

TMS

SECTION

TRACTION MOTOR SYSTEM

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PRECAUTIONS

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PRECAUTION

PRECAUTIONS

Precaution for Technicians Using Medical Electric

INFOID:000000007071845

OPERATION PROHIBITION

WARNING:

- Parts with strong magnet is used in this vehicle.
- Technicians using a medical electric device such as pacemaker must never perform operation on the vehicle, as magnetic field can affect the device function by approaching to such parts.

NORMAL CHARGE PRECAUTION

WARNING:

- If a technician uses a medical electric device such as an implantable cardiac pacemaker or an implantable cardioverter defibrillator, the possible effects on the devices must be checked with the device manufacturer before starting the charge operation.
- As radiated electromagnetic wave generated by on board charger at normal charge operation may effect medical electric devices, a technician using a medical electric device such as implantable cardiac pacemaker or an implantable cardioverter defibrillator must not enter the vehicle compartment (including luggage room) during normal charge operation.

PRECAUTION AT TELEMATICS SYSTEM OPERATION

WARNING:

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of TCU might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), when using the service, etc.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of TCU might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before TCU use.

PRECAUTION AT INTELLIGENT KEY SYSTEM OPERATION

WARNING:

- If a technician uses implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), avoid the device implanted part from approaching within approximately 220 mm (8.66 in) from interior/exterior antenna.
- The electromagnetic wave of Intelligent Key might affect the function of the implantable cardiac pacemaker or the implantable cardioverter defibrillator (ICD), at door operation, at each request switch operation, or at engine starting.
- If a technician uses other medical electric devices than implantable cardiac pacemaker or implantable cardioverter defibrillator (ICD), the electromagnetic wave of Intelligent Key might affect the function of the device. The possible effects on the devices must be checked with the device manufacturer before Intelligent Key use.

Point to Be Checked Before Starting Maintenance Work

INFOID:000000007079410

The high voltage system may starts automatically. It is required to check that the timer air conditioner and timer charge (during EVSE connection) are not set before starting maintenance work.

NOTE:

If the timer air conditioner or timer charge (during EVSE connection) is set, the high voltage system starts automatically even when the power switch is in OFF state.

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

INFOID:000000007080034

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

PRECAUTIONS

< PRECAUTION >

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

WARNING:

Always observe the following items for preventing accidental activation.

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

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

WARNING:

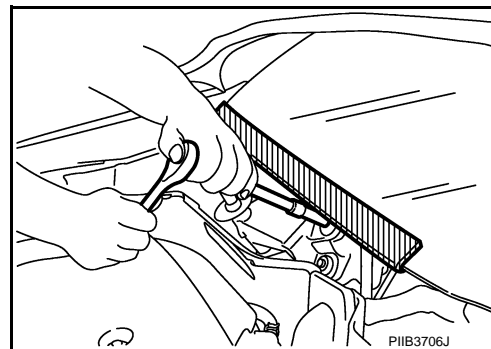
Always observe the following items for preventing accidental activation.

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

Precaution for Procedure without Cowl Top Cover

INFOID:000000006998321

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



High Voltage Precautions

INFOID:000000006998322

DANGER:



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

WARNING:

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

CAUTION:

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

PRECAUTIONS

< PRECAUTION >

HIGH VOLTAGE HARNESS AND EQUIPMENT IDENTIFICATION

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

HANDLING OF HIGH VOLTAGE HARNESS AND TERMINALS

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

REGULATIONS ON WORKERS WITH MEDICAL ELECTRONICS

WARNING:

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

PROHIBITED ITEMS TO CARRY DURING THE WORK

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

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

PRECAUTIONS

< PRECAUTION >

Indicate "HIGH VOLTAGE. DO NOT TOUCH" on the vehicle under repair/inspection to call attention to other workers.

DANGER:
HIGH VOLTAGE
REPAIR IN PROGRESS.
DO NOT TOUCH!

Person in charge:

**DANGER:
HIGH VOLTAGE
REPAIR IN PROGRESS.
DO NOT TOUCH!**

Person in charge:_____

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PRECAUTIONS

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Precautions for Removing Battery Terminal

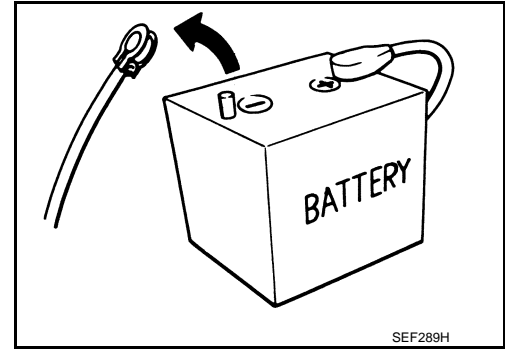
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- When removing the 12V battery terminal, turn OFF the power switch and wait at least 5 minutes.

NOTE:

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

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



WORK PROCEDURE

1. Check that EVSE is not connected.

NOTE:

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

2. Turn the power switch OFF → ON → OFF. Get out of the vehicle. Close all doors (including back door).
3. Check that the charge status indicator lamp does not blink and wait for 5 minutes or more.

NOTE:

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

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

CAUTION:

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

NOTE:

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

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

NOTE:

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

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

NOTE:

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

General Precautions

INFOID:000000006998324

CAUTION:

If the traction motor inverter or traction motor was replaced, be sure to perform writing of the traction motor resolver offset. Refer to [TMS-44, "Description"](#).

Take care when handling the traction motor inverter so that dust, dirt, and other substances do not enter into the inside from the opening.

PREPARATION

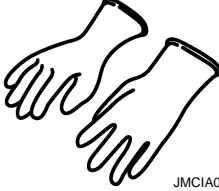
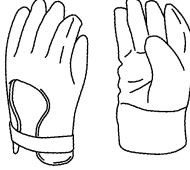

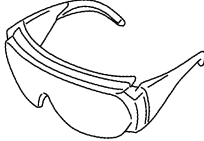
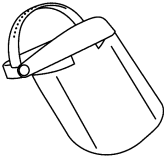
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PREPARATION

PREPARATION

Commercial Service Tools

INFOID:000000007080639

Tool name		Description
Insulated gloves [Guaranteed insulation performance for 1000V/300A]	 JMCIA0149ZZ	Removing and installing high voltage components
Leather gloves [Use leather gloves that can fasten the wrist tight]	 JPCIA0066ZZ	<ul style="list-style-type: none"> • Removing and installing high voltage components • Protect insulated gloves
Insulated safety shoes	 JPCIA0011ZZ	Removing and installing high voltage components
Safety glasses [ANSI Z87.1]	 JPCIA0012ZZ	<ul style="list-style-type: none"> • Removing and installing high voltage components • To protect eye from the spatter on the work to electric line
Face shield	 JPCIA0167ZZ	<ul style="list-style-type: none"> • Removing and installing high voltage components • To protect face from the spatter on the work to electric line

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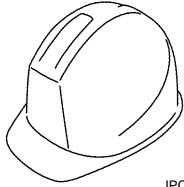
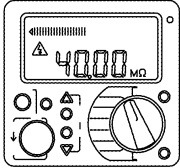
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PREPARATION

< PREPARATION >

Tool name		Description
Insulated helmet	 JPCIA0013ZZ	Removing and installing high voltage components
Insulation resistance tester (Multi tester)	 JPCIA0014ZZ	Measuring voltage and insulation resistance

< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

DESCRIPTION

Description

INFOID:000000006998326

- The traction motor contains a compact, lightweight, high output, high efficiency “Interior Permanent Magnet Synchronous Motor (IPMSM)”.
- The traction motor inverter is a device which converts DC power from the Li-ion battery to AC power, and drives the traction motor. Because the AC power frequency and voltage can be varied when the DC power is converted to AC power, it provides control performance with a high degree of freedom.

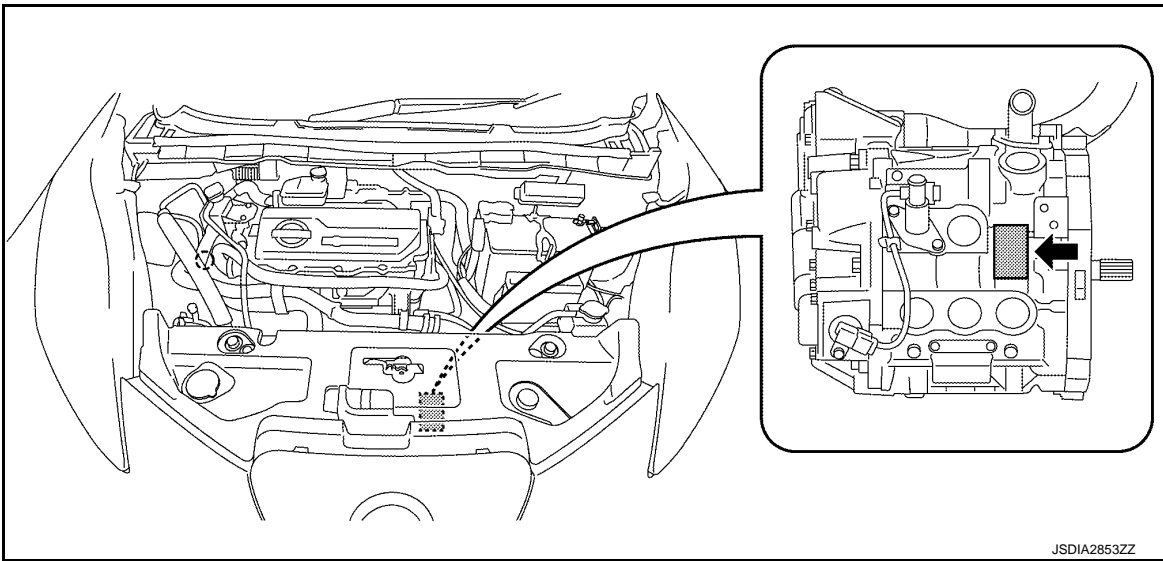
Specifications (Traction Motor)

INFOID:000000006998327

Max torque	280 Nm
Max output	80 kW
Max speed	10,390 rpm
Cooling system	Water cooling type

Location of Traction Motor Model Number and Serial Number Stamps

INFOID:000000007454466



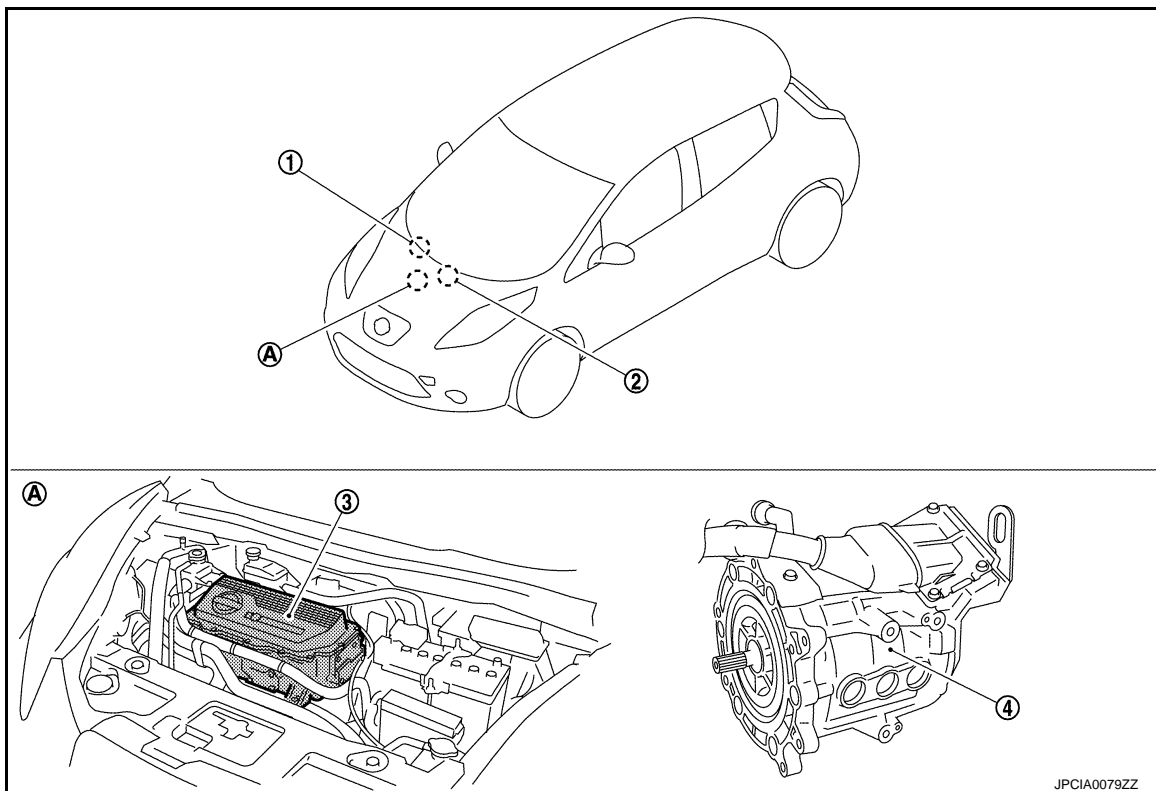
COMPONENT PARTS

< SYSTEM DESCRIPTION >

COMPONENT PARTS

Component Parts Location

INFOID:000000006998328



A. Motor room

COMPONENT DESCRIPTION

No.	Item	Function
1	VCM	<ul style="list-style-type: none"> • Transmits mainly the following signals to VCM via EV system CAN. <ul style="list-style-type: none"> - Motor speed signal - Motor torque limit signal - Motor discharge status signal - High voltage power supply preparation completion signal - Input high voltage signal • Receives mainly the following signals from VCM via EV system CAN. <ul style="list-style-type: none"> - Target motor torque signal - Pulse signal OFF signal - High voltage power supply status signal - System cut off signal - Vibration control switching signal - Motor charge preparation request signal - Motor discharge request signal - Regenerative torque command signal - Shift position signal
2	Electric shift control module	<ul style="list-style-type: none"> • Receives mainly the following signal from electric shift control module via EV system CAN. <ul style="list-style-type: none"> - Shift position signal
3	Traction motor inverter	TMS-13, "Traction Motor Inverter"
4	Traction motor	TMS-13, "Traction Motor"

COMPONENT PARTS

< SYSTEM DESCRIPTION >

Traction Motor Inverter

INFOID:000000006998329

NOTE:

Control of the traction motor and control of EV system CAN communications with other control modules is actually performed by the motor controller. However, because the motor controller is installed inside the traction motor inverter, the motor controller is here referred to as the traction motor inverter.

- The traction motor inverter is composed of the motor controller, driver, smoothing condenser, 3 current sensors, and power module.
- The traction motor inverter controls the traction motor based on the target motor torque signal transmitted by EV system CAN from the VCM.
- Traction motor inverter drives traction motor accurately based on resolver detection signal and current sensor detection signal.
- The traction motor inverter performs charging judgment for the high voltage circuit and also discharges the voltage inside the circuit.
- The traction motor inverter performs vibration control in order to improve accelerator response and provide good acceleration while driving.

MOTOR CONTROLLER

- The motor controller receives the rotor rotation angle from the traction motor resolver and the traction motor current value from the current sensor, and creates the pulse signal for driving the IGBT (Insulated Gate Bipolar Transistor).
- The motor controller detects the traction motor temperature by means of the traction motor temperature sensor, and limits the output torque (protection control) according to the level of heat in the traction motor.

DRIVER

The driver converts the pulse signal (12 V) from the motor controller to a high voltage signal (300 V) and drives the IGBT.

POWER MODULE

- The power module is composed of 6 power semiconductor IGBTs.
- An IGBT is a semiconductor switch that is capable of switching ON/OFF at high speed.
- An IGBT uses the IGBT drive signal from the driver to perform switching, converting the Li-ion battery DC power to AC power and supplying AC power to the traction motor.

SMOOTHING CONDENSER

The smoothing condenser controls the voltage ripple which occurs as a result of IGBT switching.

CURRENT SENSORS

One sensor each is installed at the U-phase, V-phase, and W-phase. They detect the current supplied to the traction motor and send the current values as feedback to the motor controller.

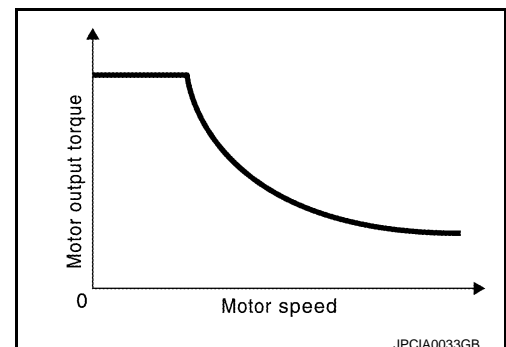
DISCHARGE RESISTER

The discharge resistor discharges the high voltage in case the traction motor inverter is unable to discharge the remaining high voltage in the high voltage circuit due to a malfunction.

Traction Motor

INFOID:000000006998330

- The traction motor contains an "Interior Permanent Magnet Synchronous Motor (IPMSM)". A permanent magnet is embedded inside the rotor core, and the rotating magnetic field generated by the stator coil is used to generate rotational torque.
- The traction motor is able to generate torque even when the vehicle is stopped, and outputs maximum drive torque when the vehicle starts moving in order to provide good initial acceleration.



TRACTION MOTOR RESOLVER

COMPONENT PARTS

< SYSTEM DESCRIPTION >

The traction motor resolver is located coaxially with the traction motor, and detects the rotor rotation angle. The rotation angle is sent to the motor controller.

CAUTION:

If the traction motor inverter or traction motor is replaced, be sure to perform writing of the traction motor resolver offset. Refer to [TMS-44, "Description"](#).

TRACTION MOTOR TEMPERATURE SENSOR

The traction motor temperature sensor detects the temperature of the stator inside the traction motor, and sends that temperature information to the motor controller.

High Voltage Warning Label

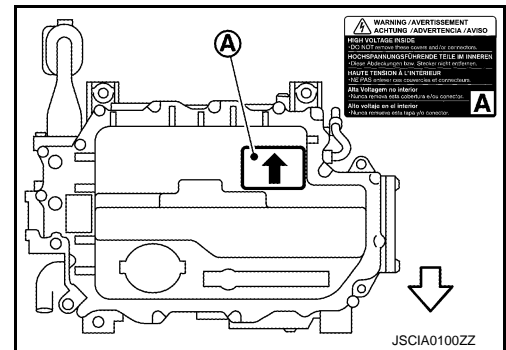
INFOID:000000006998331

- High voltage warning label is affixed to each of the following component parts.
- When replacing component parts make sure to affix the label in the original position.

TRACTION MOTOR INVERTER

The label (A) is affixed to the top of traction motor inverter.

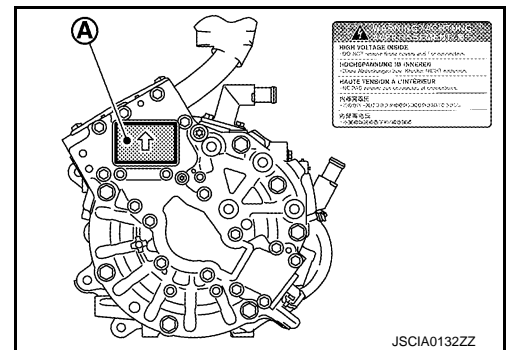
- ⇐ : Vehicle front
⇐ : Direction of the label



TRACTION MOTOR

The label (A) is affixed to the right side of traction motor.

