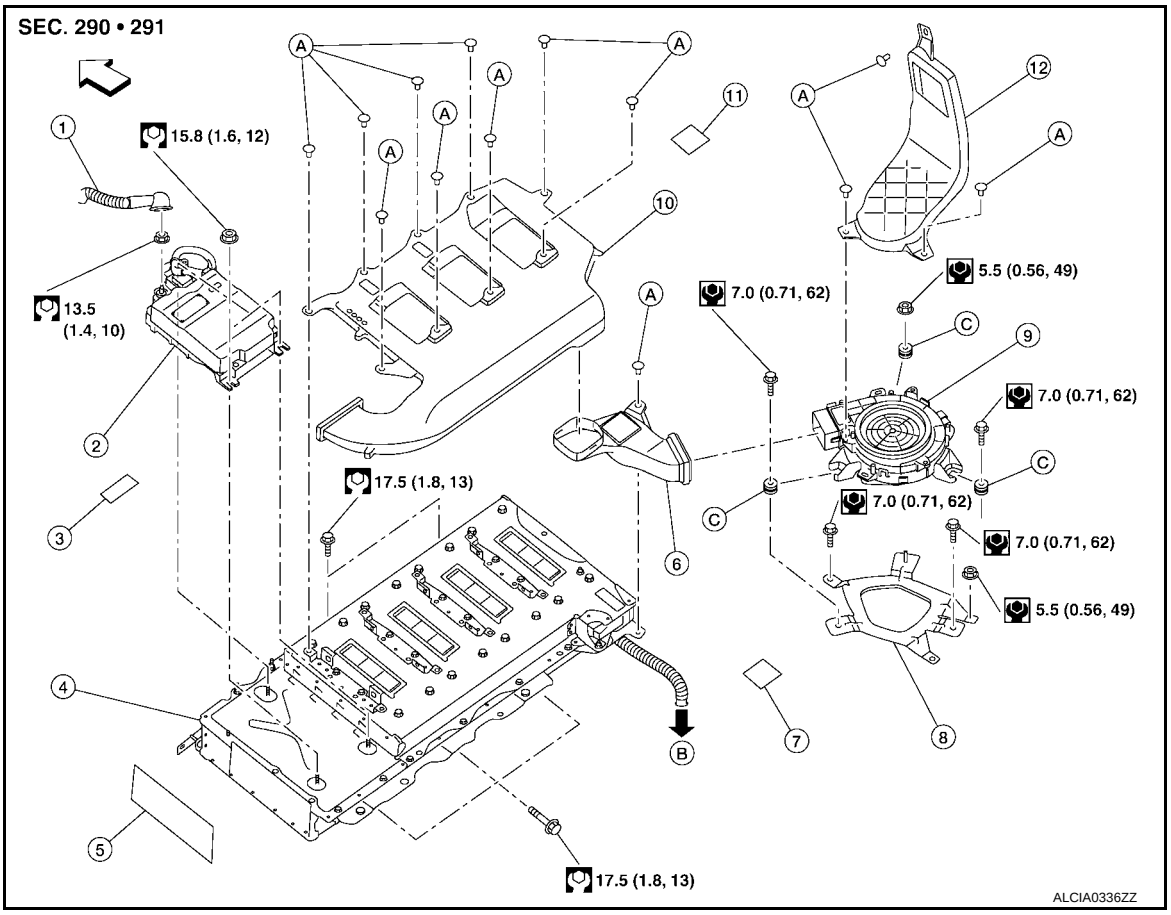
Installation is in the reverse order of removal.

UNIT REMOVAL AND INSTALLATION

LI-ION BATTERY

Exploded View

INFOID:0000000014740558



1. 12V battery positive terminal
2. DC/DC converter
3. High voltage warning label
4. Li-ion battery
5. High voltage warning label
6. Air duct B
7. High voltage warning label
8. Battery cooling fan bracket
9. Battery cooling fan
10. Air duct A
11. Gas vent hose warning label
12. Air duct C

A. Clip
B. To floor
C. Bushing

⇦ : Front

Removal and Installation

INFOID:0000000014630809

DANGER:

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.