- ⇐ : Direction of the label



STRUCTURE AND OPERATION

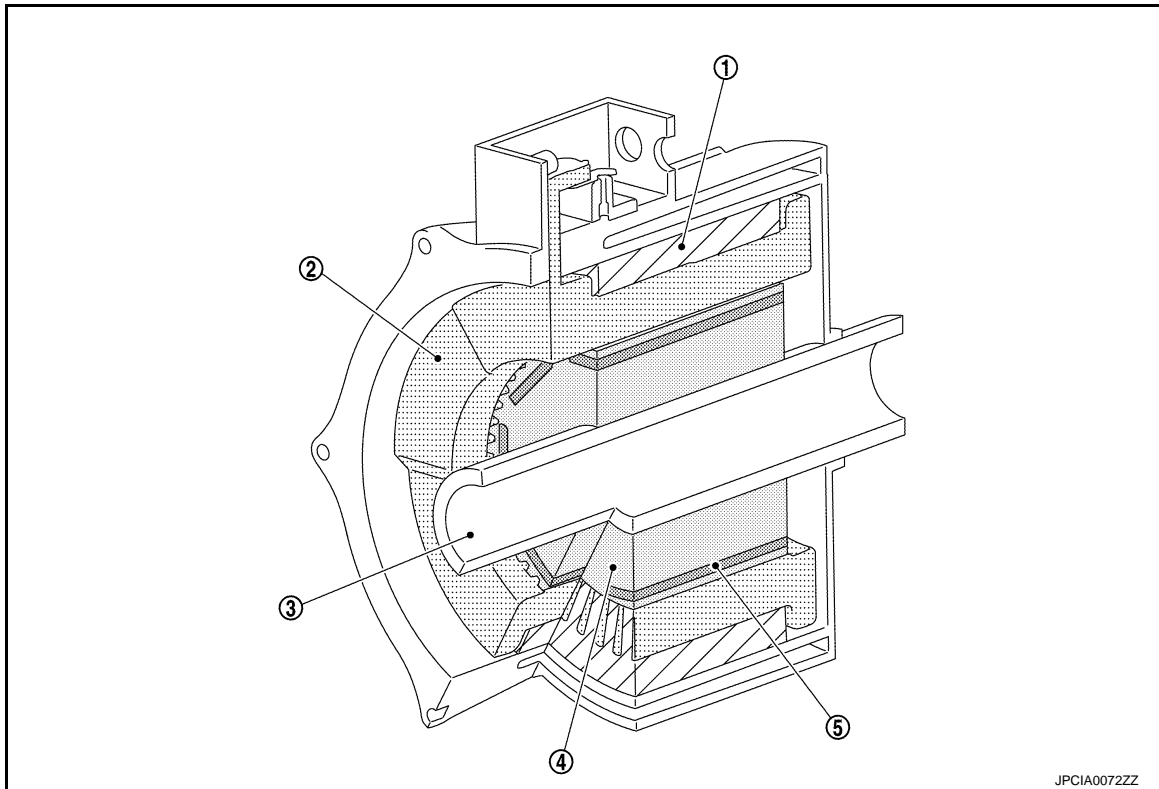
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STRUCTURE AND OPERATION

Structural Drawing

INFOID:000000006998332

MOTOR MECHANISM (DIAGRAM)



1. Stator core

2. Coil

3. Shaft

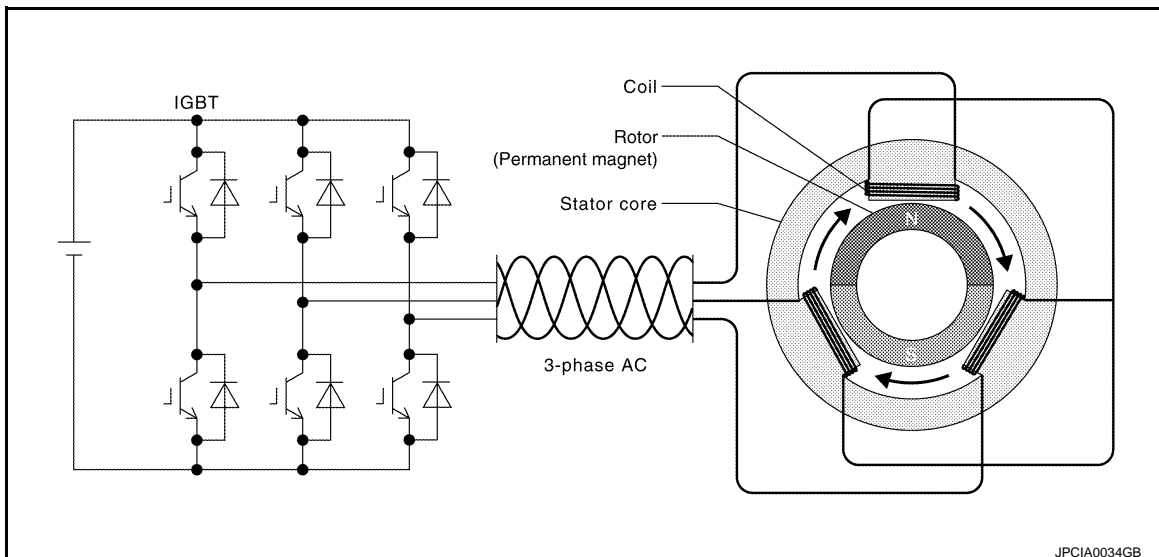
4. Rotor core

5. Permanent magnet

OPERATION DESCRIPTION

INFOID:000000006998333

OPERATION PRINCIPLE



- When 3-phase AC current is applied to the stator coil, a rotating magnetic field is generated. This rotating magnetic field pulls on the permanent magnet inside the rotor core, generating rotational torque that is syn-

STRUCTURE AND OPERATION

< SYSTEM DESCRIPTION >

chronized with the rotating magnetic field. The generated torque is approximately proportional to the current, and the rotating speed depends on the frequency of the 3-phase current.

- In order to generate optimal rotor rotation, judgments regarding the position (angle) of the permanent magnet within the rotor core and the timing of current application to the coil are necessary. For this purpose, the traction motor resolver and current sensor are used in order to continually detect the rotating position of the rotor and control the timing of current application to the coil.

SYSTEM

< SYSTEM DESCRIPTION >

SYSTEM

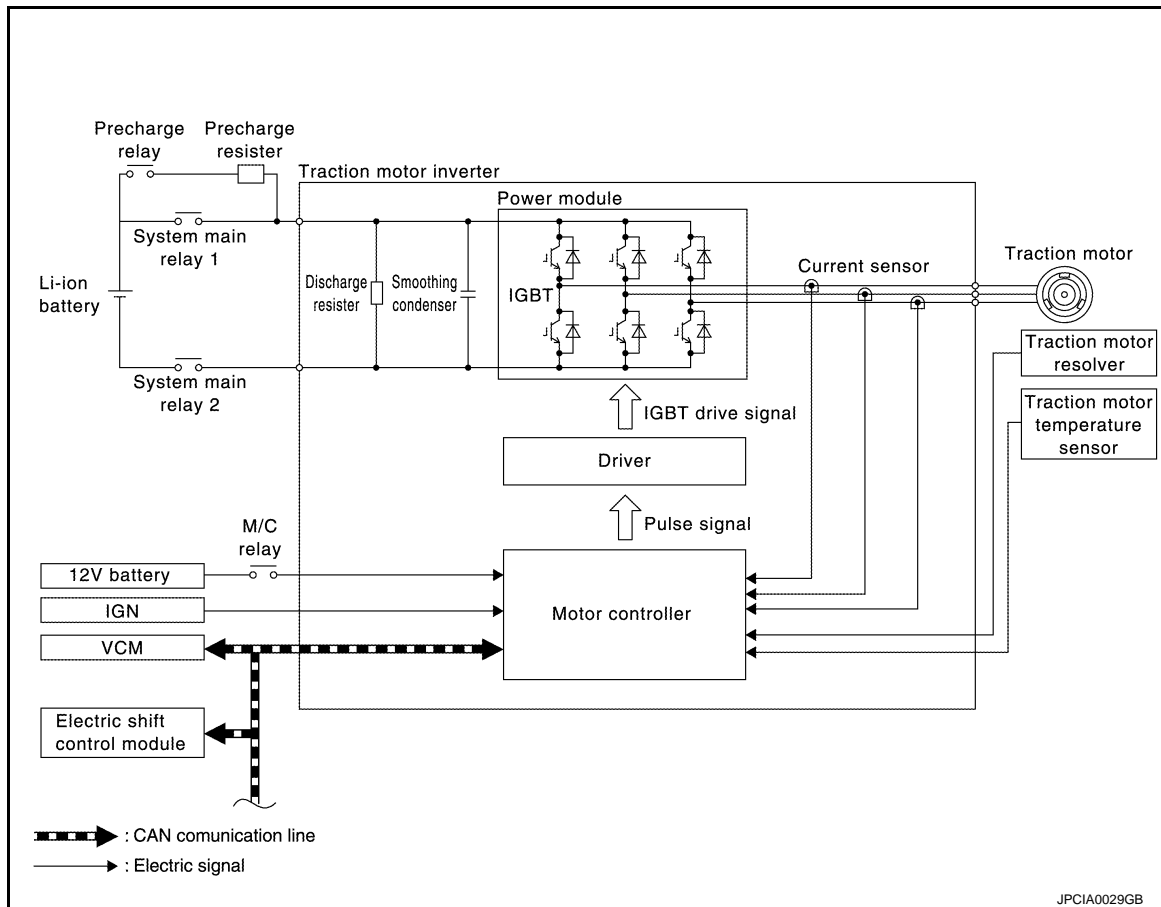
TRACTION MOTOR INVERTER

TRACTION MOTOR INVERTER : System Description

INFOID:0000000006998334

- The traction motor inverter controls the traction motor based on the target motor torque signal transmitted by EV system CAN from the VCM.
- Traction motor inverter converts DC power from Li-ion battery to AC power, and drives traction motor accurately based on resolver detection signal and current sensor detection signal.
- At deceleration, traction motor is used as generator. It converts kinetic energy generated by rotary motion of tires (AC power) to electric energy (DC power) and charges Li-ion battery.
- If malfunction is detected, the system enters fail-safe mode. Refer to [TMS-32, "Fail-Safe"](#).

SYSTEM DIAGRAM



INPUT/OUTPUT SIGNAL

SYSTEM

< SYSTEM DESCRIPTION >

Item	Signal name
VCM	<ul style="list-style-type: none">• Transmits mainly the following signals to VCM via EV system CAN.<ul style="list-style-type: none">- Motor speed signal- Motor torque limit signal- Motor discharge status signal- High voltage power supply preparation completion signal- Input high voltage signal• Receives mainly the following signals from VCM via EV system CAN.<ul style="list-style-type: none">- Target motor torque signal- Pulse signal OFF signal- High voltage power supply status signal- System cut off signal- Vibration control switching signal- Motor charge preparation request signal- Motor discharge request signal- Regenerative torque command signal- Shift position signal
Electric shift control module	<ul style="list-style-type: none">• Receives mainly the following signal from electric shift control module via EV system CAN.<ul style="list-style-type: none">- Shift position signal

TRACTION MOTOR INVERTER : Circuit Diagram

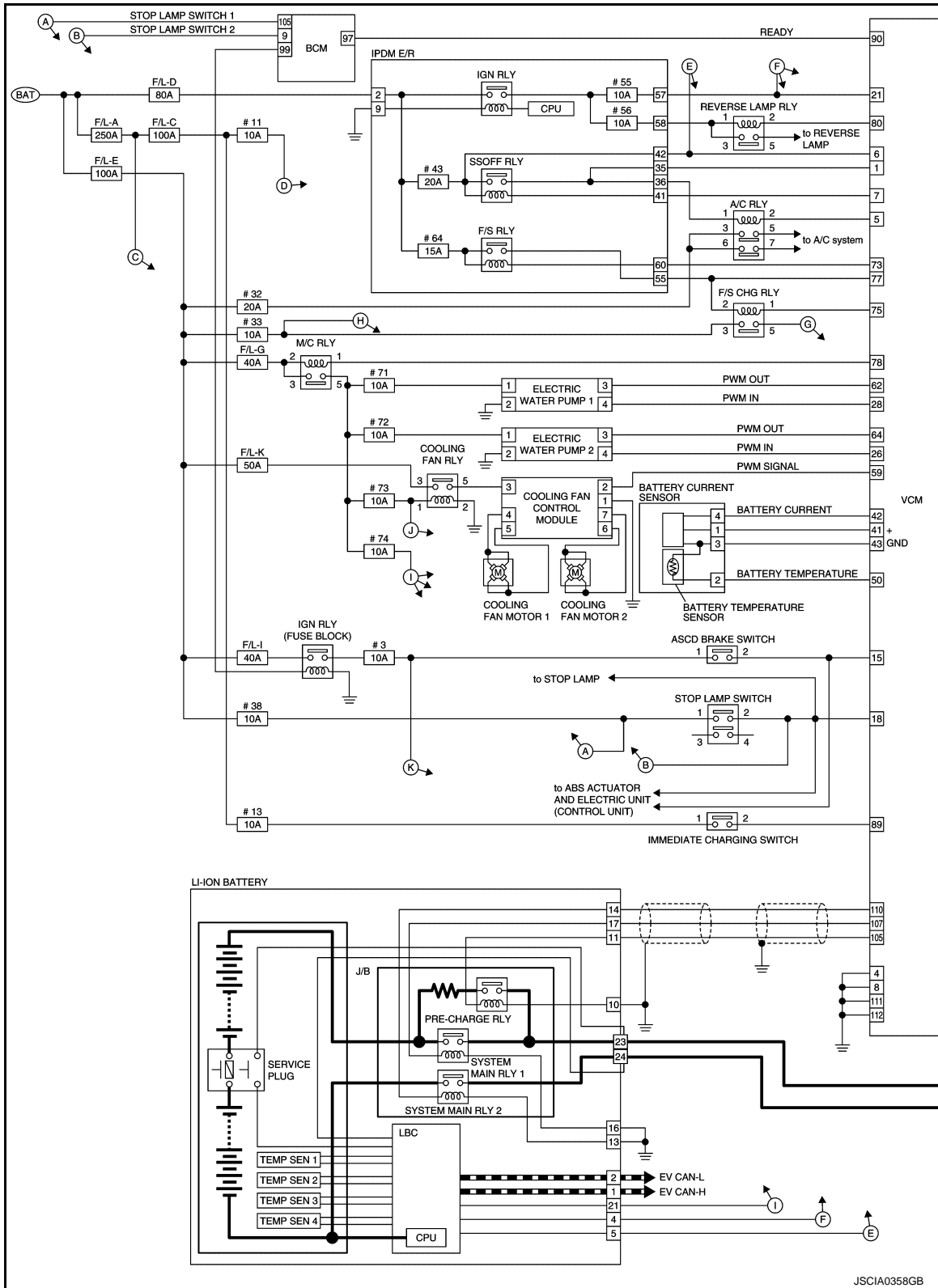
INFOID:000000006998335

NOTE:

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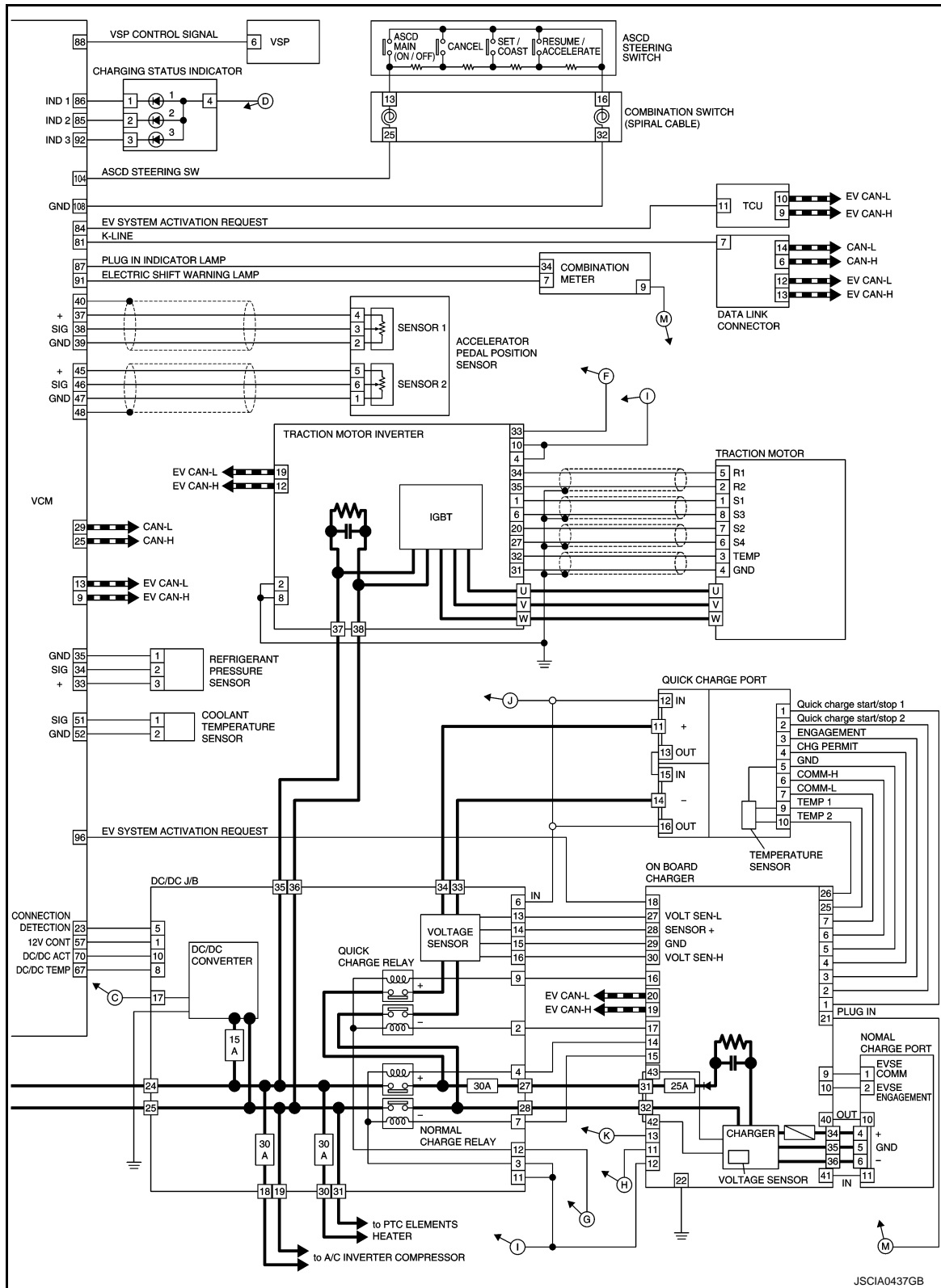
< SYSTEM DESCRIPTION >

For Li-ion battery heater circuit, refer to [EVB-250, "Circuit Diagram" \(TYPE 2\)](#), [EVB-716, "Circuit Diagram" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).



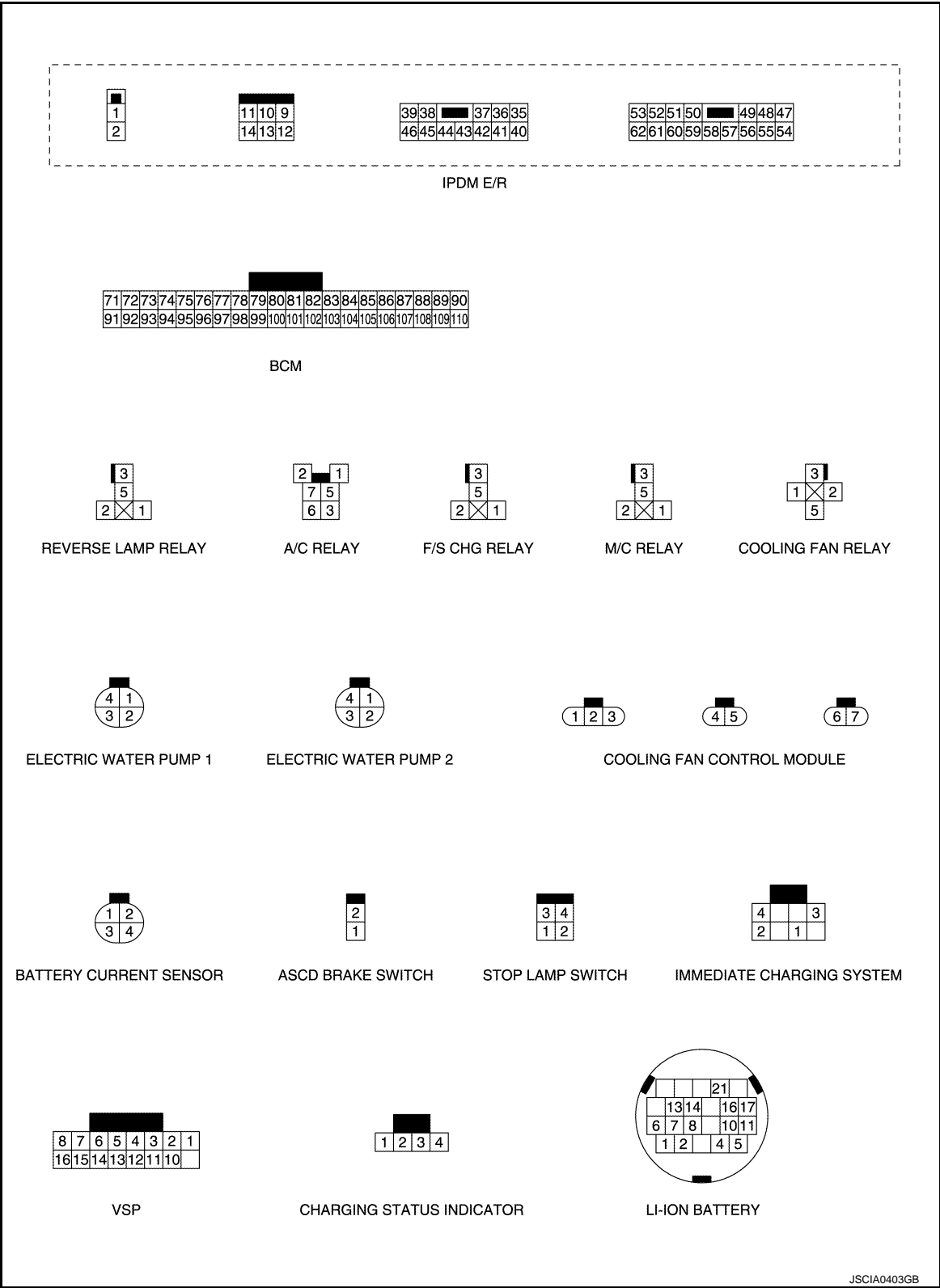
SYSTEM

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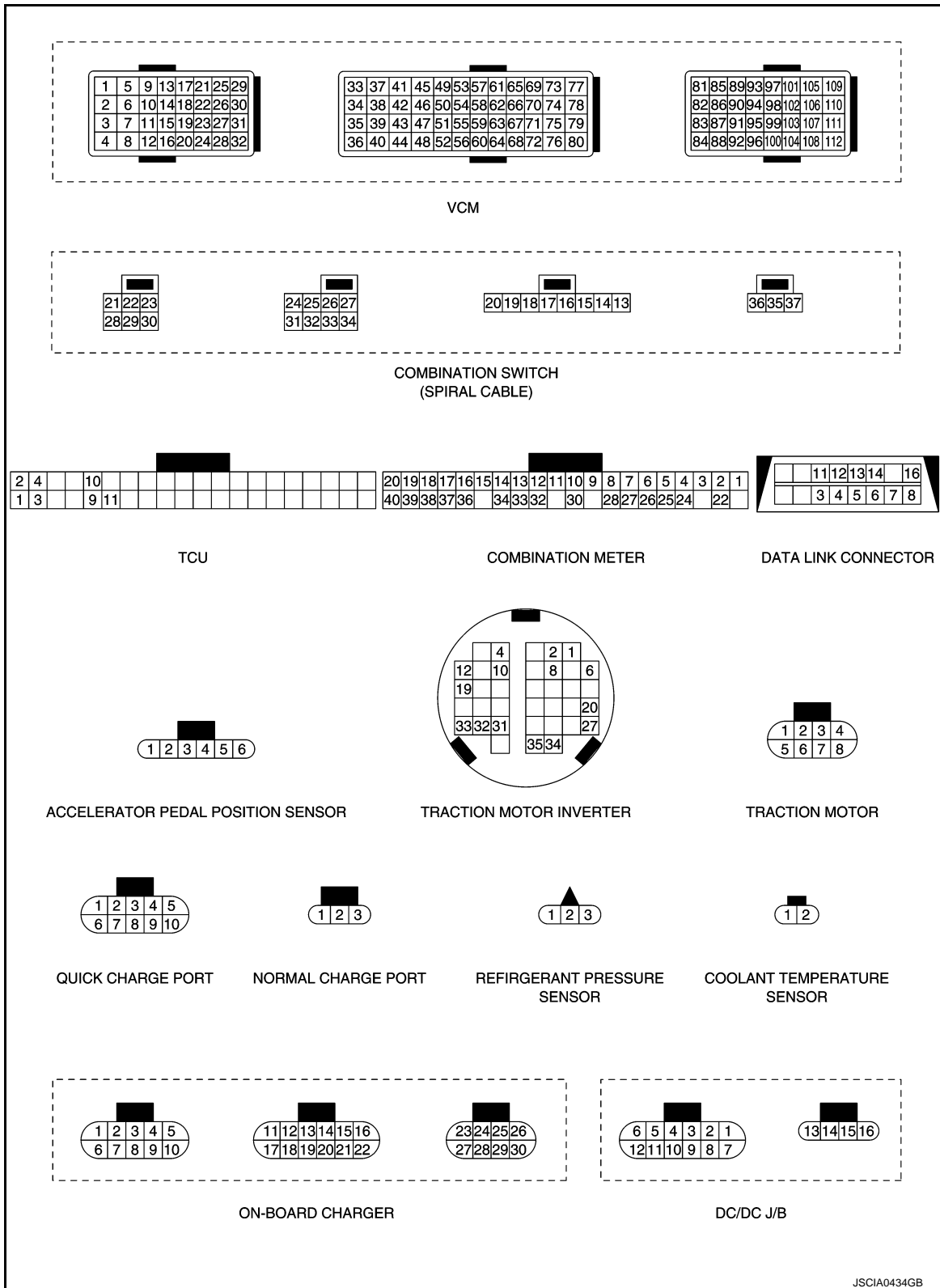
SYSTEM

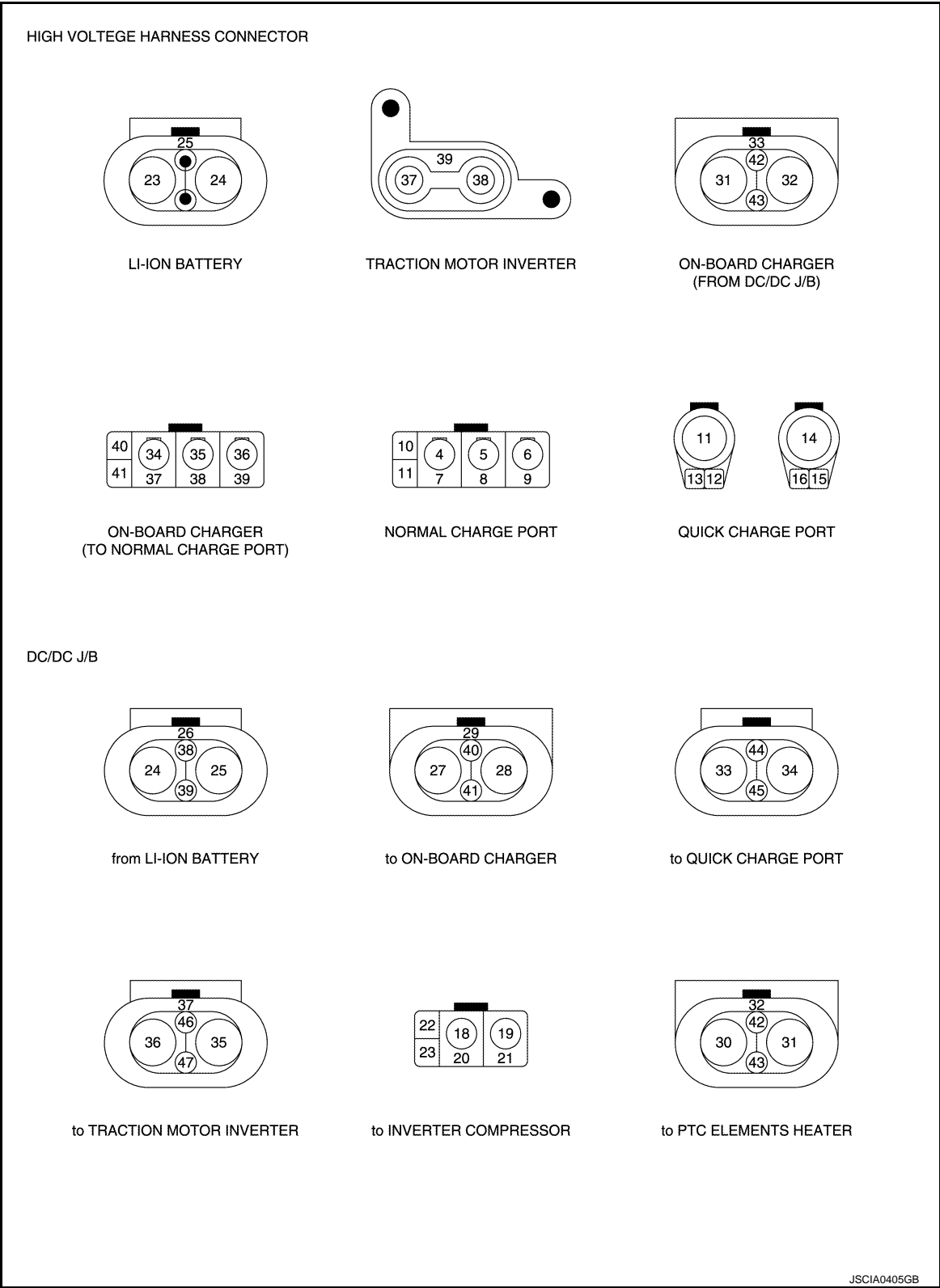
< SYSTEM DESCRIPTION >



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SYSTEM

< SYSTEM DESCRIPTION >

TRACTION MOTOR INVERTER : Fail-Safe

INFOID:000000006998336

DTC	Vehicle behavior
P0A1B	Either of following status is observed. <ul style="list-style-type: none"> No impact to vehicle behavior Stops drive control of traction motor Stops drive control of traction motor, and requires system main relay OFF to VCM Limits the maximum torque of traction motor to 10%
P0A2C	Limits the maximum torque of traction motor to 40%
P0A2D	Limits the maximum torque of traction motor to 40%
P0A2F	Stops drive control of traction motor
P0A3C	Stops drive control of traction motor
P0A3F	Stops drive control of traction motor
P0A44	Stops drive control of traction motor
P0A78	Stops drive control of traction motor
P0A8D	Stops drive control of traction motor, and requires system main relay OFF to VCM
P0AEF	Stops drive control of traction motor
P0AF0	Stops drive control of traction motor
P0BE6	Stops drive control of traction motor
P0BEA	Stops drive control of traction motor
P0BEE	Stops drive control of traction motor
P0BFD	Stops drive control of traction motor
P0C79	Stops drive control of traction motor, and requires system main relay OFF to VCM
P318E	It can stop the drive control of traction motor
P3193	—
P3197	Either of following status is observed. <ul style="list-style-type: none"> Stops drive control of traction motor Limits the maximum torque of traction motor to 0%
P3199	It can stop the drive control of traction motor
P319E	—
P31A2	Either of following status is observed. <ul style="list-style-type: none"> Stops drive control of traction motor Limits the maximum torque of traction motor to 0%
P31A4	It can stop the drive control of traction motor
P31A9	—
P31AD	Either of following status is observed. <ul style="list-style-type: none"> Stops drive control of traction motor Limits the maximum torque of traction motor to 0%
P3240	Stops drive control of traction motor
P3241	Stops drive control of traction motor
P3244	—
P3245	—
P3246	Stops drive control of traction motor, and requires system main relay OFF to VCM
P3247	Stops drive control of traction motor
P3248	Stops drive control of traction motor, and requires system main relay OFF to VCM
P3249	Stops drive control of traction motor, and requires system main relay OFF to VCM
P324A	Stops drive control of traction motor, and requires system main relay OFF to VCM
P324D	Stops drive control of traction motor, and requires system main relay OFF to VCM

SYSTEM

< SYSTEM DESCRIPTION >

DTC	Vehicle behavior
P324F	Stops drive control of traction motor, and requires system main relay OFF to VCM
P3252	Limits the maximum torque of traction motor to 50%
P325A	—
P325B	—
P325C	—
P325D	Limits the maximum torque of traction motor to 10%
P325E	—
P325F	—
U1000	—

TRACTION MOTOR INVERTER : Protection Control

INFOID:000000006998337

When temperature of traction motor inverter or traction motor components rises, the traction motor inverter temporarily enters a protective control state in order to protect the system. It automatically returns to the normal status if the safety is secured.

Condition	Navigation display	Control	Normal return condition
Traction motor is overheated	Exists	Traction motor output torque is limited according to the traction motor temperature.	Traction motor temperature drops
IGBT high temperatures seen when traction motor speed is extremely low	Does not exist	IGBT switching frequency is reduced. NOTE: Traction motor electromagnetic noise increases.	<ul style="list-style-type: none"> IGBT temperature drops Traction motor speed increases
IGBT is overheated	Exists	Traction motor output torque is limited according to the IGBT temperature.	IGBT temperature drops
Smoothing condenser is overheated	Exists	Traction motor output torque is limited according to the smoothing condenser temperature.	Smoothing condenser temperature drops

MOTOR POWER CONTROL

MOTOR POWER CONTROL : System Description

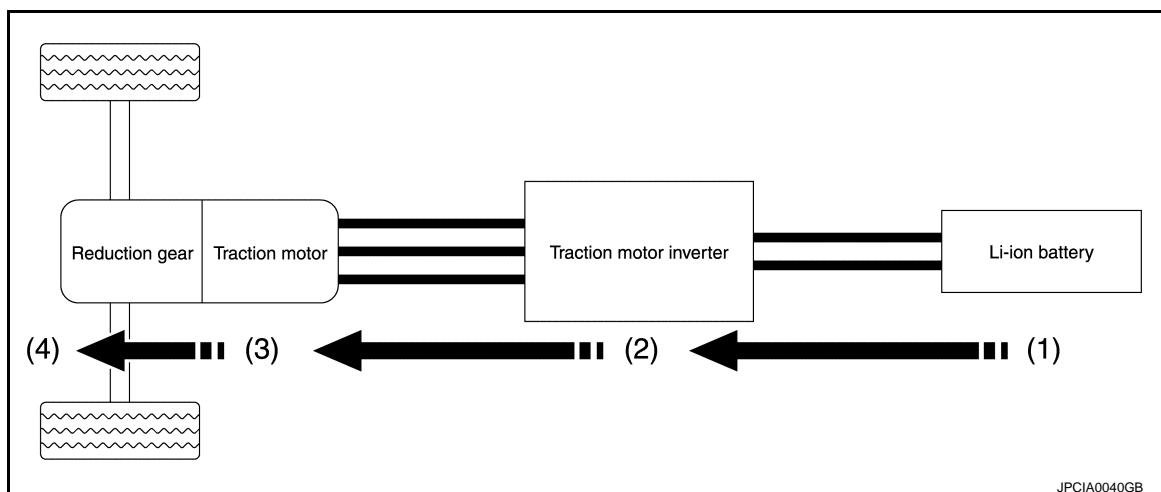
INFOID:000000006998338

The traction motor inverter applies AC power to the traction motor according to the target motor torque signal calculated by VCM in order to generate drive force.

MOTOR POWER CONTROL : Operating Principle

INFOID:000000006998339

Flow of energy



SYSTEM

< SYSTEM DESCRIPTION >

When the traction motor inverter receives the target motor torque signal from the VCM via EV system CAN.

(4)		(3)		(2)		(1)
The drive torque from the traction motor is output as kinetic energy.	⇐	The AC power from the traction motor inverter is converted to magnetic energy and a rotating magnetic field is created in order to generate drive torque.	⇐	The traction motor inverter (IGBT) switches in order to convert the DC power from the Li-ion battery to AC power.	⇐	The DC power from the Li-ion battery is input to the traction motor inverter.

MOTOR REGENERATION CONTROL

MOTOR REGENERATION CONTROL : System Description

INFOID:000000006998340

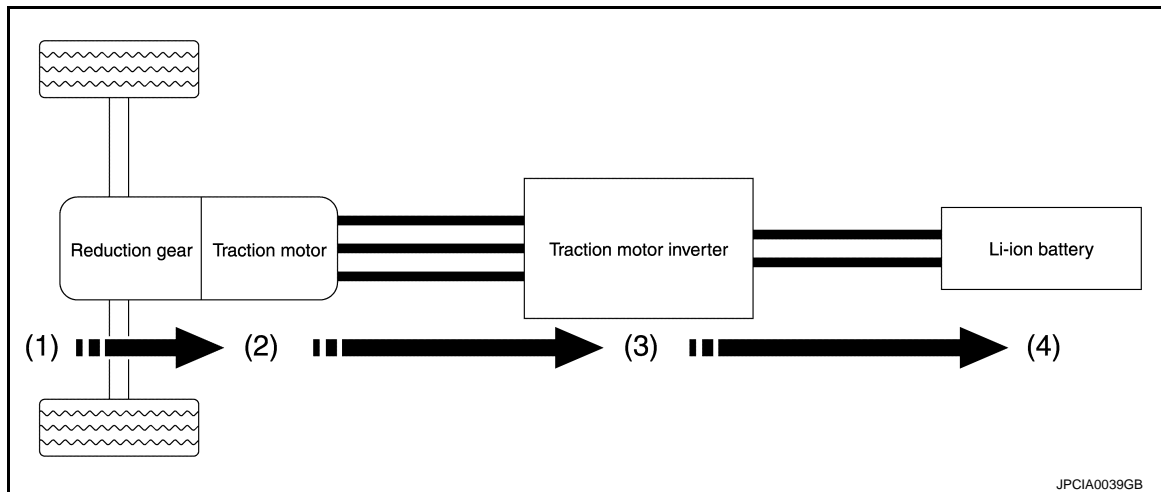
During deceleration, the traction motor inverter drives the traction motor to function as a generator based on the regenerative torque command signal sent via EV system CAN from the VCM, converting the kinetic torque generated by rotation of the tires into electrical energy. The converted electrical energy charges the Li-ion battery.

The regenerative torque that is generated when the traction motor is driven as a generator can be used as braking force, acting similar to engine braking and reducing the burden on the service brakes.

MOTOR REGENERATION CONTROL : Operating Principle

INFOID:000000006998341

Flow of energy



When the traction motor inverter receives the regenerative torque command signal from the VCM via EV system CAN.

(1)		(2)		(3)		(4)
The kinetic energy generated by rotation of the tires operates the traction motor as a generator.	⇒	Rotation of the traction motor generates AC power.	⇒	The traction motor inverter (IGBT) switches in order to convert the AC power from the traction motor to DC power.	⇒	The DC power regenerated by the traction motor inverter is used to charge the Li-ion battery.

DIAGNOSIS SYSTEM (TRACTION MOTOR INVERTER)

< SYSTEM DESCRIPTION >

DIAGNOSIS SYSTEM (TRACTION MOTOR INVERTER)

DIAGNOSIS DESCRIPTION

DIAGNOSIS DESCRIPTION : System Description

INFOID:0000000006998342

This is an on-board trouble diagnosis system which automatically detects malfunction. Detected malfunction is memorized in ECU as DTC. Diagnosis information can be confirmed using CONSULT.

DIAGNOSIS DESCRIPTION : DTC and Freeze Frame Data

INFOID:0000000006998343

NOTE:

Operate the power switch from OFF to ON. This operation is defined as 1 trip.

- DTC (P0A1B, P0A8D, P0C79, etc.) is specified by SAE J2012/ISO 15031-6.
- Traction motor inverter memorizes DTC and freeze frame data when malfunction is detected.
- Traction motor inverter can memorize plural DTCs but only 1 set of freeze frame data.
- Freeze frame data is not updated even if a different DTC is detected in another trip. The first memorized data is kept as freeze frame data.
- The procedure to erase DTC from traction motor inverter memory is described in "How to Erase DTC". Refer to [TMS-27, "CONSULT Function"](#).

DIAGNOSIS DESCRIPTION : Counter System

INFOID:0000000006998344

Counter system counts up at every operation of power switch from OFF to ON under condition that the same malfunction is not detected. On the other hand, if the same DTC as memorized one is detected again, the count is reset and the counter system counts up again from "0".

CONSULT Function

INFOID:0000000006998345

APPLICATION ITEM

Item	Function
All DTC Reading	Display all DTCs or diagnostic items that all ECUs are recording and judging.
Work Support	This mode enables a technician to adjust some devices faster and more accurately.
Self Diagnostic Results	Retrieve DTC from ECU and display diagnostic items.
Data Monitor	Monitor the input/output signal of the control unit in real time.
CAN Diagnosis	This mode displays a network diagnosis result about CAN by diagram.
CAN Diagnosis Support Monitor	It monitors the status of CAN communication.
ECU Identification	Display the ECU identification number (part number etc.) of the selected system.

WORK SUPPORT

Item	Description
RESOLVER WRITE	Performs writing of traction motor resolver offset.
CLEAR OUTPUT LIMIT REASON	Resets output limit history of traction motor and traction motor inverter. NOTE: Resets "OUTPUT LIMIT MOTOR TEMP" and "OUTPUT LIMIT INV TEMP" values of data monitor.

SELF DIAGNOSTIC RESULTS

Display Item List

Refer to [TMS-36, "DTC Index"](#).

How to Read DTC

DTC is displayed on "Self Diagnostic results" of CONSULT.

When DTC is currently detected, "CRNT" is displayed. If "PAST" is displayed, it shows a malfunction occurred in the past. The trip number of drive without malfunction of concerned DTC can be confirmed with "IGN counter" inside "FFD".

DIAGNOSIS SYSTEM (TRACTION MOTOR INVERTER)

< SYSTEM DESCRIPTION >

How to Erase DTC

NOTE:

If the power switch is kept ON after repair operation, operate the power switch to OFF. Operate the power switch to ON again after waiting at least 10 seconds.

1. Touch "MOTOR CONTROL" of CONSULT.
2. Touch "Self Diagnostic Result".
3. Touch "Erase". (DTC memorized in electric traction motor inverter is erased.)

IGN Counter

IGN counter is displayed in "FFD". It displays the number of operations of power switch from OFF to ON after DTC recovery to normal.

- If malfunction (DTC) is currently detected, "0" is displayed.
- The displayed number counts up at each operation of power switch from OFF to ON after recovery to normal, such as 1 → 2 → 3...38 → 39.
- When the number reaches to 40, DTC is erased.

NOTE:

The counter display of "40" cannot be checked.