WARNING:

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

- **Clearly identify the persons responsible for high voltage work and make sure that others 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".**
- **For DTC code "P30EE" be sure to store battery in a safe place. Do not disassemble or dispose of the battery. Always contact address included in the label on the battery.**

CAUTION:

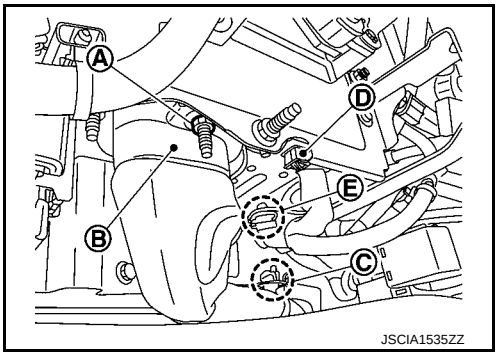
- **There is the possibility of a malfunction occurring if the vehicle is changed to READY status while the service plug is removed. Therefore do not change the vehicle to READY status unless instructed to do so in the service manual.**
- **Do not disassemble Li-ion battery.**

REMOVAL

WARNING:

- **Shut off high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".**
- **Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".**

1. Disconnect negative and positive battery terminals, then wait at least three minutes. Refer to PG-128, "Battery Disconnect".
2. Remove luggage floor box. Refer to INT-32, "Exploded View".
3. Remove inside key antenna. Refer to DLK-334, "CONSOLE : Removal and Installation".
4. Loosen high voltage harness connector nut (A), then remove harness clamp (C) and disconnect high voltage harness connector (B).



WARNING:

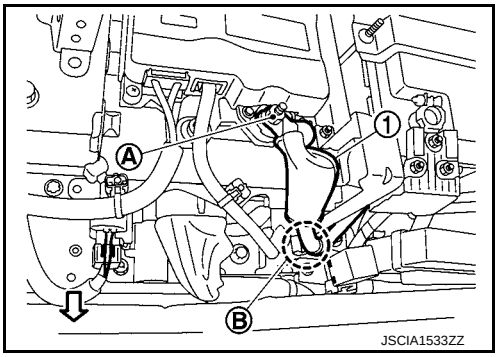
To prevent electric shock, wear insulated protective gear.



NOTE:
High voltage harness connector nut (A) is fixed to the connector to prevent the nut from dropping.

5. Disconnect harness connector (D) from Li-ion battery, then remove harness clamp (E).
6. Disconnect 12V battery positive terminal (1) from DC/DC converter using the following step.

a. Remove nut (A), then release harness clamp (B) from LI-ion battery.



WARNING:

To prevent electric shock, wear insulated protective gear.