FREEZE FRAME DATA (FFD)

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

Monitored item (Unit)	Remarks
NUMBER OF DTC	Displays the number of DTCs detected
DTC	Displays the DTC which caused FFD memory
12V POWER VOLTAGE (V)	Displays 12V battery power voltage input to traction motor inverter
CODE IN INVERTER	Displays the trouble code inside traction motor inverter
RESOLVER OFFSET VALUES (1st and 2nd symbols)	Displays 1st and 2nd symbols of traction motor resolver offset value written in traction motor inverter
RESOLVER OFFSET VALUES (3rd and 4th symbols)	Displays 3rd and 4th symbols of traction motor resolver offset value written in traction motor inverter
RESOLVER OFFSET VALUES (5th and 6th symbols)	Displays 5th and 6th symbols of traction motor resolver offset value written in traction motor inverter
RESOLVER OFFSET VALUES (7th and 8th symbols)	Displays 7th and 8th symbols of traction motor resolver offset value written in traction motor inverter
RESOLVER OFFSET VALUES (9th and 10th symbols)	Displays 9th and 10th symbols of traction motor resolver offset value written in traction motor inverter
VIBRATION COMMAND TORQ (Nm)	Displays the vibration control torque
DIAGNOSIS START HISTORY	Displays if DTC detection mode is started
DPA REQUEST	Displays the request status of DPA
TORQUE LIMIT RATE (%)	Displays the output torque limit rate
TORQUE LIMIT (UPPER) (Nm)	Displays the torque limitation (upper) signal value from VCM via EV system CAN
TORQUE LIMIT (LOWER) (Nm)	Displays the torque limitation (lower) signal value from VCM via EV system CAN
MOTOR TEMPERATURE (°C or °F)	Displays the temperature of traction motor
MAX MOTOR TEMPERATURE (°C or °F)	Displays the highest temperature of traction motor detected
MIN MOTOR TEMPERATURE (°C or °F)	Displays the lowest temperature of traction motor detected
No. OF MOTOR OVER HEAT	Displays the number of times that traction motor temperature exceeds the standard value
INVERTER TEMPERATURE 2 (°C or °F)	Displays the inside temperature of traction motor inverter
MAX INV TEMPERATURE (°C or °F)	Displays the highest temperature of traction motor inverter detected
MIN INV TEMPERATURE (°C or °F)	Displays the lowest temperature of traction motor inverter detected
No. OF INV OVER HEAT	Displays the number of times that traction motor inverter temperature exceeds the standard value

DIAGNOSIS SYSTEM (TRACTION MOTOR INVERTER)

< SYSTEM DESCRIPTION >

Monitored item (Unit)		Remarks
INVERTER TEMPERATURE 5	(°C or °F)	Displays the inside temperature of traction motor inverter
MAX INV TEMPERATURE 5	(°C or °F)	Displays the highest temperature of traction motor inverter detected
MIN INV TEMPERATURE 5	(°C or °F)	Displays the lowest temperature of traction motor inverter detected
No. OF INV OVER HEAT 5		Displays the number of times that traction motor inverter temperature exceeds the standard value
INVERTER TEMPERATURE 4	(°C or °F)	Displays the inside temperature of traction motor inverter
MAX INV TEMPERATURE 4	(°C or °F)	Displays the highest temperature of traction motor inverter detected
MIN INV TEMPERATURE 4	(°C or °F)	Displays the lowest temperature of traction motor inverter detected
No. OF INV OVER HEAT 4		Displays the number of times that traction motor inverter temperature exceeds the standard value
INVERTER TEMPERATURE 1	(°C or °F)	Displays the inside temperature of traction motor inverter
INVERTER TEMPERATURE 3	(°C or °F)	Displays the inside temperature of traction motor inverter
INV INPUT HIGH VOLTAGE	(V)	Displays high voltage input to traction motor inverter
Li-ion BAT TOTAL VOLTAGE	(V)	Displays the Li-ion battery voltage from Li-ion battery controller via EV system CAN
COMMAND TORQUE	(Nm)	Displays the torque command value from VCM via EV system CAN
INSIDE COMMAND TORQUE	(Nm)	Displays the torque command value in motor controller
MOTOR SPEED	(rpm)	Displays the traction motor speed
COMMAND MTR d CURRENT	(A)	Displays the command value of current (d-axis) of traction motor
MOTOR d CURRENT	(A)	Displays the detected value of current (d-axis) of traction motor
COMMAND MTR q CURRENT	(A)	Displays the command value of current (q-axis) of traction motor
MOTOR q CURRENT	(A)	Displays the detected value of current (q-axis) of traction motor
COMMAND MTR d VOLTAGE	(V)	Displays the command value of voltage (d-axis) of traction motor
COMMAND MTR q VOLTAGE	(V)	Displays the command value of voltage (q-axis) of traction motor
3 PHASE SUM	(A)	Displays the sum of detected values of current (U-phase, V-phase, and W-phase) of traction motor
U PHASE CURRENT	(A)	Displays the U-phase current detected value
V PHASE CURRENT	(A)	Displays the V-phase current detected value
W PHASE CURRENT	(A)	Displays the W-phase current detected value
PHASE ANGLE	(deg)	Displays the turning angle position of rotor
SEQUENCE MODE		Displays the sequence number in motor controller
CARRIER FREQUENCY		Displays the carrier frequency
IGBT HIGH TEMP DETECT		Displays the status of high temperature detection of IGBT
SLEEP REFUSE SIGNAL		Displays the status of sleep refuse
FAIL-SAFE STATUS		Displays the fail safe status of traction motor inverter
DISCHARGE STATUS		Displays that high voltage circuit is under discharge
MOTOR CONTROL STATUS		Displays the set status of traction motor control
CHARGE JUDGE		Displays the charge status of high voltage circuit
CHARGE PERMIT		Displays the charge permission status
RESTART		Displays the restart status of traction motor inverter
HIGH VOLTAGE SUPPLY		Displays the high voltage supply status from VCM via EV system CAN
START/STOP REQUEST		Displays the start/stop request status from VCM via EV system CAN
CHARGE RELAY READY REQ		Displays the start request status of charge judgement of high voltage circuit from VCM via EV system CAN
SHIFT POSITION (VCM)		Displays the shift position from VCM via EV system CAN

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DIAGNOSIS SYSTEM (TRACTION MOTOR INVERTER)

< SYSTEM DESCRIPTION >

Monitored item (Unit)	Remarks
SHIFT POSITION (E-SHIFT)	Displays the shift position from electric shift control module via EV system CAN
PWM OFF REQUEST	Displays the pulse signal off request status from VCM via EV system CAN
SYSTEM CUT OFF COMPLETE	Displays the system cut off status from VCM via EV system CAN
DISCHARGE REQUEST	Displays the discharge request status from VCM via EV system CAN
VIBRATION CONT REQUEST	Displays the vibration control switching request status from VCM via EV system CAN
DIAG PROHIBIT	Displays the CAN diagnosis inhibition status from VCM via EV system CAN
WAKE UP SLEEP COMMAND	Displays the wake up/sleep request status from VCM via EV system CAN

DATA MONITOR

Monitored item (Unit)	Remarks
MOTOR TEMPERATURE (°C or °F)	Displays the temperature of traction motor
INVERTER TEMPERATURE 2 (°C or °F)	Displays the inside temperature of traction motor inverter
INVERTER TEMPERATURE 4 (°C or °F)	Displays the inside temperature of traction motor inverter
12V POWER VOLTAGE (V)	Displays 12V battery power voltage input to traction motor inverter
INV INPUT HIGH VOLTAGE (V)	Displays high voltage input to traction motor inverter
COMMAND TORQUE (Nm)	Displays the torque command value from VCM via EV system CAN
MOTOR SPEED (rpm)	Displays the traction motor speed
SEQUENCE MODE	Displays the sequence number in motor controller
OUTPUT LIMIT MOTOR TEMP	<ul style="list-style-type: none"> Displays presence of output limit due to traction motor temperature increase after last deletion of output limit history Values can be reset using "CLEAR OUTPUT LIMIT REASON" of work support
OUTPUT LIMIT INV TEMP	<ul style="list-style-type: none"> Displays presence of output limit due to temperature increase inside traction motor inverter after last deletion of output limit history Values can be reset using "CLEAR OUTPUT LIMIT REASON" of work support
CARRIER FREQUENCY	Displays the carrier frequency

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

ECU DIAGNOSIS INFORMATION

TRACTION MOTOR INVERTER

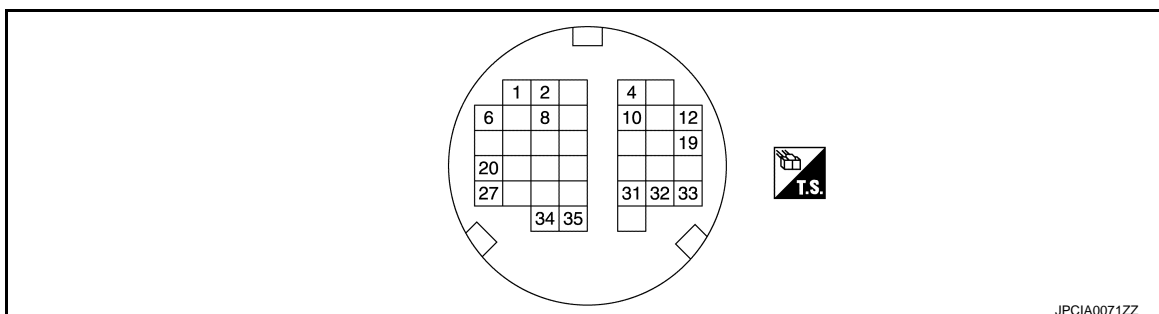
Reference Value

INFOID:000000006998346

CONSULT DATA MONITOR STANDARD VALUE

Monitor item	Condition	Value / Status (Approx.)
MOTOR TEMPERATURE	READY (stop the vehicle)	Almost same as coolant temperature after temperature saturation. [approximately within 10°C (50°F) of coolant temperature]
	During driving	The value changes along with acceleration/deceleration.
INVERTER TEMPERATURE 2	READY (stop the vehicle)	Almost same as coolant temperature after temperature saturation. [approximately within 10°C (50°F) of coolant temperature]
	During driving	The value changes along with acceleration/deceleration.
INVERTER TEMPERATURE 4	READY (stop the vehicle)	Almost same as coolant temperature after temperature saturation. [approximately within 10°C (50°F) of coolant temperature]
	During driving	The value changes along with acceleration/deceleration.
12V POWER VOLTAGE	Power switch ON	9 – 16 V
INV INPUT HIGH VOLTAGE	READY (stop the vehicle) and during driving	240 – 403 V
COMMAND TORQUE	During driving	The value changes along with acceleration/deceleration.
MOTOR SPEED	READY (stop the vehicle)	0 rpm
	During driving	The value changes along with acceleration/deceleration.
SEQUENCE MODE	READY (stop the vehicle)	11
OUTPUT LIMIT MOTOR TEMP	When the vehicle has history of output limit	Yes
	When output limit is reset	None
OUTPUT LIMIT INV TEMP	When the vehicle has history of output limit	Yes
	When output limit is reset	None
CARRIER FREQUENCY	READY (stop the vehicle)	5k

TERMINAL LAYOUT



PHYSICAL VALUES

CAUTION:

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

- Check them with vehicle side harness connector, removing traction motor inverter connector. Never touch terminals of traction motor inverter side connector at this operation.
- If power switch is pushed ON with traction motor inverter connector removed, other control modules might detect malfunction of traction motor inverter.

Terminal No. (Color)		Description		Condition	Value (Approx.)
+	-	Signal name	Input/ Output		
1 (B)	6 (W)	Traction motor resolver signal (S1 – S3)	Input	Power switch OFF	27 – 49 Ω
2 (B)	Ground	Ground	—	Always	0 V
4 (G)	Ground	Power supply (BAT)	—	Power switch ON	9 – 16 V
8 (B)	Ground	Ground	—	Always	0 V
10 (G)	Ground	Power supply (BAT)	—	Power switch ON	9 – 16 V
12 (L)	—	EV system CAN-H	Input/ Output	—	—
19 (G)	—	EV system CAN-L	Input/ Output	—	—
20 (L)	27 (P)	Traction motor resolver signal (S2 – S4)	Input	Power switch OFF	27 – 49 Ω
31 (O)	32 (B/P)	Traction Motor Tem- perature Sensor	Input	Power switch OFF	Within ± 50% of temperature characteristics diagram
33 (LG)	Ground	Power supply (IGN)	—	Power switch ON	9 – 16 V
				Power switch OFF	0 V
34 (R)	35 (G)	Traction motor resolver signal (R1 – R2)	Output	Power switch OFF	13 – 23 Ω

Fail-Safe

INFOID:000000006998347

DTC	Vehicle behavior
P0A1B	Any of the following statuses is observed. <ul style="list-style-type: none"> • No impact to vehicle behavior • Stops drive control of traction motor • Stops drive control of traction motor, and requires system main relay OFF to VCM • Limits the maximum torque of traction motor to 10%
P0A2C	Limits the maximum torque of traction motor to 40%
P0A2D	Limits the maximum torque of traction motor to 40%
P0A2F	Stops drive control of traction motor
P0A3C	Stops drive control of traction motor

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

DTC	Vehicle behavior	
P0A3F	Stops drive control of traction motor	A
P0A44	Stops drive control of traction motor	
P0A78	Stops drive control of traction motor	B
P0A8D	Stops drive control of traction motor, and requires system main relay OFF to VCM	
P0AEF	Stops drive control of traction motor	
P0AF0	Stops drive control of traction motor	TMS
P0BE6	Stops drive control of traction motor	
P0BEA	Stops drive control of traction motor	
P0BEE	Stops drive control of traction motor	D
P0BFD	Stops drive control of traction motor	
P0C79	Stops drive control of traction motor, and requires system main relay OFF to VCM	E
P318E	It can stop the drive control of traction motor	
P3193	—	F
P3197	Either of the following statuses is observed. • Stops drive control of traction motor • Limits the maximum torque of traction motor to 0%	
P3199	It can stop the drive control of traction motor	G
P319E	—	
P31A2	Either of the following statuses is observed. • Stops drive control of traction motor • Limits the maximum torque of traction motor to 0%	H
P31A4	It can stop the drive control of traction motor	
P31A9	—	I
P31AD	Either of the following statuses is observed. • Stops drive control of traction motor • Limits the maximum torque of traction motor to 0%	J
P3240	Stops drive control of traction motor	
P3241	Stops drive control of traction motor	K
P3244	—	
P3245	—	
P3246	Stops drive control of traction motor, and requires system main relay OFF to VCM	L
P3247	Stops drive control of traction motor	
P3248	Stops drive control of traction motor, and requires system main relay OFF to VCM	M
P3249	Stops drive control of traction motor, and requires system main relay OFF to VCM	
P324A	Stops drive control of traction motor, and requires system main relay OFF to VCM	
P324D	Stops drive control of traction motor, and requires system main relay OFF to VCM	N
P324F	Stops drive control of traction motor, and requires system main relay OFF to VCM	
P3252	Limits the maximum torque of traction motor to 50%	O
P325A	—	
P325B	—	
P325C	—	P
P325D	Limits the maximum torque of traction motor to 10%	
P325E	—	
P325F	—	
U1000	—	

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

Protection Control

INFOID:000000006998348

When temperature of traction motor inverter or traction motor components rises, the traction motor inverter temporarily enters a protective control state in order to protect the system. It automatically returns to the normal status if the safety is secured.

Condition	Control	Normal return condition
Traction motor is overheated	Traction motor output torque is limited according to the traction motor temperature.	Traction motor temperature drops
IGBT high temperatures seen when traction motor speed is extremely low	IGBT switching frequency is reduced. NOTE: Traction motor electromagnetic noise increases.	<ul style="list-style-type: none">• IGBT temperature drops• Traction motor speed increases
IGBT is overheated	Traction motor output torque is limited according to the IGBT temperature.	IGBT temperature drops
Smoothing condenser is overheated	Traction motor output torque is limited according to the smoothing condenser temperature.	Smoothing condenser temperature drops

DTC Inspection Priority Chart

INFOID:000000006998349

If some DTCs are displayed at the same time, perform inspections one by one based on the priority as per the following list.

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

Priority	Detected items (DTC)	Reference	
1	P0A2C DRIVE MOTOR A TEMP SENSOR	TMS-47	A
	P0A2D DRIVE MOTOR A TEMP SENSOR	TMS-49	
	P0A2F DRIVE MOTOR A OVER TEMPERATURE	TMS-51	B
	P0A3C DRIVE MOTOR A INVERTER OVER TEMP	TMS-55	
	P0A3F DRIVE MOTOR A POSITION SENSOR	TMS-56	TMS
	P0A44 DRIVE MOTOR A OVER SPEED	TMS-59	
	P0A78 DRIVE MOTOR A INVERTER	TMS-62	
	P0A8D 14VOLT POWER VOLTAGE	TMS-63	D
	P0AEF DRIVE MOTOR INVERTER TEMP SEN A	TMS-64	
	P0AF0 DRIVE MOTOR INVERTER TEMP SEN A	TMS-65	E
	P0C79 DRIVE MOTOR A INVERTER VOLTAGE	TMS-70	
	P318E CAN ERROR	TMS-72	
	P3193 CAN ERROR	TMS-73	F
	P3197 CAN ERROR	TMS-74	
	P3199 CAN ERROR	TMS-75	
	P319E CAN ERROR	TMS-76	G
	P31A2 CAN ERROR	TMS-77	
	P31A4 CAN ERROR	TMS-78	H
	P31A9 CAN ERROR	TMS-79	
	P31AD CAN ERROR	TMS-80	
	P3241 DRIVE MOTOR A INVERTER CRNT CONT	TMS-84	I
	P3244 DRIVE MOTOR A INVERTER	TMS-86	
	P3245 DRIVE MOTOR A INVERTER	TMS-88	J
	P3246 DRIVE MOTOR A INVERTER VOLTAGE	TMS-89	
	P3247 DRIVE MOTOR A INVERTER	TMS-91	
	P3248 DRIVE MOTOR A INVERTER	TMS-92	K
	P3249 DRIVE MOTOR A INVERTER	TMS-93	
	P324A DRIVE MOTOR A INVERTER VOLTAGE	TMS-94	L
	P324D DRIVE MOTOR A INVERTER IGBT	TMS-96	
	P3252 DRIVE MOTOR A INVERTER IGBT	TMS-103	
	P325A CAN ERROR	TMS-104	M
	P325B DRIVE MOTOR A INVERTER	TMS-105	
	P325C DRIVE MOTOR A POSITION	TMS-106	
	P325D DRIVE MOTOR A POSITION	TMS-107	N
	P325E DRIVE MOTOR A POSITION	TMS-108	
	P325F DRIVE MOTOR A POSITION	TMS-109	O
	U1000 CAN COMM CIRCUIT	TMS-110	
2	P0A1B DRIVE MOTOR A CONTROL MODULE	TMS-46	P
	P0BE6 D-MOTOR A PHASE U CURRENT SEN	TMS-66	
	P0BEA D-MOTOR A PHASE V CURRENT SEN	TMS-67	
	P0BEE D-MOTOR A PHASE W CURRENT SEN	TMS-68	
	P0BFD D-MOTOR A PHASE UVW CURRENT SEN	TMS-69	
3	P3240 DRIVE MOTOR A INVERTER CRNT CONT	TMS-81	
	P324F DRIVE MOTOR A INVERTER IGBT	TMS-99	

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

DTC Index

INFOID:000000006998350

NOTE:

If some DTCs are displayed at the same time, perform inspections one by one based on the priority as per the following list. Refer to [TMS-34, "DTC Inspection Priority Chart"](#).

DTC*	Items (CONSULT screen terms)	EV system warning lamp	Reference
CONSULT			
P0A1B	DRIVE MOTOR A CONTROL MODULE	Can illuminate	TMS-46
P0A2C	DRIVE MOTOR A TEMP SENSOR	—	TMS-47
P0A2D	DRIVE MOTOR A TEMP SENSOR	—	TMS-49
P0A2F	DRIVE MOTOR A OVER TEMPERATURE	ON	TMS-51
P0A3C	DRIVE MOTOR A INVERTER OVER TEMP	ON	TMS-55
P0A3F	DRIVE MOTOR A POSITION SENSOR	ON	TMS-56
P0A44	DRIVE MOTOR A OVER SPEED	ON	TMS-59
P0A78	DRIVE MOTOR A INVERTER	ON	TMS-62
P0A8D	14VOLT POWER VOLTAGE	ON	TMS-63
P0AEF	DRIVE MOTOR INVERTER TEMP SEN A	ON	TMS-64
P0AF0	DRIVE MOTOR INVERTER TEMP SEN A	ON	TMS-65
P0BE6	D-MOTOR A PHASE U CURRENT SEN	ON	TMS-66
P0BEA	D-MOTOR A PHASE V CURRENT SEN	ON	TMS-67
P0BEE	D-MOTOR A PHASE W CURRENT SEN	ON	TMS-68
P0BFD	D-MOTOR A PHASE UVW CURRENT SEN	ON	TMS-69
P0C79	DRIVE MOTOR A INVERTER VOLTAGE	ON	TMS-70
P318E	CAN ERROR	Can illuminate	TMS-72
P3193	CAN ERROR	—	TMS-73
P3197	CAN ERROR	Can illuminate	TMS-74
P3199	CAN ERROR	Can illuminate	TMS-75
P319E	CAN ERROR	—	TMS-76
P31A2	CAN ERROR	Can illuminate	TMS-77
P31A4	CAN ERROR	Can illuminate	TMS-78
P31A9	CAN ERROR	—	TMS-79
P31AD	CAN ERROR	Can illuminate	TMS-80
P3240	DRIVE MOTOR A INVERTER CRNT CONT	ON	TMS-81
P3241	DRIVE MOTOR A INVERTER CRNT CONT	ON	TMS-84
P3244	DRIVE MOTOR A INVERTER	—	TMS-86
P3245	DRIVE MOTOR A INVERTER	—	TMS-88
P3246	DRIVE MOTOR A INVERTER VOLTAGE	ON	TMS-89
P3247	DRIVE MOTOR A INVERTER	ON	TMS-91
P3248	DRIVE MOTOR A INVERTER	ON	TMS-92
P3249	DRIVE MOTOR A INVERTER	ON	TMS-93
P324A	DRIVE MOTOR A INVERTER VOLTAGE	ON	TMS-94
P324D	DRIVE MOTOR A INVERTER IGBT	ON	TMS-96
P324F	DRIVE MOTOR A INVERTER IGBT	—	TMS-99
P3252	DRIVE MOTOR A INVERTER IGBT	—	TMS-103
P325A	CAN ERROR	—	TMS-104
P325B	DRIVE MOTOR A INVERTER	—	TMS-105

TRACTION MOTOR INVERTER

< ECU DIAGNOSIS INFORMATION >

DTC*	Items (CONSULT screen terms)	EV system warning lamp	Reference
CONSULT			
P325C	DRIVE MOTOR A POSITION	ON	TMS-106
P325D	DRIVE MOTOR A POSITION	—	TMS-107
P325E	DRIVE MOTOR A POSITION	—	TMS-108
P325F	DRIVE MOTOR A POSITION	—	TMS-109
U1000	CAN COMM CIRCUIT	—	TMS-110