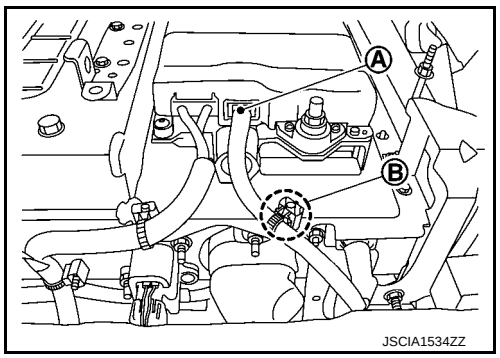
⇦ : Vehicle front

7. Disconnect DC/DC converter harness connector (A), then release harness clamp (B).

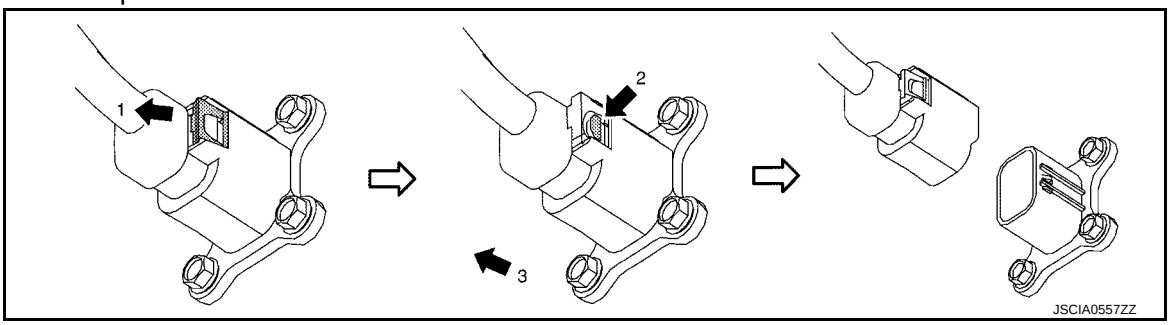
WARNING:

To prevent electric shock, wear insulated protective gear.





- Follow the procedure below to connect the DC/DC converter harness connector.



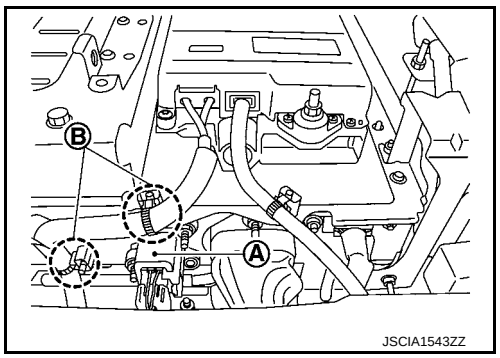
8. Disconnect DC/DC converter high voltage harness connector (A), then remove harness clamp (B).

WARNING:

To prevent electric shock, wear insulated protective gear.



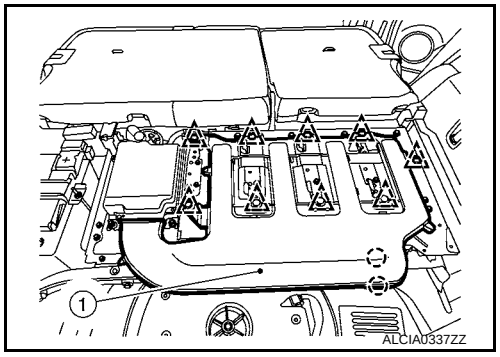
Ⓑ : Harness clamp



9. Release clips and pawls, then remove air duct A (1).

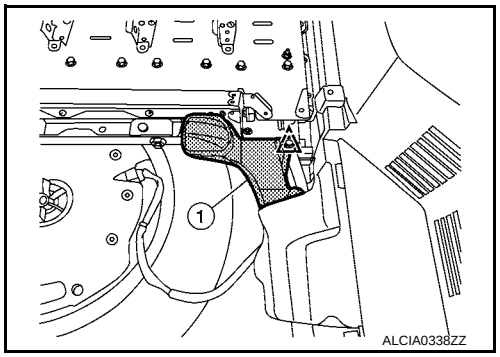
△ : Clip

◌ : Pawl



10. Release clip and remove air duct B (1).

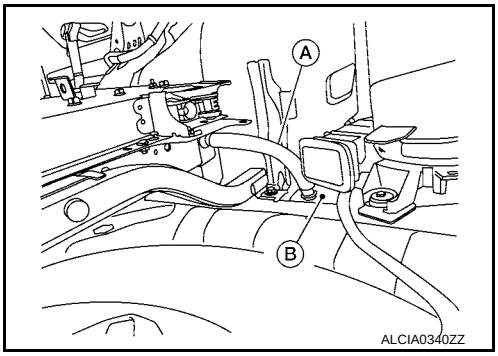
△ : Clip



11. Remove gas vent hose (A) from floor panel (B).

WARNING:

If gas vent hose is disconnected at the Li-ion battery assembly side, this allows easy access to the inside of the Li-ion battery assembly. To prevent this, always disconnect gas vent hose at the insertion part on the vehicle body side.



12. Remove bolts (A, B) and Li-ion battery (1).

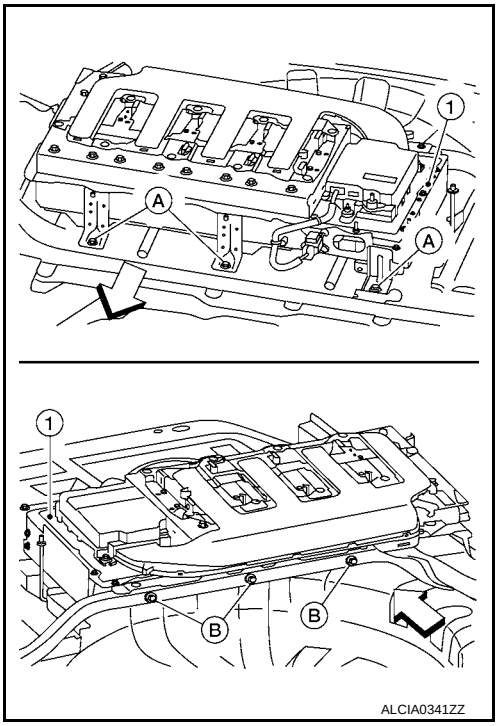
WARNING:

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



CAUTION:

When removing Li-ion battery, two people are required.



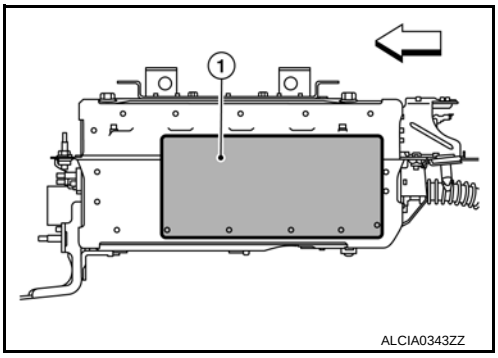
INSTALLATION

Installation is in the reverse order of removal.

CAUTION:

- **Visually check the clips for deformation and damage during installation. Replace with new ones if necessary.**
- **After installing Li-ion battery, perform inspection. Refer to HBB-159, "Inspection".**
- **When connecting the gas vent hose, make sure that there is no clearance between grommet and body.**
- **When replacing the Li-ion battery, new high voltage label (1) must be applied as shown.**

⇦ : Front



- **When replacing Li-ion battery you must reconfigure the Li-ion Battery Controller (LBC). Refer to HBB-53, "Description".**

Inspection

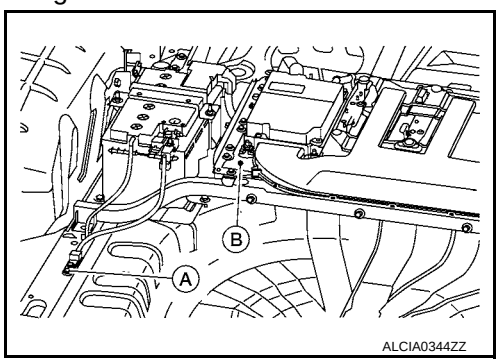
INFOID:0000000014630810

INSPECTION AFTER INSTALLATION

Equipotential Test

After installing Li-ion battery, measure resistance using one of the following methods:.

1. Between earth ground bolt (A) and the Li-ion battery surface (B) while applying 0.2A and above using suitable tool.



WARNING:

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



Specification : Less than 0.1 Ω

NOTE:
The illustration on the right shows an example. Other points which have electrical continuity to body are acceptable.