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

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TRACTION MOTOR INVERTER

< WIRING DIAGRAM >

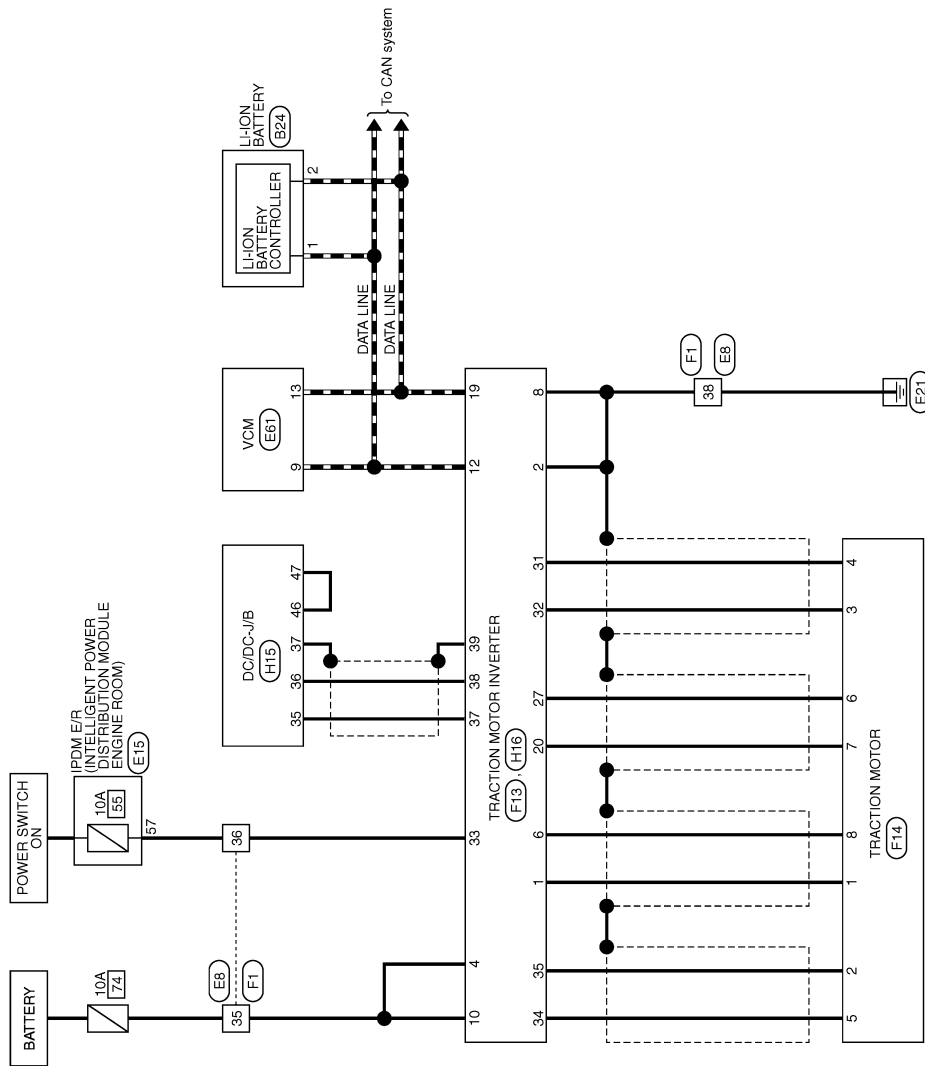
WIRING DIAGRAM

TRACTION MOTOR INVERTER

Wiring Diagram

INFOID:000000006998351

TRACTION MOTOR SYSTEM



2010/10/29

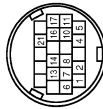
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TRACTION MOTOR INVERTER

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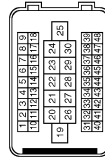
TRACTION MOTOR SYSTEM

Connector No.	B24
Connector Name	LI-ION BATTERY
Connector Type	Yazaki 7283-2750-30



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

Connector No.	E8
Connector Name	WIRE TO WIRE
Connector Type	SAA38MB-RS10-SJ22



Terminal No.	Color of Wire	Signal Name [Specification]
1	Y	-
2	L	-
3	GR	-
4	LG	-
5	P	-
6	B	-
8	BR	-
10	B	-

11	W	-
12	O	-
13	G	-
14	V	-
15	SB	-
16	R	-
17	L	-
18	LG	-
20	V	-
21	G	-
22	Y	-
23	B/R	-
26	V	-
27	P	-
28	B/R	-
29	W	-
30	B/R	-
31	LG	-
32	W	-
33	Y	-
34	P	-
35	P	-
36	R	-
37	G	-
38	B/R	-
40	BR	-
41	G	-
42	SB	-
43	L	-
44	O	-
47	V	-
48	P	-

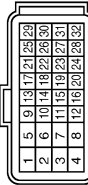
Connector No.	E15
Connector Name	POWER INTELLIGENT POWER DISTRIBUTION MODULE (PDU)
Connector Type	NS16FW-CS



Terminal No.	Color of Wire	Signal Name [Specification]
49	Y	-
50	G	-
51	L	-
52	P	-

55	LG	-
57	R	-
58	O	-
60	GR	-
61	Y	-
62	V	-

Connector No.	E61
Connector Name	VCM
Connector Type	RH24GY-RZ8-R-RH



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

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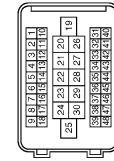
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TRACTION MOTOR INVERTER

< WIRING DIAGRAM >

TRACTION MOTOR SYSTEM

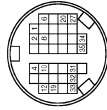
Connector No.	F1
Connector Name	WIRE TO WIRE
Connector Type	SAA38FB-RS10-SJ2Z



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

44	LG	-
47	V	-
48	P	-

Connector No.	F13
Connector Name	TRACTION MOTOR INVERTER
Connector Type	RH48FG-GY



Terminal No.	Color of Wire	Signal Name [Specification]
1	B	TRACTION MOTOR RESOLVER SIGNAL (S1)
2	B	GROUND
4	G	POWER SUPPLY (BATTERY)
6	W	TRACTION MOTOR RESOLVER SIGNAL (S3)
8	B	GROUND
10	G	POWER SUPPLY (BATTERY)
12	L	EV SYSTEM CAN-H
19	G	EV SYSTEM CAN-L
20	L	TRACTION MOTOR RESOLVER SIGNAL (S2)
27	P	TRACTION MOTOR RESOLVER SIGNAL (S4)
31	O	TRACTION MOTOR TEMPERATURE SENSOR
32	B/P	TRACTION MOTOR TEMPERATURE SENSOR
33	LG	POWER SUPPLY (IGN)
34	R	TRACTION MOTOR RESOLVER SIGNAL (R1)
35	G	TRACTION MOTOR RESOLVER SIGNAL (R2)

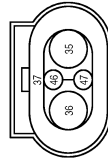
Connector No.	F14
Connector Name	TRACTION MOTOR
Connector Type	RH48FB



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

3	B/P	-
4	O	-
5	R	-
6	P	-
7	L	-
8	W	-

Connector No.	H15
Connector Name	DC/DC -I/B
Connector Type	Z4342-3NA0B



Terminal No.	Color of Wire	Signal Name [Specification]
35	O	(+)
36	O	(-)
37	SHIELD	-
46	-	HIGH VOLTAGE CABLE CONNECTION-DETECTING CIRCUIT IN
47	-	HIGH VOLTAGE CABLE CONNECTION-DETECTING CIRCUIT OUT

Connector No.	H16
Connector Name	TRACTION MOTOR INVERTER
Connector Type	Z4340-3NA1C



Terminal No.	Color of Wire	Signal Name [Specification]
37	O	-
38	O	-
39	SHIELD	-

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DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

BASIC INSPECTION

DIAGNOSIS AND REPAIR WORK FLOW

Work Flow

INFOID:000000006998352

1.OBTAIN INFORMATION ABOUT SYMPTOM

Refer to [TMS-42. "Question 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 IN VCM

1. Check DTC in VCM.
2. Check related service bulletins for information.

Are any DTCs detected?

- YES >> Check the DTC. Refer to [EVC-84. "DTC Index"](#).
NO >> GO TO 3.

3.CHECK DTC IN TRACTION MOTOR INVERTER

1. Before checking the malfunction, check whether any DTC exists.
2. If DTC exists, perform the following operations.
 - Record the DTC and freeze frame data. (Print out the data using CONSULT and affix them to the Work Order Sheet.)
 - Erase DTCs.
 - Check the relationship between the cause that is clarified with DTC and the malfunction information described by the customer.
3. Check the information of related service bulletins and others also.

Do malfunction information and DTC exist?

- Malfunction information and DTC exists. >>GO TO 4.
Malfunction information exists, but no DTC. >>GO TO 5.
No malfunction information, but DTC exists. >>GO TO 6.

4.REPRODUCE MALFUNCTION SYMPTOM

Check any malfunction described by a customer, except those with DTC on the vehicle.

Also investigate whether the symptom is a fail-safe or normal operation. Refer to [TMS-32. "Fail-Safe"](#). When a malfunction symptom is reproduced, the question sheet is effective. Refer to [TMS-42. "Question sheet"](#).

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 6.

5.REPRODUCE MALFUNCTION SYMPTOM

Check the malfunction described by the customer on the vehicle.

Also investigate whether the symptom is a normal operation. Refer to [TMS-34. "Protection Control"](#). When a malfunction symptom is reproduced, the question sheet is effective. Refer to [TMS-42. "Question sheet"](#).

Verify the relationship between the symptom and the conditions in which the malfunction described by the customer occurs.

>> GO TO 8.

6.PERFORM "DTC CONFIRMATION PROCEDURE"

Perform "DTC CONFIRMATION PROCEDURE" of the appropriate DTC to check if DTC is detected again.

Refer to [TMS-34. "DTC Inspection Priority Chart"](#) when multiple DTCs are detected, and then determine the order for performing the diagnosis.

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

NOTE:

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

Is any DTC detected?

YES >> GO TO 7.

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

7. REPAIR OR REPLACE THE MALFUNCTIONING PARTS

Repair or replace the detected malfunctioning parts.

Reconnect parts or connector after repairing or replacing, and then erase DTC if necessary.

>> GO TO 8.

8. FINAL CHECK

Perform "DTC CONFIRMATION PROCEDURE" again 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 4 or 5.

Is DTC or malfunction symptom reproduced?

YES >> GO TO 2.

NO >> Before delivering the vehicle to the customer, make sure that DTC is erased.

Question sheet

INFOID:000000006998353

DESCRIPTION

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 the concerns carefully. In order to systemize all the information for the diagnosis, prepare the question sheet referring to the question points.

KEY POINTS

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

SEF907L

WORKSHEET SAMPLE

Question Sheet				
Customer name MR/MS	Motor No.		Inverter No.	
	Incident Date		VIN	
	Model & Year		In Service Date	
	Trans.		Mileage	km/mile
Symptoms	<input type="checkbox"/> Does not to READY		<input type="checkbox"/> EV system warning lamp is on	<input type="checkbox"/> Power limitation indicator lamp is on
	<input type="checkbox"/> Water leak*	<input type="checkbox"/> Noise*	<input type="checkbox"/> Vibration*	<input type="checkbox"/> Shock*
	<input type="checkbox"/> Gear noise*	<input type="checkbox"/> Non driving*	<input type="checkbox"/> Poor acceleration*	<input type="checkbox"/> Poor torque*
	<input type="checkbox"/> Radio noise*	<input type="checkbox"/> Does not charge	<input type="checkbox"/> Other*	*: If applied, enter in detail
	Detailed symptom			
	Onomatopoeia			
Frequency	<input type="checkbox"/> All the time <input type="checkbox"/> Once <input type="checkbox"/> Sometimes (times a day) <input type="checkbox"/> Other			
Weather conditions	<input type="checkbox"/> Not affected			

DIAGNOSIS AND REPAIR WORK FLOW

< BASIC INSPECTION >

Question Sheet						
	Weather	<input type="checkbox"/> Fine	<input type="checkbox"/> Clouding	<input type="checkbox"/> Raining	<input type="checkbox"/> Snowing	<input type="checkbox"/> Other ()
	Temp.	<input type="checkbox"/> Hot	<input type="checkbox"/> Warm	<input type="checkbox"/> Cool	<input type="checkbox"/> Cold	<input type="checkbox"/> Temp. [Approx. °C (°F)]
	Humidity	<input type="checkbox"/> High	<input type="checkbox"/> Middle	<input type="checkbox"/> Low	<input type="checkbox"/> Humidity (Approx. %)	
Road conditions	<input type="checkbox"/> Not affected		<input type="checkbox"/> In town	<input type="checkbox"/> Freeway	<input type="checkbox"/> Off road (Up / Down)	<input type="checkbox"/> Deplorable road
	<input type="checkbox"/> Flat road		<input type="checkbox"/> While turning (Right / Left)		<input type="checkbox"/> Bump	
	<input type="checkbox"/> Other					
Shift position	<input type="checkbox"/> Not affected					
	<input type="checkbox"/> P position	<input type="checkbox"/> R position	<input type="checkbox"/> N position	<input type="checkbox"/> D position	<input type="checkbox"/> ECO mode	
Driving conditions	<input type="checkbox"/> Not affected					
	<input type="checkbox"/> Power switch ON → OFF			<input type="checkbox"/> Power switch OFF → ON		<input type="checkbox"/> READY (stop the vehicle)
	<input type="checkbox"/> While cruising	<input type="checkbox"/> While decelerating	<input type="checkbox"/> Just before stopping	<input type="checkbox"/> Just after stopping	<input type="checkbox"/> D position (stop the vehicle)	
	<input type="checkbox"/> While recharging			<input type="checkbox"/> Other		
	<input type="checkbox"/> Vehicle speed [km/h (MPH)]			<input type="checkbox"/> Accelerator pedal (/ 8)		
	<input type="checkbox"/> Battery level (Low / Middle / High)					
Moments when malfunction disappears	<input type="checkbox"/> Disappears while driving			<input type="checkbox"/> Disappears when stopped		<input type="checkbox"/> Disappears with select operation
	<input type="checkbox"/> Disappears when power switch is pushed OFF			<input type="checkbox"/> Disappears when battery charge is stopped		<input type="checkbox"/> Does not disappear
	<input type="checkbox"/> Other					
Other						

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RESOLVER WRITE

< BASIC INSPECTION >

RESOLVER WRITE

Description

INFOID:000000006998354

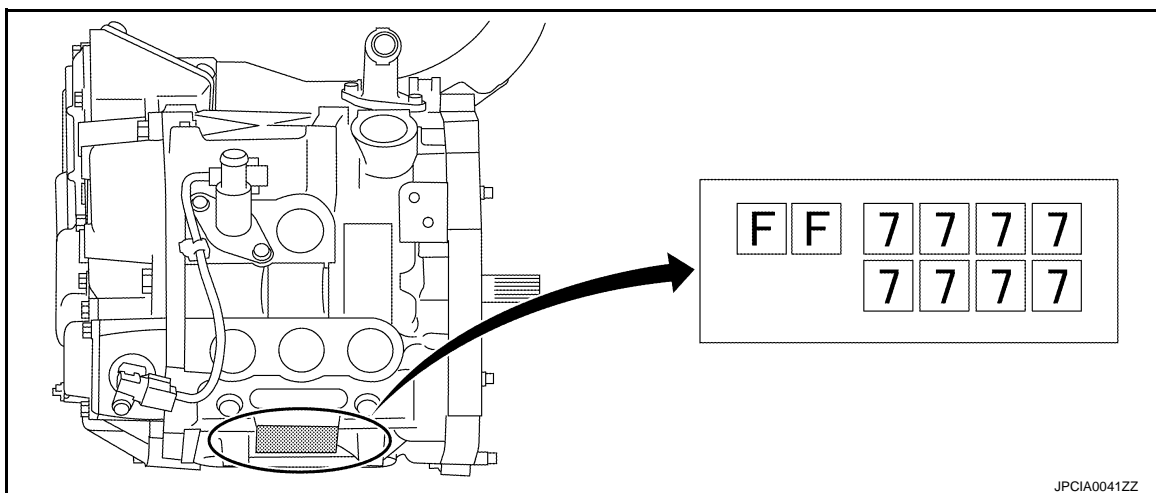
If the work listed below was performed, it is necessary to perform writing of the traction motor resolver offset to the traction motor inverter.

- Replacement of traction motor
- Replacement of traction motor inverter
- Replacement of traction motor and traction motor inverter

Location of traction motor resolver offset stamp

NOTE:

Because the traction motor resolver offset stamp is located on the lower side of the traction motor, it is necessary to remove the under cover in order to check it.



Work Procedure

INFOID:000000006998355

CAUTION:

If the traction motor inverter was replaced, then the EV system warning lamp illuminates when the power switch is turned ON, and DTC "P325C" is detected. Therefore after writing of the traction motor resolver offset is completed, verify that the EV system warning lamp has turned off and erase DTC "P325C".

1. CHECK BEFORE PERFORMING WRITING OF THE TRACTION MOTOR RESOLVER OFFSET

Check the replaced parts.

Which parts were replaced?

- Traction motor>>GO TO 2.
- Traction motor inverter>>GO TO 3.
- Traction motor and traction motor inverter>>GO TO 3.

2. WRITING OF THE TRACTION MOTOR RESOLVER OFFSET

With CONSULT

1. Power switch ON.
2. Select "Work Support" in "MOTOR CONTROL".
3. Select "RESOLVER WRITE".
4. Enter the traction motor resolver offset.
5. Touch "WRITE".

Is "Writing is complete" displayed?

- YES >> 1. Power switch OFF.
- 2. Power switch ON and wait 2 seconds or more.
- 3. Power switch OFF to complete the work.
- NO >> Perform again STEP 2.

RESOLVER WRITE

< BASIC INSPECTION >

3. WRITING OF THE TRACTION MOTOR RESOLVER OFFSET

④ With CONSULT

1. Power switch ON.

NOTE:

EV system warning lamp turns on.

2. Select "Work Support" in "MOTOR CONTROL".
3. Select "RESOLVER WRITE".
4. Enter the traction motor resolver offset.
5. Touch "WRITE".

Is "Writing is complete" displayed?

YES >> GO TO 4.

NO >> Perform again STEP 3.

4. STEPS AFTER WRITING OF THE TRACTION MOTOR RESOLVER OFFSET

④ With CONSULT

1. Power switch OFF.
2. Power switch ON and wait 2 seconds or more.
3. Verify that the EV system warning lamp is off.
4. Select "Work Support" in "MOTOR CONTROL".
5. Select "RESOLVER WRITE".
6. Confirm the value is changed according to the correction value input.
7. Perform "Self Diagnostic Results" in "MOTOR CONTROL".
8. Erase the DTC "P325C".
9. Power switch OFF.

>> END

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P0A1B DRIVE MOTOR A CONTROL MODULE

< DTC/CIRCUIT DIAGNOSIS >

DTC/CIRCUIT DIAGNOSIS

P0A1B DRIVE MOTOR A CONTROL MODULE

DTC Logic

INFOID:000000006998356

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A1B	Drive Motor "A" Control Module	A malfunction is detected in the traction motor inverter (motor controller)	Traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

If this DTC is detected simultaneously with P0A8D, inspect the 12V battery first, as it is suspected to be dead.

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

⑧ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0A1B" detected?

- YES >> Go to [TMS-46. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998357

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116. "Removal and Installation"](#).

>> END

P0A2C DRIVE MOTOR A TEMP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0A2C DRIVE MOTOR A TEMP SENSOR

DTC Logic

INFOID:000000006998358

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A2C	Drive Motor "A" Temperature Sensor Circuit Low	If the value detected for the traction motor temperature is too low	<ul style="list-style-type: none">• Harness or connectors (Each circuit is open or shorted.)• Traction motor• Traction motor Inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0A2C" detected?

- YES >> Go to [TMS-47, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998359

1.CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

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

2.CHECK TRACTION MOTOR HARNESS CONNECTOR

Check the connection conditions of the traction motor harness connector.

Is the inspection result normal?

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

3.CHECK TRACTION MOTOR TEMPERATURE SENSOR CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and ground.

Traction motor inverter vehicle side harness connector		Ground	Resistance
Connector	Terminal		
F13	31	Ground	200 kΩ or more
	32		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace damaged parts.

P0A2C DRIVE MOTOR A TEMP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

4. CHECK TRACTION MOTOR TEMPERATURE SENSOR CIRCUIT

1. Disconnect the traction motor harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and traction motor vehicle side harness connector terminals.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	31	F14	4	1 Ω or less
	32		3	

3. Check the harness for short.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	31	F14	3	100 k Ω or more
	32		4	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the traction motor temperature sensor. Refer to [TMS-48, "Component Inspection \(Traction Motor Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

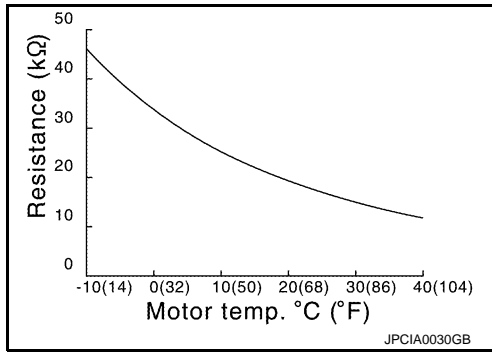
NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Temperature Sensor)

INFOID:000000006998360

1. CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the resistance between traction motor connector terminals.

Traction motor connector		Resistance
Terminal		
3	4	Within ± 50% of temperature characteristics diagram 

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the traction motor temperature sensor. Refer to [TMS-124, "Removal and Installation"](#).

P0A2D DRIVE MOTOR A TEMP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0A2D DRIVE MOTOR A TEMP SENSOR

DTC Logic

INFOID:000000006998361

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A2D	Drive Motor "A" Temperature Sensor Circuit High	If the value detected for the traction motor temperature is too high	<ul style="list-style-type: none">• Harness or connectors (Each circuit is open or shorted.)• Traction motor• Traction motor Inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0A2D" detected?

- YES >> Go to [TMS-49. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998362

1.CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

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

2.CHECK TRACTION MOTOR HARNESS CONNECTOR

Check the connection conditions of the traction motor harness connector.

Is the inspection result normal?

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

3.CHECK TRACTION MOTOR TEMPERATURE SENSOR CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and ground.

Traction motor inverter vehicle side harness connector		Ground	Resistance
Connector	Terminal		
F13	31	Ground	200 kΩ or more
	32		

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace damaged parts.

P0A2D DRIVE MOTOR A TEMP SENSOR

< DTC/CIRCUIT DIAGNOSIS >

4. CHECK TRACTION MOTOR TEMPERATURE SENSOR CIRCUIT

1. Disconnect the traction motor harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and traction motor vehicle side harness connector terminals.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	31	F14	4	1 Ω or less
	32		3	

3. Check the harness for short.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	31	F14	3	100 k Ω or more
	32		4	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the traction motor temperature sensor. Refer to [TMS-50, "Component Inspection \(Traction Motor Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

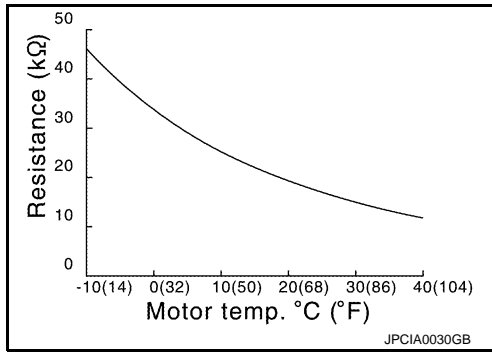
NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Temperature Sensor)

INFOID:000000006998363

1. CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the resistance between traction motor connector terminals.

Traction motor connector		Resistance
Terminal		
3	4	Within ± 50% of temperature characteristics diagram 

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the traction motor temperature sensor. Refer to [TMS-124, "Removal and Installation"](#).