2. Verify torque specification of the Li-ion battery bolts.

WARNING:

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



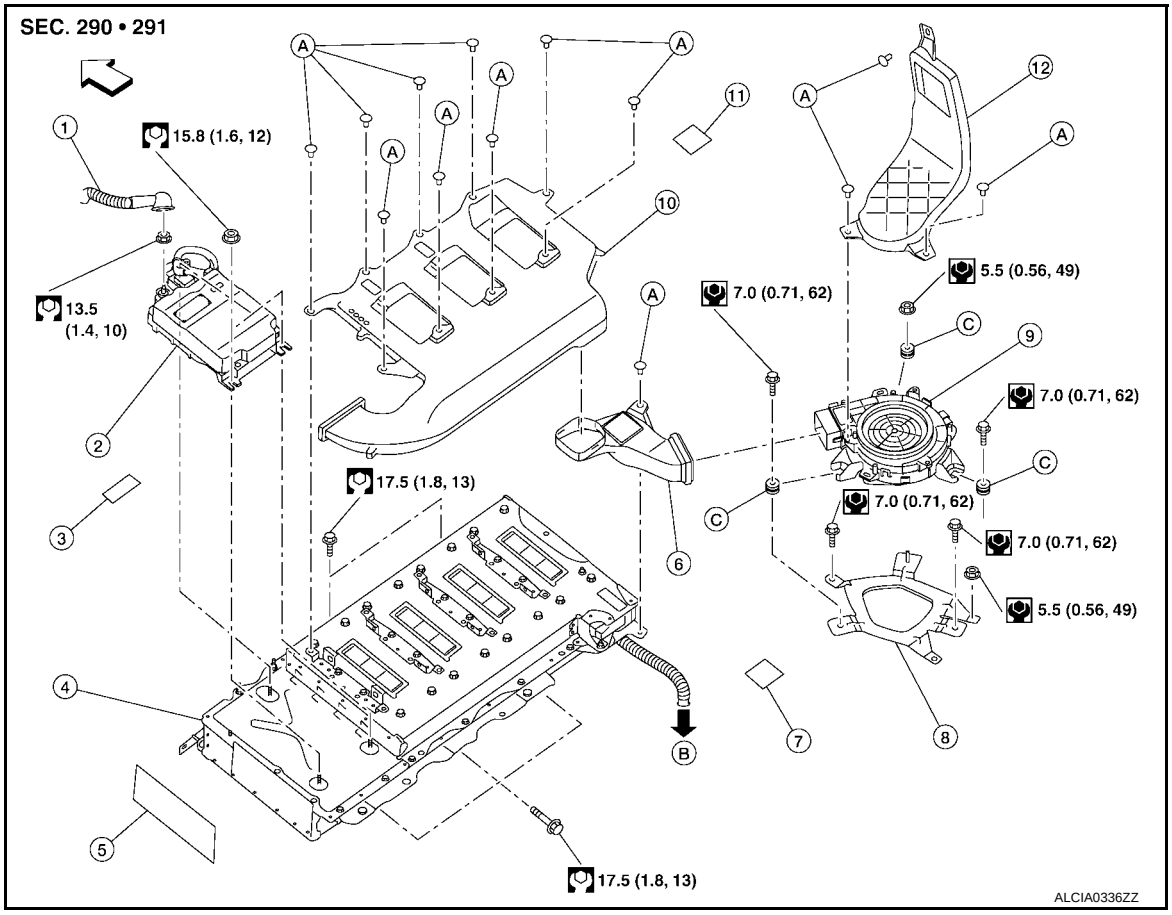
Li-ion battery bolt : 17.5 N·m (1.8 kg-m, 13 lb-ft)

If the result deviates from the specification, check for paint, oil, dirt, or other substance adhering to the bolts or conductive parts. If such substances are found, clean the surrounding area and remove the foreign substances.

DC/DC CONVERTER

Exploded View

INFOID:0000000014740559



1. 12V battery positive terminal
2. DC/DC converter
3. High voltage warning label
4. Li-ion battery
5. High voltage warning label
6. Air duct B
7. High voltage warning label
8. Battery cooling fan bracket
9. Battery cooling fan
10. Air duct A
11. Gas vent hose warning label
12. Air duct C

A. Clip
B. To floor
C. Bushing

⇦ : Front

Removal and Installation

INFOID:0000000014630812

DANGER:

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.

WARNING:

- **Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.**
- **To prevent the removed service plug from being connected by mistake during the procedure, be sure to 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 make sure that others 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.

REMOVAL

WARNING:

- **Disconnect high voltage circuit. Refer to HBB-7, "How to Disconnect High Voltage".**
- **Check voltage in high voltage circuit. Refer to HBB-9, "Check Voltage in High Voltage Circuit".**

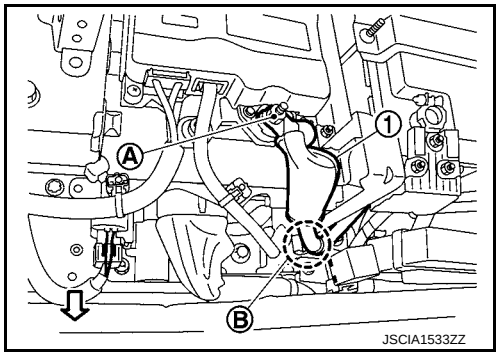
1. Remove rear luggage floor board. Refer to INT-32, "Exploded View".
2. Disconnect 12V battery positive terminal (1) from DC/DC converter using the following step.

a. Remove nut (A), then release harness clamp (B) from LI-ion battery.

WARNING:

To prevent electric shock, wear insulated protective gear.





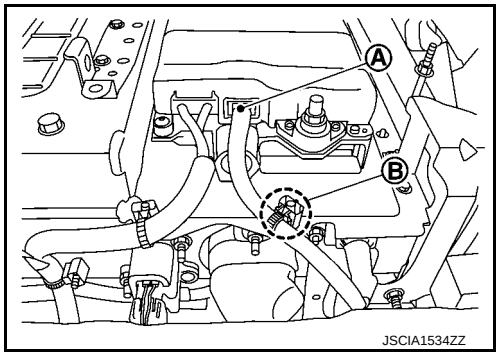
⇦ : Vehicle front

3. Disconnect harness connector (A) from DC/DC converter, then remove harness clamp (B).

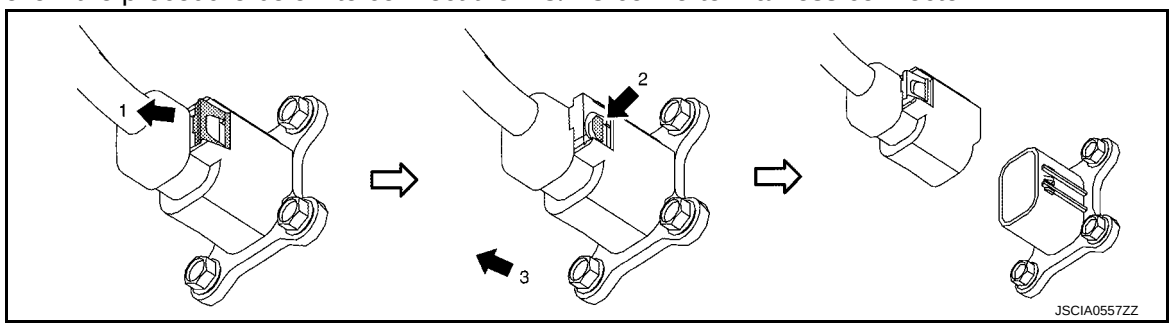
WARNING:

To prevent electric shock, wear insulated protective gear.





- Follow the procedure below to connect the DC/DC converter harness connector.