P0A2F DRIVE MOTOR A OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

P0A2F DRIVE MOTOR A OVER TEMPERATURE

DTC Logic

INFOID:000000006998364

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A2F	Drive Motor "A" Over Temperature	If traction motor temperature is too high	<ul style="list-style-type: none">• Traction motor inverter• Traction motor• High voltage cooling system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

④ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Drive during 20 minutes for warm-up.
3. Repeat driving of 0 km/h (0 MPH) → 60 km/h (37 MPH) with full acceleration 10 times without interval.
4. Stop the vehicle.
5. Check DTC.

Is "P0A2F" detected?

- YES >> Go to [TMS-51, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998365

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE COOLING SYSTEM

1. Power switch ON and wait 10 seconds or more.
2. Perform "Self Diagnostic Results" in "EV/HEV".

Is any DTC detected?

- YES >> Check DTC detected item. Refer to [EVC-84, "DTC Index"](#).

P0A2F DRIVE MOTOR A OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK COOLANT WATER

Check the coolant level and check for coolant leakage. Refer to [HCO-11, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

3.CHECK COOLANT HOSE

Check for clogging of fluid paths and twisting of hoses in traction motor inverter, traction motor, DC/DC-J/B, and on board charger. Refer to [HCO-7, "High Voltage Cooling System"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4.PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

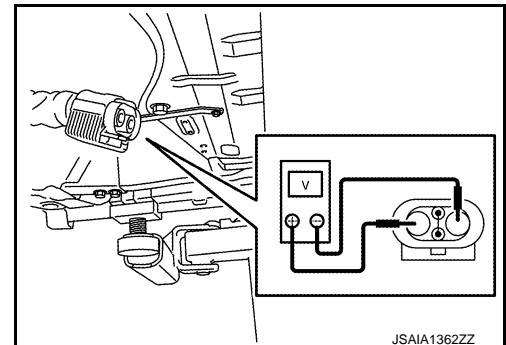


Standard

: 5 V or less

CAUTION:

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



>> GO TO 5.

5.CHECK TRACTION MOTOR INSULATION RESISTANCE

CAUTION:

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

1. Disconnect the 3-phase harness from the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
2. Using an insulation resistance tester (500V range), measure the resistance according to the value in the table below.

CAUTION:

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

NOTE:

As each harness (U-phase, V-phase, and W-phase) contacts to each other inside the traction motor, check resistance of a phase.

P0A2F DRIVE MOTOR A OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

3-phase harness	Ground	Resistance
Terminal		
U-phase	Ground	10 MΩ or more
V-phase		
W-phase		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

6.CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the traction motor temperature sensor. Refer to [TMS-53, "Component Inspection \(Traction Motor Temperature Sensor\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

7.CHECK RESISTANCE OF TRACTION MOTOR STATOR COIL

Check the resistance of traction motor stator coil. Refer to [TMS-53, "Component Inspection \(Traction Motor Stator Coil\)"](#).

Is the inspection result normal?

YES >> 1. Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

2. If DTC "P0A2F" is still detected after traction motor replacement, replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Temperature Sensor)

INFOID:000000006998366

1. CHECK TRACTION MOTOR TEMPERATURE SENSOR

Check the resistance between traction motor connector terminals.

Traction motor connector		Resistance														
Terminal																
3	4	<div>Within ± 50% of temperature characteristics diagram</div> <div><table border="1"><caption>Approximate data points from the temperature characteristics diagram</caption><thead><tr><th>Motor temp. °C (°F)</th><th>Resistance (kΩ)</th></tr></thead><tbody><tr><td>-10 (14)</td><td>45</td></tr><tr><td>0 (32)</td><td>38</td></tr><tr><td>10 (50)</td><td>30</td></tr><tr><td>20 (68)</td><td>22</td></tr><tr><td>30 (86)</td><td>15</td></tr><tr><td>40 (104)</td><td>10</td></tr></tbody></table></div> <div>JPCIA0030GB</div>	Motor temp. °C (°F)	Resistance (kΩ)	-10 (14)	45	0 (32)	38	10 (50)	30	20 (68)	22	30 (86)	15	40 (104)	10
Motor temp. °C (°F)	Resistance (kΩ)															
-10 (14)	45															
0 (32)	38															
10 (50)	30															
20 (68)	22															
30 (86)	15															
40 (104)	10															

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the traction motor temperature sensor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Stator Coil)

INFOID:000000006998367

1.CHECK RESISTANCE OF TRACTION MOTOR STATOR COIL

Using a milliohmmeter and check the resistance traction motor stator coil.

CAUTION:

P0A2F DRIVE MOTOR A OVER TEMPERATURE

< DTC/CIRCUIT DIAGNOSIS >

As resistance of stator coil is affected by temperature, check it at least 8 hour after removal of service plug.

3-phase harness		Resistance*
Terminal		
U-phase	V-phase	11.6 – 14.3 mΩ
V-phase	W-phase	
W-phase	U-phase	

*: The value is at 20 °C (68 °F). Calculate the resistance standard value based on actual ambient temperature at operation based on the below calculation formula.

Calculating formula

- $R_{20} = R / [1 + 0.00393 \times (T - 20)]$
- R₂₀: Resistance value (mΩ) at 20 °C (68 °F)
- R: Resistance value (mΩ) at actual ambient temperature at operation
- T: Actual ambient temperature [°C (°F)] at operation

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the stator coil. Refer to [TMS-124, "Removal and Installation"](#).

P0A3C DRIVE MOTOR A INVERTER OVER TEMP

< DTC/CIRCUIT DIAGNOSIS >

P0A3C DRIVE MOTOR A INVERTER OVER TEMP

DTC Logic

INFOID:000000006998368

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A3C	Drive Motor "A" Inverter Over Temperature	If smoothing condenser temperature is too high	<ul style="list-style-type: none">• Traction motor inverter• High voltage cooling system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Drive during 20 minutes for warm-up.
3. Repeat driving of 0 km/h (0 MPH) → 60 km/h (37 MPH) with full acceleration 10 times without interval.
4. Stop the vehicle.
5. Check DTC.

Is "P0A3C" detected?

- YES >> Go to [TMS-55, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998369

1.CHECK DTC HIGH VOLTAGE COOLING SYSTEM

1. Power switch ON and wait for 10 seconds or more.
2. Perform "Self Diagnostic Results" in "EV/HEV".

Is any DTC detected?

- YES >> Check DTC detected item. Refer to [EVC-84, "DTC Index"](#).
NO >> GO TO 2.

2.CHECK COOLANT WATER

Check the coolant level and check for coolant leakage. Refer to [HCO-11, "Inspection"](#).

Is the inspection result normal?

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

3.CHECK COOLANT HOSE

Check for clogging of fluid paths and twisting of hoses in traction motor inverter, traction motor, DC/DC-J/B, and on board charger. Refer to [HCO-7, "High Voltage Cooling System"](#).

Is the inspection result normal?

- YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Repair or replace damaged parts.

P0A3F DRIVE MOTOR A POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

P0A3F DRIVE MOTOR A POSITION SENSOR

DTC Logic

INFOID:000000006998370

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A3F	Drive Motor "A" Position Sensor Circuit	If there is an abnormality in the traction motor resolver detection circuit	<ul style="list-style-type: none">• Harness or connectors (Each circuit is open or shorted.)• Traction motor• Traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

ⒺWith CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0A3F" detected?

- YES >> Go to [TMS-56, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998371

1.CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

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

2.CHECK TRACTION MOTOR HARNESS CONNECTOR

Check the connection conditions of the traction motor harness connector.

Is the inspection result normal?

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

3.CHECK TRACTION MOTOR RESOLVER CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and ground.

P0A3F DRIVE MOTOR A POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Traction motor inverter vehicle side harness connector		Ground	Resistance
Connector	Terminal		
F13	1	Ground	100 kΩ or more
	6		
	20		
	27		
	34		
	35		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK TRACTION MOTOR RESOLVER CIRCUIT

1. Disconnect the traction motor harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and traction motor vehicle side harness connector terminals.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	1	F14	1	1 Ω or less
	6		8	
	20		7	
	27		6	
	34		5	
	35		2	

3. Check the harness for short.

Traction motor inverter vehicle side harness connector			Resistance
Connector	Terminal		
F13	1	6	100 kΩ or more
	20	27	
	34	35	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK TRACTION MOTOR RESOLVER

Check the traction motor resolver. Refer to [TMS-57, "Component Inspection \(Traction Motor Resolver\)"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Resolver)

INFOID:000000006998372

1. CHECK TRACTION MOTOR RESOLVER

1. Disconnect the traction motor connector.
2. Check the resistance between traction motor connector terminals.

P0A3F DRIVE MOTOR A POSITION SENSOR

< DTC/CIRCUIT DIAGNOSIS >

Traction motor connector		Resistance
Terminal		
1	8	27 – 49 Ω
2	5	13 – 23 Ω
6	7	27 – 49 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the traction motor resolver. Refer to [TMS-124](#), "[Removal and Installation](#)".

P0A44 DRIVE MOTOR A OVER SPEED

< DTC/CIRCUIT DIAGNOSIS >

P0A44 DRIVE MOTOR A OVER SPEED

DTC Logic

INFOID:000000006998373

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A44	Drive Motor "A" Position Sensor Circuit Overspeed	If the value detected for motor speed at the traction motor resolver is too high	<ul style="list-style-type: none">• Harness or connectors (Each circuit is open or shorted.)• Traction motor• Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Accelerate to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P0A44" detected?

- YES >> Go to [TMS-59, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998374

1.CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

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

2.CHECK TRACTION MOTOR HARNESS CONNECTOR

Check the connection conditions of the traction motor harness connector.

Is the inspection result normal?

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

3.CHECK TRACTION MOTOR RESOLVER CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and ground.

P0A44 DRIVE MOTOR A OVER SPEED

< DTC/CIRCUIT DIAGNOSIS >

Traction motor inverter vehicle side harness connector		Ground	Resistance
Connector	Terminal		
F13	1	Ground	100 kΩ or more
	6		
	20		
	27		
	34		
	35		

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK TRACTION MOTOR RESOLVER CIRCUIT

1. Disconnect the traction motor harness connector.
2. Check the resistance between traction motor inverter vehicle side harness connector terminals and traction motor vehicle side harness connector terminals.

Traction motor inverter vehicle side harness connector		Traction motor vehicle side harness connector		Resistance
Connector	Terminal	Connector	Terminal	
F13	1	F14	1	1 Ω or less
	6		8	
	20		7	
	27		6	
	34		5	
	35		2	

3. Check the harness for short.

Traction motor inverter vehicle side harness connector			Resistance
Connector	Terminal		
F13	1	6	100 kΩ or more
	20	27	
	34	35	

Is the inspection result normal?

YES >> GO TO 5.

NO >> Repair or replace damaged parts.

5. CHECK TRACTION MOTOR RESOLVER

Check the traction motor resolver. Refer to [TMS-60, "Component Inspection \(Traction Motor Resolver\)"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Resolver)

INFOID:000000006998375

1. CHECK TRACTION MOTOR RESOLVER

1. Disconnect the traction motor connector.
2. Check the resistance between traction motor connector terminals.

P0A44 DRIVE MOTOR A OVER SPEED

< DTC/CIRCUIT DIAGNOSIS >

Traction motor connector		Resistance
Terminal		
1	8	27 – 49 Ω
2	5	13 – 23 Ω
6	7	27 – 49 Ω

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the traction motor resolver. Refer to [TMS-124](#), "[Removal and Installation](#)".

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P0A78 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P0A78 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998376

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A78	Drive Motor "A" Inverter Performance	A malfunction is detected in the traction motor inverter (motor controller)	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

ⓘ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0A78" detected?

- YES >> Go to [TMS-62, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998377

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0A8D 14VOLT POWER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P0A8D 14VOLT POWER VOLTAGE

DTC Logic

INFOID:000000006998378

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0A8D	14 Volt Power Module System Voltage Low	If the 12V battery voltage is too low	<ul style="list-style-type: none">• Harness, fuse, or connectors (Each circuit is open or shorted.)• Traction motor inverter• M/C relay

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

 With CONSULT

1. Power switch ON and wait 10 seconds or more.
2. Check DTC.

Is "P0A8D" detected?

- YES >> Go to [TMS-63, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998379

1.CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

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

2.CHECK POWER SUPPLY CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the 10A fuse (# 74).
3. Power switch ON.
4. Check the voltage between traction motor inverter vehicle side harness connector terminals.

traction motor inverter vehicle side harness connector			Voltage
Connector	Terminal		
	+	–	
F13	4	2	9 – 16 V
	10	8	

Is the inspection result normal?

- YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Check the M/C relay. Refer to [EVC-335, "Diagnosis Procedure"](#).

P0AEF DRIVE MOTOR INVERTER TEMP SEN A

< DTC/CIRCUIT DIAGNOSIS >

P0AEF DRIVE MOTOR INVERTER TEMP SEN A

DTC Logic

INFOID:000000006998380

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0AEF	Drive Motor Inverter Temperature Sensor "A" Circuit Low	If the value detected by the smoothing condenser temperature sensor is too low	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

ⓘ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0AEF" detected?

YES >> Go to [TMS-64, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998381

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0AF0 DRIVE MOTOR INVERTER TEMP SEN A

< DTC/CIRCUIT DIAGNOSIS >

P0AF0 DRIVE MOTOR INVERTER TEMP SEN A

DTC Logic

INFOID:000000006998382

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0AF0	Drive Motor Inverter Temperature Sensor "A" Circuit High	If the value detected by the smoothing condenser temperature sensor is too high	Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓜ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0AF0" detected?

- YES >> Go to [TMS-65, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998383

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0BE6 D-MOTOR A PHASE U CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

P0BE6 D-MOTOR A PHASE U CURRENT SEN

DTC Logic

INFOID:000000006998384

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0BE6	Drive Motor "A" Phase U Current Sensor Circuit Range/Performance	If the value detected by the traction motor U-phase current sensor is abnormal	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0BE6" detected?

- YES >> Go to [TMS-66, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998385

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0BEA D-MOTOR A PHASE V CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

P0BEA D-MOTOR A PHASE V CURRENT SEN

DTC Logic

INFOID:000000006998386

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0BEA	Drive Motor "A" Phase V Current Sensor Circuit Range/Performance	If the value detected by the traction motor V-phase current sensor is abnormal	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

 With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0BEA" detected?

- YES >> Go to [TMS-67, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998387

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0BEE D-MOTOR A PHASE W CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

P0BEE D-MOTOR A PHASE W CURRENT SEN

DTC Logic

INFOID:000000006998388

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0BEE	Drive Motor "A" Phase W Current Sensor Circuit Range/Performance	If the value detected by the traction motor W-phase current sensor is abnormal	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P0BEE" detected?

YES >> Go to [TMS-68, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998389

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P0BFD D-MOTOR A PHASE UVW CURRENT SEN

< DTC/CIRCUIT DIAGNOSIS >

P0BFD D-MOTOR A PHASE UVW CURRENT SEN

DTC Logic

INFOID:000000006998390

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0BFD	Drive Motor "A" Phase U-V-W Current Sensor Correlation	If the current sensor offset is abnormal	Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

 With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Fully open the accelerator and accelerate the vehicle to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P0BFD" detected?

- YES >> Go to [TMS-69. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998391

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116. "Removal and Installation"](#).

>> END

P0C79 DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P0C79 DRIVE MOTOR A INVERTER VOLTAGE

DTC Logic

INFOID:000000006998392

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P0C79	Drive Motor "A" Inverter Voltage Too High	If the high voltage DC voltage is too high	<ul style="list-style-type: none">• Traction motor inverter• High voltage harness or connector• Li-ion battery• High voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Accelerate to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P0C79" detected?

- YES >> Go to [TMS-70, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998393

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Power switch ON and wait 10 seconds or more.
2. Check DTC of the high voltage systems.

P0C79 DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

Were there any detected DTC related to a high voltage systems other than the traction motor inverter?

- YES >> Check DTC detected item.
NO >> GO TO 2.

2. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

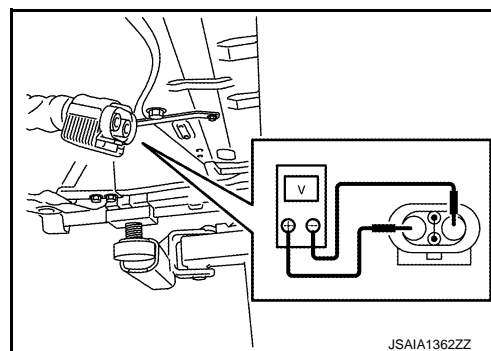


Standard

: 5 V or less

CAUTION:

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



>> GO TO 3.

3. CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK HIGH VOLTAGE HARNESS

Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

Is the inspection result normal?

- YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Repair or replace damaged parts.

P318E CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P318E CAN ERROR

DTC Logic

INFOID:000000006998394

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P318E	CAN data error	If traction motor inverter detects CAN data error	VCM

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

① With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P318E" detected?

YES >> Go to [TMS-72, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998395

1.REPLACE VCM

Replace the VCM. Refer to [EVC-377, "Removal and Installation"](#).

>> END

P3193 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3193 CAN ERROR

DTC Logic

INFOID:000000006998396

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3193	CAN data error	If traction motor inverter detects CAN data error	Li-ion battery controller

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DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

D

>> GO TO 2.

2.CHECK DTC DETECTION

E

Ⓔ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

F

Is "P3193" detected?

G

- YES >> Go to [TMS-73. "Diagnosis Procedure"](#).
NO >> INSPECTION END

H

Diagnosis Procedure

INFOID:000000006998397

1.REPLACE LI-ION BATTERY CONTROLLER

I

Replace the Li-ion battery controller. Refer to [EVB-169. "Exploded View"](#) (TYPE 1), [EVB-395. "Exploded View"](#) (TYPE 2), [EVB-626. "Exploded View"](#) (TYPE 3), or [EVB-866. "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14. "How to Check Vehicle Type"](#).

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>> END

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P3197 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3197 CAN ERROR

DTC Logic

INFOID:000000006998398

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3197	CAN data error	If traction motor inverter detects CAN data error	Electric shift control module

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

 With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P3197" detected?

YES >> Go to [TMS-74, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998399

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to [TM-138, "Removal and Installation"](#).

>> END

P3199 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P3199 CAN ERROR

DTC Logic

INFOID:000000006998400

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3199	CAN data error	If traction motor inverter detects CAN data error	VCM

A

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TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

D

>> GO TO 2.

2.CHECK DTC DETECTION

E

Ⓔ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

F

Is "P3199" detected?

G

- YES >> Go to [TMS-75, "Diagnosis Procedure"](#).
NO >> INSPECTION END

H

Diagnosis Procedure

INFOID:000000006998401

1.REPLACE VCM

I

Replace the VCM. Refer to [EVC-377, "Removal and Installation"](#).

>> END

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P319E CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P319E CAN ERROR

DTC Logic

INFOID:000000006998402

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P319E	CAN data error	If traction motor inverter detects CAN data error	Li-ion battery controller

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P319E" detected?

- YES >> Go to [TMS-76, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998403

1. REPLACE LI-ION BATTERY CONTROLLER

Replace the Li-ion battery controller. Refer to [EVB-169, "Exploded View" \(TYPE 1\)](#), [EVB-395, "Exploded View" \(TYPE 2\)](#), [EVB-626, "Exploded View" \(TYPE 3\)](#), or [EVB-866, "Exploded View" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).

>> END

P31A2 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31A2 CAN ERROR

DTC Logic

INFOID:000000006998404

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P31A2	CAN data error	If traction motor inverter detects CAN data error	Electric shift control module

TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P31A2" detected?

- YES >> Go to [TMS-77. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998405

1.REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to [TM-138. "Removal and Installation"](#).

>> END

P31A4 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31A4 CAN ERROR

DTC Logic

INFOID:000000006998406

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P31A4	CAN data error	If traction motor inverter detects CAN data error	VCM

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

 With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P31A4" detected?

YES >> Go to [TMS-78, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998407

1. REPLACE VCM

Replace the VCM. Refer to [EVC-377, "Removal and Installation"](#).

>> END

P31A9 CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31A9 CAN ERROR

DTC Logic

INFOID:000000006998408

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P31A9	CAN data error	If traction motor inverter detects CAN data error	Li-ion battery controller

A

B

TMS

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

D

>> GO TO 2.

2. CHECK DTC DETECTION

E

④ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

F

Is "P31A9" detected?

G

YES >> Go to [TMS-79, "Diagnosis Procedure"](#).

H

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998409

1. REPLACE LI-ION BATTERY CONTROLLER

I

Replace the Li-ion battery controller. Refer to [EVB-169, "Exploded View" \(TYPE 1\)](#), [EVB-395, "Exploded View" \(TYPE 2\)](#), [EVB-626, "Exploded View" \(TYPE 3\)](#), or [EVB-866, "Exploded View" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).

J

>> END

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P31AD CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P31AD CAN ERROR

DTC Logic

INFOID:000000006998410

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P31AD	CAN data error	If traction motor inverter detects CAN data error	Electric shift control module

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P31AD" detected?

- YES >> Go to [TMS-80, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998411

1. REPLACE ELECTRIC SHIFT CONTROL MODULE

Replace the electric shift control module. Refer to [TM-138, "Removal and Installation"](#).

>> END

P3240 DRIVE MOTOR A INVERTER CRNT CONT

< DTC/CIRCUIT DIAGNOSIS >

P3240 DRIVE MOTOR A INVERTER CRNT CONT

DTC Logic

INFOID:000000006998412

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3240	Drive Motor "A" Inverter Performance/Motor Current Control Error	If the traction motor inverter output voltage is abnormal	<ul style="list-style-type: none">• Traction motor inverter• Traction motor• High voltage harness or connector• Li-ion battery• High voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Fully open the accelerator and accelerate the vehicle to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P3240" detected?

- YES >> Go to [TMS-81. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998413

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5. "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Power switch ON and wait 10 seconds or more.
2. Check DTC of the high voltage systems.

P3240 DRIVE MOTOR A INVERTER CRNT CONT

< DTC/CIRCUIT DIAGNOSIS >

Were there any detected DTC related to a high voltage systems other than the traction motor inverter?

- YES >> Check DTC detected item.
NO >> GO TO 2.

2.CHECK TRACTION MOTOR RESOLVER OFFSET DATA

1. Use CONSULT to read the traction motor resolver offset, and record the result.

NOTE:

"Work support" - "RESOLVER WRITE" can be used to check the traction motor resolver offset that is currently stored by the traction motor inverter.

2. Remove the under cover and record the traction motor resolver offset that is stamped on the traction motor.

NOTE:

For the location of traction motor resolver offset stamping, refer to [TMS-44, "Description"](#).

3. Check whether or not the value read with CONSULT matches the value which was stamped on the traction motor.

Do the values match?

- YES >> GO TO 3.
NO >> Write the traction motor resolver offset to the traction motor inverter. Refer to [TMS-44, "Work Procedure"](#).

3.PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

- Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
- Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
- Measure voltage between high voltage harness terminals.

DANGER:

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

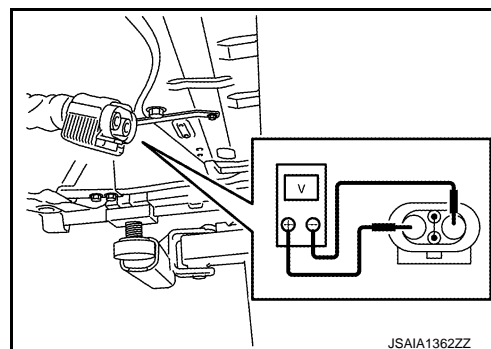


Standard

: 5 V or less

CAUTION:

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



>> GO TO 4.

4.CHECK THE CONNECTION CONDITIONS OF THE TRACTION MOTOR INVERTER U-V-W TERMINALS

Remove the high voltage safety cover and 3-phase harness cover from the traction motor inverter, and check the 3-harness connection conditions. Refer to [TMS-116, "Exploded View"](#).

Is the inspection result normal?

- YES >> GO TO 5.
NO >> Tighten the 3-phase harness to the specified torque. Refer to [TMS-116, "Exploded View"](#).

5.CHECK DISCONNECTION TRACTION MOTOR STATOR COIL

- Disconnect the 3-phase harness from the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
- Check for an open circuit in the traction motor stator coil.

P3240 DRIVE MOTOR A INVERTER CRNT CONT

< DTC/CIRCUIT DIAGNOSIS >

3-phase harness		Resistance
Terminal		
U-phase	V-phase	1Ω or less
V-phase	W-phase	
W-phase	U-phase	

Is the inspection result normal?

YES >> GO TO 6.

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

6.CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

YES >> GO TO 7.

NO >> Repair or replace damaged parts.

7.CHECK HIGH VOLTAGE HARNESS

Check the following items. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

- Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery.
- Check for an open circuit or short circuit between DC/DC-J/B and A/C inverter compressor.
- Check for an open circuit or short circuit between DC/DC-J/B and PTC element heater.
- Check for an open circuit or short circuit between DC/DC-J/B and on board charger.
- Check for an open circuit or short circuit between DC/DC-J/B and quick charge port.

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Repair or replace damaged parts.

P3241 DRIVE MOTOR A INVERTER CRNT CONT

< DTC/CIRCUIT DIAGNOSIS >

P3241 DRIVE MOTOR A INVERTER CRNT CONT

DTC Logic

INFOID:000000006998414

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3241	Drive Motor "A" Inverter Performance/AC Error Detection	If no current is being applied to 1 phase of the traction motor	<ul style="list-style-type: none">• Traction motor inverter• Traction motor• High voltage harness or connector

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

④ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Fully open the accelerator and accelerate the vehicle to 10 km/h (6 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P3241" detected?

- YES >> Go to [TMS-84, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998415

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).
Check the voltage in high voltage circuit. (Check that condenser are discharged.)

P3241 DRIVE MOTOR A INVERTER CRNT CONT

< DTC/CIRCUIT DIAGNOSIS >

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

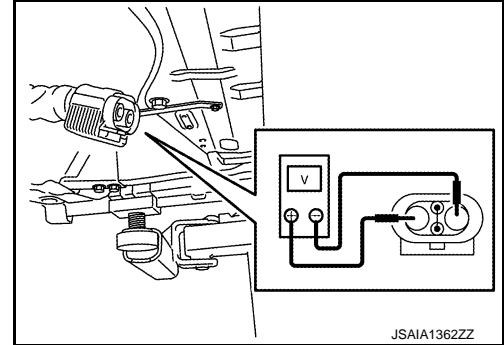


Standard

: 5 V or less

CAUTION:

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



>> GO TO 2.

2.CHECK THE CONNECTION CONDITIONS OF THE TRACTION MOTOR INVERTER U-V-W TERMINALS

Remove the high voltage safety cover and 3-phase harness cover from the traction motor inverter, and check the 3-phase harness connection conditions. Refer to [TMS-116, "Exploded View"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Tighten the 3-phase harness to the specified torque. Refer to [TMS-116, "Exploded View"](#).

3.CHECK DISCONNECTION TRACTION MOTOR STATOR COIL

1. Disconnect the 3-phase harness from the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
2. Check for an open circuit in the traction motor stator coil.

3-phase harness		Resistance
Terminal		
U-phase	V-phase	1Ω or less
V-phase	W-phase	
W-phase	U-phase	

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

P3244 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3244 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998416

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3244	Drive Motor "A" Inverter Voltage Sensor Performance	If the value detected by the high voltage DC voltage sensor is abnormal	<ul style="list-style-type: none">• Traction motor inverter• High voltage harness or connector• Li-ion battery• High voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓟ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Accelerate to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P3244" detected?

- YES >> Go to [TMS-86, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998417

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC of the high voltage systems.

Were there any detected DTC related to a high voltage systems other than the traction motor inverter?

P3244 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

- YES >> Check DTC detected item.
NO >> GO TO 2.

2. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View" \(TYPE 1\)](#), [EVB-395, "Exploded View" \(TYPE 2\)](#), [EVB-626, "Exploded View" \(TYPE 3\)](#), or [EVB-866, "Exploded View" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation" \(TYPE 1\)](#), [EVB-395, "Removal and Installation" \(TYPE 2\)](#), [EVB-626, "Removal and Installation" \(TYPE 3\)](#), or [EVB-866, "Removal and Installation" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

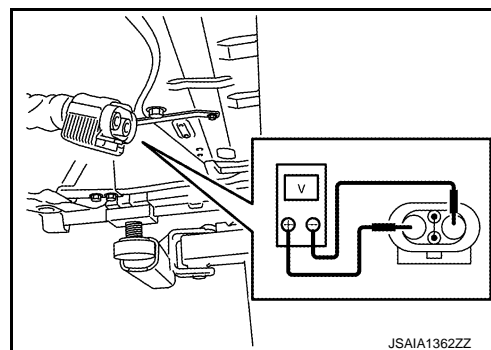


Standard

: 5 V or less

CAUTION:

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



>> GO TO 3.

3. CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK HIGH VOLTAGE HARNESS

Check the following items. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

- Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery.
- Check for an open circuit or short circuit between DC/DC-J/B and A/C inverter compressor.
- Check for an open circuit or short circuit between DC/DC-J/B and PTC element heater.
- Check for an open circuit or short circuit between DC/DC-J/B and on board charger.
- Check for an open circuit or short circuit between DC/DC-J/B and quick charge port.

Is the inspection result normal?

- YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Repair or replace damaged parts.

P3245 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3245 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998418

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3245	Drive Motor "A" Inverter Voltage Sensor Circuit	If there is an abnormality in the high voltage DC voltage sensor	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P3245" detected?

YES >> Go to [TMS-88, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998419

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P3246 DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P3246 DRIVE MOTOR A INVERTER VOLTAGE

DTC Logic

INFOID:000000006998420

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3246	Drive Motor "A" Inverter Voltage Too Low	If the high voltage DC voltage is too low	<ul style="list-style-type: none">• Traction motor inverter• High voltage harness or connector• Li-ion battery• High voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓐ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Accelerate to 60 km/h (37 MPH).
3. Stop the vehicle.
4. Check DTC.

Is "P3246" detected?

- YES >> Go to [TMS-89, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998421

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC of the high voltage systems.

Were there any detected DTC related to a high voltage systems other than the traction motor inverter?

P3246 DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

YES >> Check DTC detected item.
NO >> GO TO 2.

2. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the Li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:

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

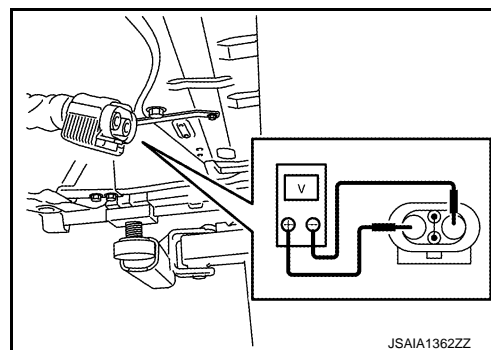


Standard

: 5 V or less

CAUTION:

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



>> GO TO 3.

3. CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. CHECK HIGH VOLTAGE HARNESS

Check the following items. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

- Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery.
- Check for an open circuit or short circuit between DC/DC-J/B and A/C inverter compressor.
- Check for an open circuit or short circuit between DC/DC-J/B and PTC element heater.
- Check for an open circuit or short circuit between DC/DC-J/B and on board charger.
- Check for an open circuit or short circuit between DC/DC-J/B and quick charge port.

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Repair or replace damaged parts.

P3247 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3247 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:0000000006998422

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3247	Drive Motor "A" Inverter Driver Power Supply	If the IGBT drive circuit power does not start up	Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

CAUTION:

If this DTC is detected simultaneously with P0A8D, inspect the 12V battery first, as it is suspected to be dead.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

④ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P3247" detected?

- YES >> Go to [TMS-91, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:0000000006998423

1. REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P3248 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3248 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998424

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3248	Drive Motor "A" Inverter Driver Power Supply Performance	If there is overcurrent or overvoltage in the IGBT drive circuit power	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P3248" detected?

YES >> Go to [TMS-92, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998425

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P3249 DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P3249 DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998426

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3249	Drive Motor "A" Inverter Driver Signal	If the IGBT drive current circuit voltage is too low	<ul style="list-style-type: none">• Harness, fuse, or connectors (Each circuit is open or shorted.)• Traction motor inverter• M/C relay

DTC CONFIRMATION PROCEDURE

CAUTION:

If this DTC is detected simultaneously with P0A8D, inspect the 12V battery first, as it is suspected to be dead.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P3249" detected?

YES >> Go to [TMS-93, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998427

1. CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the 10A fuse (# 74).
3. Power switch ON.
4. Check the voltage between traction motor inverter vehicle side harness connector terminals.

traction motor inverter vehicle side harness connector			Voltage
Connector	Terminal		
	+	–	
F13	4	2	9 – 16 V
	10	8	

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Check the M/C relay. Refer to [EVC-335, "Diagnosis Procedure"](#).

P324A DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

P324A DRIVE MOTOR A INVERTER VOLTAGE

DTC Logic

INFOID:000000006998428

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P324A	Drive Motor "A" Inverter Charge Error	If the high voltage DC circuit is not charged	<ul style="list-style-type: none">• Traction motor inverter• High voltage harness or connector• Li-ion battery• High voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓟ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P324A" detected?

- YES >> Go to [TMS-94, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998429

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC of the high voltage systems.

Were there any detected DTC related to a high voltage systems other than the traction motor inverter?

- YES >> Check DTC detected item.
NO >> GO TO 2.

P324A DRIVE MOTOR A INVERTER VOLTAGE

< DTC/CIRCUIT DIAGNOSIS >

2. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

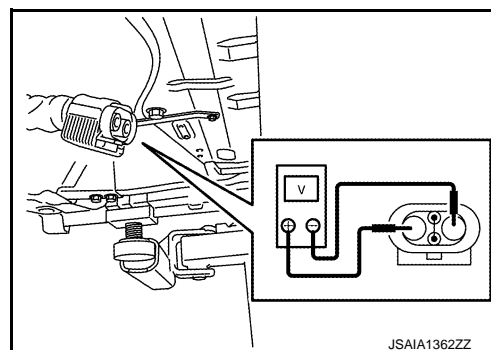


Standard

: 5 V or less

CAUTION:

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



>> GO TO 3.

3. CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4. CHECK HIGH VOLTAGE HARNESS

Check the following items. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

- Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery.
- Check for an open circuit or short circuit between DC/DC-J/B and A/C inverter compressor.
- Check for an open circuit or short circuit between DC/DC-J/B and PTC element heater.
- Check for an open circuit or short circuit between DC/DC-J/B and on board charger.
- Check for an open circuit or short circuit between DC/DC-J/B and quick charge port.

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Repair or replace damaged parts.

P324D DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

P324D DRIVE MOTOR A INVERTER IGBT

DTC Logic

INFOID:000000006998430

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P324D	Drive Motor "A" Inverter IGBT Over Load (Over Current/Over Temperature)	<ul style="list-style-type: none">• If an over current has occurred in the IGBT energizing current• If IGBT temperature is too high	<ul style="list-style-type: none">• Traction motor inverter• Traction motor• High voltage cooling system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

⑧ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Drive during 20 minutes for warm-up.
3. Repeat driving of 0 km/h (0 MPH) → 60 km/h (37 MPH) with full acceleration 10 times without interval.
4. Stop the vehicle.
5. Check DTC.

Is "P324D" detected?

- YES >> Go to [TMS-96. "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998431

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5. "High Voltage Precautions"](#).

CAUTION:

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

1. CHECK DTC HIGH VOLTAGE COOLING SYSTEM

1. Power switch ON and wait for 10 seconds or more.
2. Perform "Self Diagnostic Results" in "EV/HEV".

Is any DTC detected?

- YES >> Check DTC detected item. Refer to [EVC-84. "DTC Index"](#).

P324D DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

NO >> GO TO 2.

2.CHECK COOLANT WATER

Check the coolant level and check for coolant leakage. Refer to [HCO-11, "Inspection"](#).

Is the inspection result normal?

YES >> GO TO 3.

NO >> Repair or replace damaged parts.

3.CHECK COOLANT HOSE

Check for clogging of fluid paths and twisting of hoses in traction motor inverter, traction motor, DC/DC-J/B, and on board charger. Refer to [HCO-7, "High Voltage Cooling System"](#).

Is the inspection result normal?

YES >> GO TO 4.

NO >> Repair or replace damaged parts.

4.PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

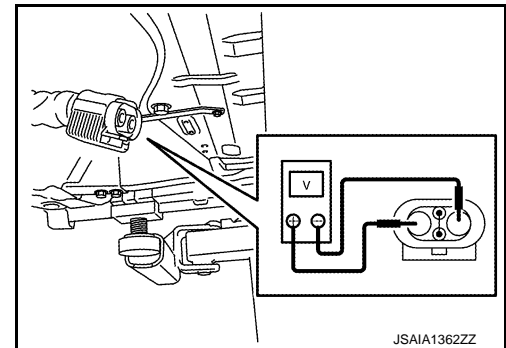


Standard

: 5 V or less

CAUTION:

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



>> GO TO 5.

5.CHECK TRACTION MOTOR INSULATION RESISTANCE

CAUTION:

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

1. Disconnect the 3-phase harness from the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
2. Using an insulation resistance tester (500V range), measure the resistance according to the value in the table below.

CAUTION:

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

NOTE:

As each harness (U-phase, V-phase, and W-phase) contacts to each other inside the traction motor, check resistance of a phase.

P324D DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

3-phase harness	Ground	Resistance
Terminal		
U-phase	Ground	10 MΩ or more
V-phase		
W-phase		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

6. CHECK RESISTANCE TRACTION MOTOR STATOR COIL

Check the resistance traction motor stator coil. Refer to [TMS-98, "Component Inspection \(Traction Motor Stator Coil\)"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

Component Inspection (Traction Motor Stator Coil)

INFOID:000000006998432

1. CHECK RESISTANCE OF TRACTION MOTOR STATOR COIL

Using a milliohm meter and check the resistance traction motor stator coil.

CAUTION:

As resistance of stator coil is affected by temperature, check it at least 8 hour after removal of service plug.

3-phase harness		Resistance*
Terminal		
U-phase	V-phase	11.6 – 14.3 mΩ
V-phase	W-phase	
W-phase	U-phase	

*: The value is at 20 °C (68 °F). Calculate the resistance standard value based on actual ambient temperature at operation based on the below calculation formula.

Calculating formula

- $R_{20} = R / [1 + 0.00393 \times (T - 20)]$
- R₂₀: Resistance value (mΩ) at 20 °C (68 °F)
- R: Resistance value (mΩ) at actual ambient temperature at operation
- T: Actual ambient temperature [°C (°F)] at operation

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the stator coil. Refer to [TMS-124, "Removal and Installation"](#).

P324F DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

P324F DRIVE MOTOR A INVERTER IGBT

DTC Logic

INFOID:000000006998433

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P324F	Drive Motor "A" Inverter IGBT Over Current / Over Temperature /Over Voltage	<ul style="list-style-type: none">If an over current has occurred in the IGBT energizing currentIf IGBT temperature is too highIf there is overvoltage in the high voltage DC voltage	<ul style="list-style-type: none">Traction motor inverterTraction motorHigh voltage harness or connectorHigh voltage cooling systemLi-ion batteryHigh voltage parts except for traction motor inverter

DTC CONFIRMATION PROCEDURE

CAUTION:

- If this DTC is detected simultaneously with P0A8D, inspect the 12V battery first, as it is suspected to be dead.
- Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

④ With CONSULT

- Set the vehicle to READY and wait for 10 seconds or more.
- Drive during 20 minutes for warm-up.
- Repeat driving of 0 km/h (0 MPH) → 60 km/h (37 MPH) with full acceleration 10 times without interval.
- Stop the vehicle.
- Check DTC.

Is "P324F" detected?

- YES >> Go to [TMS-99, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998434

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "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.

P324F DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

1. CHECK DTC HIGH VOLTAGE SYSTEMS

1. Turn power switch ON and wait for 10 seconds or more.
2. Check DTC of the high voltage systems.

Is any DTC detected?

- YES >> Check DTC detected item.
NO >> GO TO 2.

2. CHECK COOLANT WATER

Check the coolant level and check for coolant leakage. [HCO-11, "Inspection"](#).

Is the inspection result normal?

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

3. CHECK COOLANT HOSE

Check for clogging of fluid paths and twisting of hoses in traction motor inverter, traction motor, DC/DC-J/B, and on board charger. Refer to [HCO-7, "High Voltage Cooling System"](#).

Is the inspection result normal?

- YES >> GO TO 4.
NO >> Repair or replace damaged parts.

4. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:

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

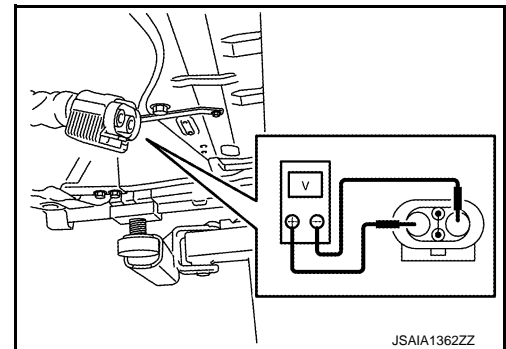


Standard

: 5 V or less

CAUTION:

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



>> GO TO 5.

5. CHECK TRACTION MOTOR INSULATION RESISTANCE

CAUTION:

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

1. Disconnect the 3-phase harness from the traction motor inverter. [TMS-116, "Removal and Installation"](#).
2. Using an insulation resistance tester (500V range), measure the resistance according to the value in the table below.

CAUTION:

P324F DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

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

NOTE:

As each harness (U-phase, V-phase, and W-phase) contacts to each other inside the traction motor, check resistance of a phase.

3-phase harness	Ground	Resistance
Terminal		
U-phase	Ground	10 MΩ or more
V-phase		
W-phase		

Is the inspection result normal?

YES >> GO TO 6.

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

6.CHECK RESISTANCE TRACTION MOTOR STATOR COIL

Check resistance traction motor stator coil. Refer to [TMS-101, "Component Inspection \(Traction Motor Stator Coil\)"](#).

Is the inspection result normal?

YES >> GO TO 7.

NO >> Remove the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

7.CHECK TRACTION MOTOR INVERTER HIGH VOLTAGE HARNESS CONNECTOR

Check the connection conditions of the traction motor inverter high voltage harness connector.

Is the inspection result normal?

YES >> GO TO 8.

NO >> Repair or replace damaged parts.

8.CHECK HIGH VOLTAGE HARNESS

Check for an open circuit or short circuit between DC/DC-J/B and Li-ion battery. Refer to [TMS-18, "TRACTION MOTOR INVERTER : Circuit Diagram"](#).

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Repair or replace damaged parts.

Component Inspection (Traction Motor Stator Coil)

INFOID:0000000006998435

1.CHECK RESISTANCE OF TRACTION MOTOR STATOR COIL

Using a milliohmmeter and check the resistance traction motor stator coil.