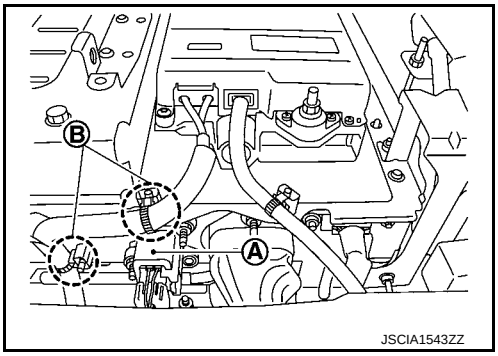


4. Disconnect high voltage harness connector (A) DC/DC converter, then remove harness clamp (B).

WARNING:

To prevent electric shock, wear insulated protective gear.





5. Remove nuts, then remove DC/DC converter. Refer to HBB-160, "Exploded View".

WARNING:

To prevent electric shock, wear insulated protective gear.

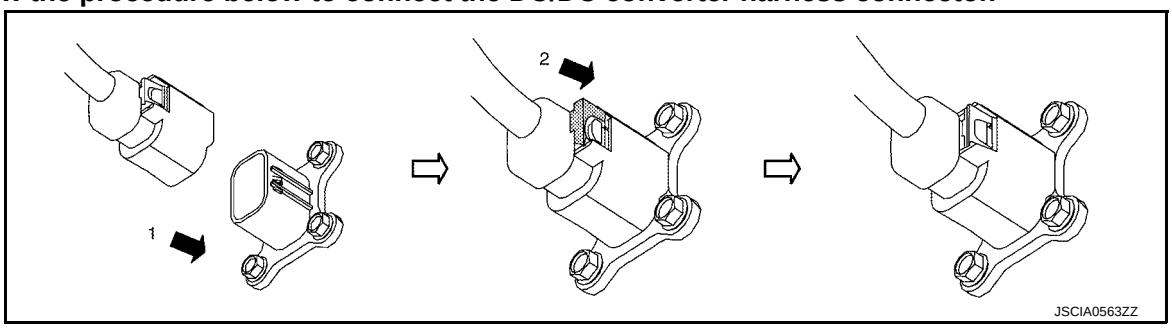


INSTALLATION

Installation is in the reverse order of removal.

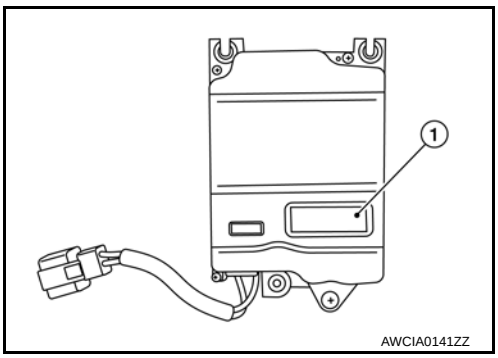
WARNING:

- **When installing 12V battery positive terminal and tightening nut, be careful not to allow harness cover to be pinched by the terminal.**
- **Follow the procedure below to connect the DC/DC converter harness connector.**



NOTE:

- Visually check the clips for deformation and damage during installation. Replace with new ones if necessary.
- When replacing the DC/DC converter, apply high voltage warning label (1) as shown.



Inspection

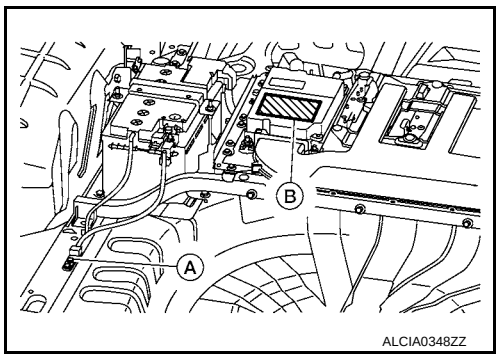
INFOID:0000000014749668

INSPECTION AFTER INSTALLATION

Equipotential Test

After installing DC/DC converter, measure resistance using one of the following methods:.

1. Between earth ground bolt (A) and the DC/DC converter surface (B) while applying 0.2A and above using suitable tool.



WARNING:

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



Specification : Less than 0.1 Ω

NOTE:
The illustration on the right shows an example. Other points which have electrical continuity to body are acceptable.

2. Verify torque specification of the following.

WARNING:

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



Li-ion battery bolt : 17.5 N·m (1.8 kg-m, 13 lb-ft)
DC/DC converter nuts : 15.8 N·m (1.6 kg-m, 12 lb-ft)

If the result deviates from the specification, check for paint, oil, dirt, or other substance adhering to the bolts or conductive parts. If such substances are found, clean the surrounding area and remove the foreign substances.

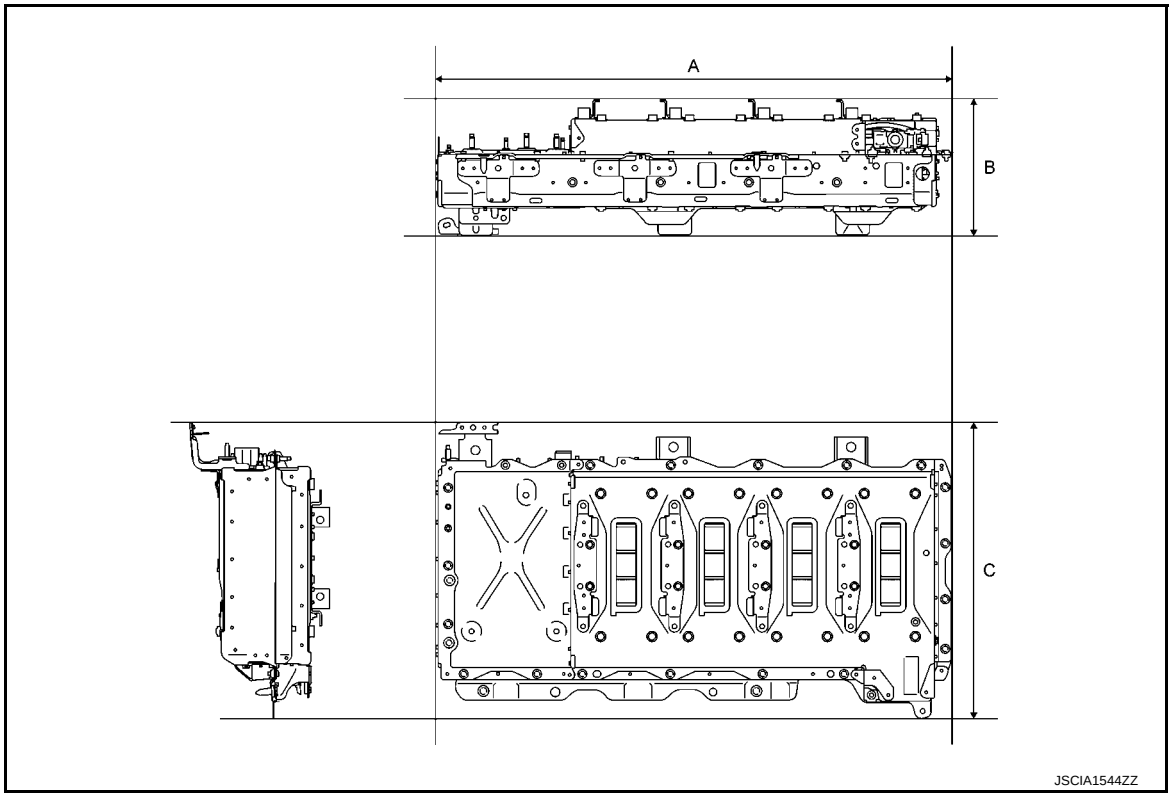
SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Li-ion Battery

INFOID:0000000014630813

Type	Li-ion battery
Structure	4 modules (56 cells)
Rated voltage (V)	Approx. 202
Weight kg (lb)	Approx. 34.9 (76.95)



Unit: mm (in)

Dimension	A	823.7 (32.43)
	B	206.8 (8.14)
	C	475.8 (18.73)