CAUTION:

As resistance of stator coil is affected by temperature, check it at least 8 hour after removal of service plug.

3-phase harness		Resistance*
Terminal		
U-phase	V-phase	11.6 – 14.3 mΩ
V-phase	W-phase	
W-phase	U-phase	

*: The value is at 20 °C (68 °F). Calculate the resistance standard value based on actual ambient temperature at operation based on the below calculation formula.

Calculating formula

• $R_{20} = R / [1 + 0.00393 \times (T - 20)]$

- R₂₀: Resistance value (mΩ) at 20 °C (68 °F)

- R: Resistance value (mΩ) at actual ambient temperature at operation

P324F DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

- T: Actual ambient temperature [°C (°F)] at operation

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor due to malfunction in the stator coil. Refer to [TMS-124, "Removal and Installation"](#).

P3252 DRIVE MOTOR A INVERTER IGBT

< DTC/CIRCUIT DIAGNOSIS >

P3252 DRIVE MOTOR A INVERTER IGBT

DTC Logic

INFOID:000000006998436

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P3252	Drive Motor "A" Inverter IGBT High Temperature	If IGBT temperature is too high	<ul style="list-style-type: none">• Traction motor inverter• High voltage cooling system

DTC CONFIRMATION PROCEDURE

CAUTION:

Always drive vehicle at a safe speed.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Set the vehicle to READY and wait for 10 seconds or more.
2. Drive during 20 minutes for warm-up.
3. Repeat driving of 0 km/h (0 MPH) → 60 km/h (37 MPH) with full acceleration 10 times without interval.
4. Stop the vehicle.
5. Check DTC.

Is "P3252" detected?

- YES >> Go to [TMS-103, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998437

1. CHECK DTC HIGH VOLTAGE COOLING SYSTEM

1. Power switch ON and wait for 10 seconds or more.
2. Perform "Self Diagnostic Results" in "EV/HEV".

Is any DTC detected?

- YES >> Check DTC detected item. Refer to [EVC-84, "DTC Index"](#).
NO >> GO TO 2.

2. CHECK COOLANT WATER

Check the coolant level and check for coolant leakage. Refer to [HCO-11, "Inspection"](#).

Is the inspection result normal?

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

3. CHECK COOLANT HOSE

Check for clogging of fluid paths and twisting of hoses in traction motor inverter, traction motor, DC/DC-J/B, and on board charger. Refer to [HCO-7, "High Voltage Cooling System"](#).

Is the inspection result normal?

- YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
NO >> Repair or replace damaged parts.

P325A CAN ERROR

< DTC/CIRCUIT DIAGNOSIS >

P325A CAN ERROR

DTC Logic

INFOID:000000006998438

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325A	CAN data error	If traction motor inverter detects CAN data error	VCM

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

 With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "P325A" detected?

YES >> Go to [TMS-104, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998439

1. REPLACE VCM

Replace the VCM. Refer to [EVC-377, "Removal and Installation"](#).

>> END

P325B DRIVE MOTOR A INVERTER

< DTC/CIRCUIT DIAGNOSIS >

P325B DRIVE MOTOR A INVERTER

DTC Logic

INFOID:000000006998440

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325B	Drive Motor "A" Inverter TEMP-M Circuit	If the IGBT high temperature detection signal is stuck	<ul style="list-style-type: none">• Harness, fuse, or connectors (Each circuit is open or shorted.)• Traction motor inverter• M/C relay

DTC CONFIRMATION PROCEDURE

CAUTION:

If this DTC is detected simultaneously with P0A8D, inspect the 12V battery first, as it is suspected to be dead.

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P325B" detected?

YES >> Go to [TMS-105, "Diagnosis Procedure"](#).

NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998441

1. CHECK TRACTION MOTOR INVERTER HARNESS CONNECTOR

1. Power switch OFF.
2. Check the connection conditions of the traction motor inverter harness connector.

Is the inspection result normal?

YES >> GO TO 2.

NO >> Repair or replace damaged parts.

2. CHECK POWER SUPPLY CIRCUIT

1. Disconnect the traction motor inverter harness connector.
2. Check the 10A fuse (# 74).
3. Power switch ON.
4. Check the voltage between traction motor inverter vehicle side harness connector terminals.

traction motor inverter vehicle side harness connector			Voltage
Connector	Terminal		
	+	–	
F13	4	2	9 – 16 V
	10	8	

Is the inspection result normal?

YES >> Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

NO >> Check the M/C relay. Refer to [EVC-335, "Diagnosis Procedure"](#).

P325C DRIVE MOTOR A POSITION

< DTC/CIRCUIT DIAGNOSIS >

P325C DRIVE MOTOR A POSITION

DTC Logic

INFOID:000000006998442

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325C	Drive Motor "A" Position Value Unrecorded	When correction value memorized by traction motor inverter is the initial value	The traction motor resolver offset has not been written to the traction motor inverter

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch OFF and wait for 10 seconds or more.
2. Power switch ON and wait for 10 seconds or more.
3. Check DTC.

Is "P325C" detected?

- YES >> Go to [TMS-106, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998443

1.RECORDING THE TRACTION MOTOR RESOLVER OFFSET THAT IS STAMPED ON THE TRACTION MOTOR

1. Power switch OFF.
2. Remove the under cover and record the traction motor resolver offset that is stamped on the traction motor.

NOTE:

For the traction motor stamp location, refer to [TMS-44, "Description"](#).

>> GO TO 2.

2.WRITING OF TRACTION MOTOR RESOLVER OFFSET

Write the traction motor resolver offset to the traction motor inverter. Refer to [TMS-44, "Work Procedure"](#).

>> GO TO 3.

3.READING AND CHECKING TRACTION MOTOR RESOLVER OFFSET

1. Power switch OFF and wait for 10 seconds or more.
2. Power switch ON.
3. Use CONSULT to read the traction motor offset that is written to the traction motor inverter.
4. Check whether or not the read value matches the value which is stamped on the traction motor.

Do the values match?

- YES >> INSPECTION END
NO >> GO TO 1.

P325D DRIVE MOTOR A POSITION

< DTC/CIRCUIT DIAGNOSIS >

P325D DRIVE MOTOR A POSITION

DTC Logic

INFOID:000000006998444

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325D	Drive Motor "A" Position Off-set Value Error	If the traction motor resolver angle data stored by the traction motor inverter is abnormal	Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

1.PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2.CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P325D" detected?

- YES >> Go to [TMS-107, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998445

1.REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P325E DRIVE MOTOR A POSITION

< DTC/CIRCUIT DIAGNOSIS >

P325E DRIVE MOTOR A POSITION

DTC Logic

INFOID:000000006998446

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325E	Drive Motor "A" Position Value Error 1	If the traction motor resolver offset stored by the traction motor inverter is abnormal	Traction motor inverter

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P325E" detected?

- YES >> Go to [TMS-108, "Diagnosis Procedure"](#).
NO >> INSPECTION END

Diagnosis Procedure

INFOID:000000006998447

1. REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

P325F DRIVE MOTOR A POSITION

< DTC/CIRCUIT DIAGNOSIS >

P325F DRIVE MOTOR A POSITION

DTC Logic

INFOID:000000006998448

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
P325F	Drive Motor "A" Position Value Error	If the traction motor resolver offset stored by the traction motor inverter is abnormal	Traction motor inverter

TMS

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

Ⓔ With CONSULT

1. Power switch ON and wait for 10 seconds or more.
2. Check DTC.

Is "P325F" detected?

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

Diagnosis Procedure

INFOID:000000006998449

1. REPLACE TRACTION MOTOR INVERTER

Replace the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

>> END

U1000 CAN COMM CIRCUIT

< DTC/CIRCUIT DIAGNOSIS >

U1000 CAN COMM CIRCUIT

Description

INFOID:000000006998450

CAN (Controller Area Network) is a serial communication line for real-time application. It is an on-vehicle multiplex communication line with high data communication speed and excellent malfunction detection ability. Many electronic control units are equipped onto a vehicle, and each control unit shares information and links with other control units during operation (not independently). In CAN communication, control units are connected with 2 communication lines (CAN-H line, CAN-L line) allowing a high rate of information transmission with less wiring. Each control unit transmits/receives data but selectively reads required data only.

DTC Logic

INFOID:000000006998451

DTC DETECTION LOGIC

DTC	Trouble diagnosis name	Malfunction detected condition	Possible causes
U1000	CAN communication line	If CAN communications signals continuously cannot be transmitted	Harness or connectors (CAN communication line is open or shorted.)

DTC CONFIRMATION PROCEDURE

1. PRECONDITIONING

If "DTC CONFIRMATION PROCEDURE" has been previously conducted, always power switch OFF and wait at least 10 seconds before conducting the next test.

>> GO TO 2.

2. CHECK DTC DETECTION

ⓘ With CONSULT

1. Power switch ON and wait for 5 seconds or more.
2. Check DTC.

Is "U1000" detected?

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

Diagnosis Procedure

INFOID:000000006998452

For the diagnosis procedure, refer to [LAN-15, "Trouble Diagnosis Flow Chart"](#).

TRACTION MOTOR INSULATION RESISTANCE CHECK

< DTC/CIRCUIT DIAGNOSIS >

TRACTION MOTOR INSULATION RESISTANCE CHECK

Component Inspection

INFOID:000000006998453

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

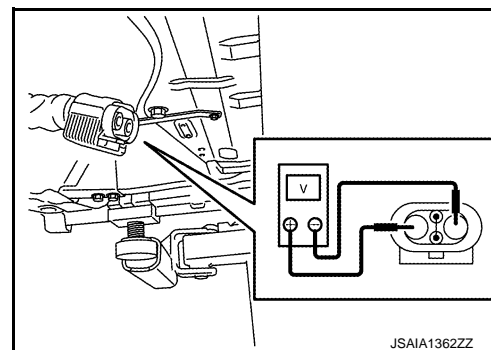


Standard

: 5 V or less

CAUTION:

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



>> GO TO 2.

2. CHECK TRACTION MOTOR INSULATION RESISTANCE

WARNING:

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

1. Disconnect the 3-phase harness from the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).

TRACTION MOTOR INSULATION RESISTANCE CHECK

< DTC/CIRCUIT DIAGNOSIS >

2. Use 500V range of insulation resistance tester to measure insulation resistance. Wait for 30 seconds until the value becomes stable.

CAUTION:

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

NOTE:

As each harness (U-phase, V-phase, and W-phase) contacts to each other inside the traction motor, check resistance of a phase.

3-phase harness Terminal	Ground	Resistance
U-phase	Ground	10 MΩ or more
V-phase		
W-phase		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor. Refer to [TMS-124, "Removal and Installation"](#).

TRACTION MOTOR INVERTER INSULATION RESISTANCE CHECK

< DTC/CIRCUIT DIAGNOSIS >

TRACTION MOTOR INVERTER INSULATION RESISTANCE CHECK

Component Inspection

INFOID:000000006998454

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "High Voltage Precautions"](#).

CAUTION:

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

1. PRECONDITIONING

WARNING:

Disconnect high voltage circuit. Refer to [GI-31, "How to Disconnect High Voltage"](#).

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

1. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
2. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
3. Measure voltage between high voltage harness terminals.

DANGER:



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

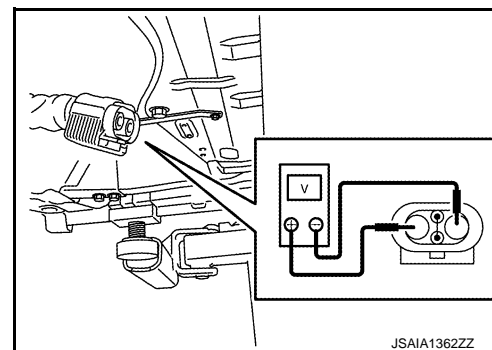


Standard

: 5 V or less

CAUTION:

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



>> GO TO 2.

2. CHECK TRACTION MOTOR INVERTER INSULATION RESISTANCE

WARNING:

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

1. Remove the traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
2. Use 500V range of insulation resistance tester to measure insulation resistance. Wait for 30 seconds until the value becomes stable.

TRACTION MOTOR INVERTER INSULATION RESISTANCE CHECK

< DTC/CIRCUIT DIAGNOSIS >

CAUTION:

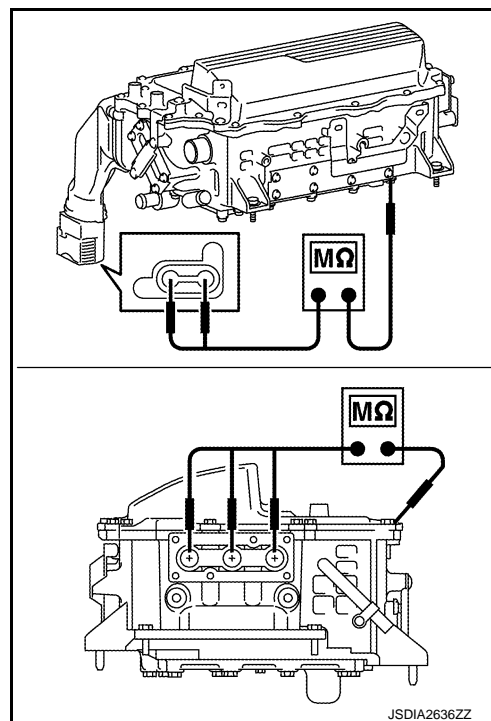
Be sure to set the insulation resistance tester to 500 V when performing this test. Using a setting higher than 500 V can result in damage to the component being inspected.

Traction motor inverter		Ground	Resistance
Item	Terminal		
High voltage connector	37	Traction motor inverter case	14 MΩ or more
	38		
3-phase harness jack	U-phase		
	V-phase		
	W-phase		

Is the inspection result normal?

YES >> INSPECTION END

NO >> Replace the traction motor inverter. Refer to [TMS-116](#), "[Removal and Installation](#)".



ELECTROMAGNETIC SOUND IS AUDIBLE

< SYMPTOM DIAGNOSIS >

SYMPTOM DIAGNOSIS

ELECTROMAGNETIC SOUND IS AUDIBLE

DESCRIPTION

INFOID:0000000006998455

The electromagnetic noise of the traction motor may become more noticeable when accelerating on a steep slope (large output torque).

This occurs when the IGBT switching frequency is lowered by the traction motor inverter due to high temperature of the IGBT inside the traction motor inverter. This does not indicate a problem with the traction motor inverter characteristics or control.

This phenomenon is one of the protective controls. Refer to [TMS-34. "Protection Control"](#).

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TRACTION MOTOR INVERTER

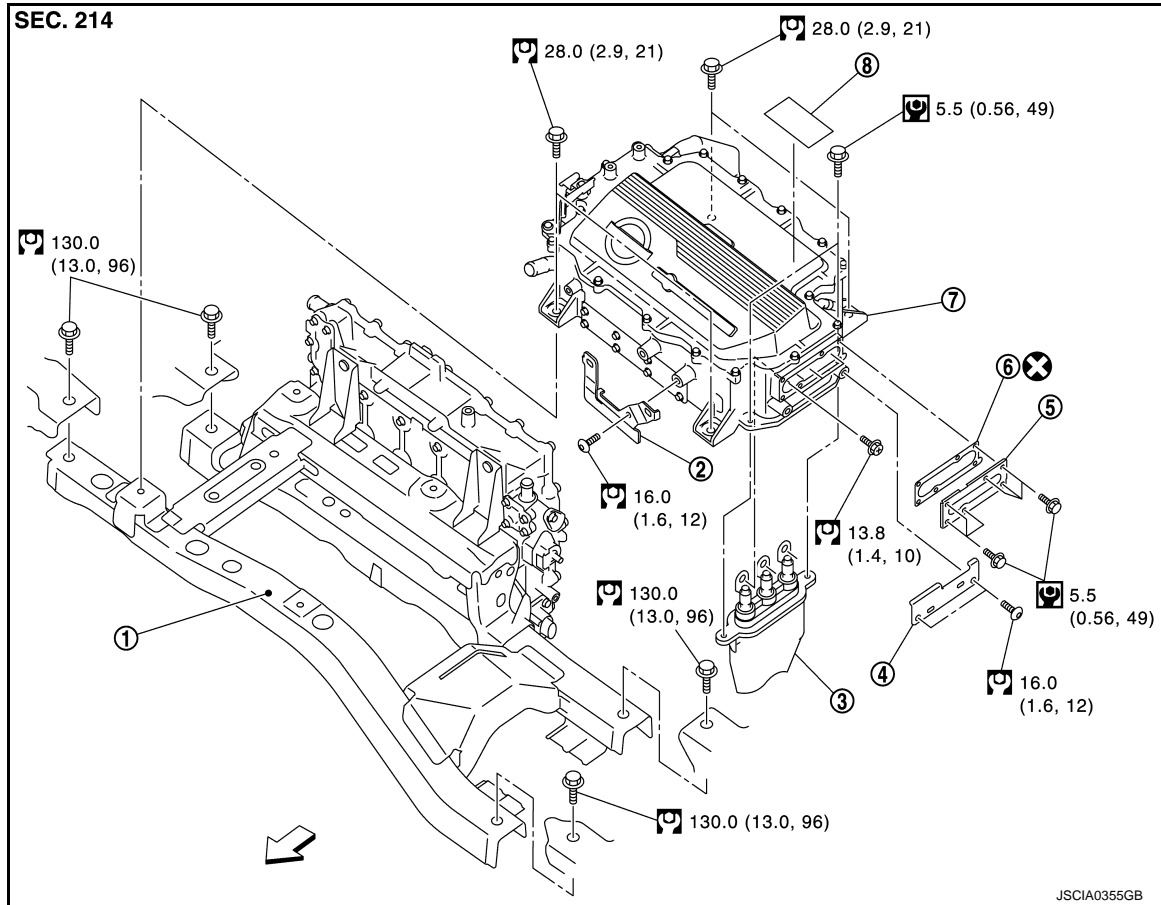
< REMOVAL AND INSTALLATION >

REMOVAL AND INSTALLATION

TRACTION MOTOR INVERTER

Exploded View

INFOID:000000006998456



- | | | |
|------------------------------|-------------------------------|--------------------|
| 1. Inverter member | 2. High voltage safety cover | 3. 3-phase harness |
| 4. High voltage safety cover | 5. 3-phase harness cover | 6. Gasket |
| 7. Traction motor inverter | 8. High voltage warning label | |

⇐ : Vehicle front

⊗ : Always replace after every disassembly.

⊙ : N·m (kg-m, in-lb)

⊙ : N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000006998457

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are handled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.
- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.

TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "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 [GI-31, "How to Disconnect High Voltage"](#).

- Check voltage in high voltage circuit. (Check that condenser are discharged.)
 - Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View" \(TYPE 1\)](#), [EVB-395, "Exploded View" \(TYPE 2\)](#), [EVB-626, "Exploded View" \(TYPE 3\)](#), or [EVB-866, "Exploded View" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
 - Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation" \(TYPE 1\)](#), [EVB-395, "Removal and Installation" \(TYPE 2\)](#), [EVB-626, "Removal and Installation" \(TYPE 3\)](#), or [EVB-866, "Removal and Installation" \(TYPE 4\)](#). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
 - Measure voltage between high voltage harness terminals.

DANGER:



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

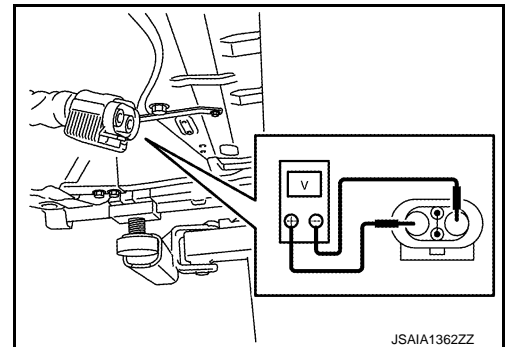


Standard

: 5 V or less

CAUTION:

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

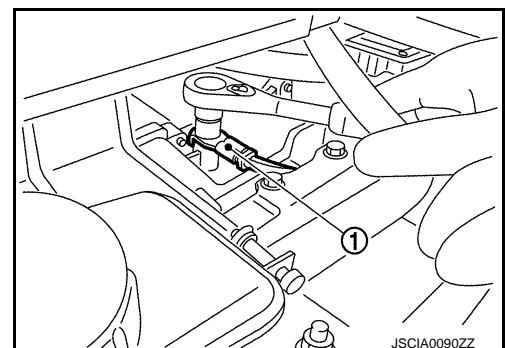


- Remove front under cover. Refer to [EXT-23, "FRONT UNDER COVER : Exploded View"](#).
- Drain coolant from radiator. Refer to [HCO-11, "Draining and Refilling"](#).
- Remove 12V battery. Refer to [TMS-8, "Precautions for Removing Battery Terminal"](#).
- Move fuse box.
- Remove ground cable from DC/DC-J/B.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- Remove motor room harness clip and water hose clip which are attached to traction motor inverter.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

8. Turn traction motor inverter harness connector (1) of traction motor inverter counterclockwise to remove it.

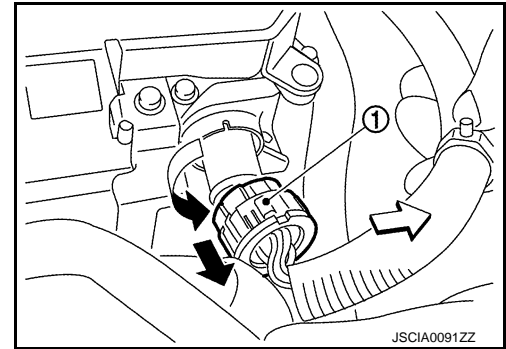


: Vehicle front

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



9. Remove brake reservoir tank together with bracket, and move it in order to secure work space needed to remove traction motor inverter.
10. Remove degas tank, and move it in order to secure work space needed to remove traction motor inverter.
11. Disconnect water hose from OUT side of traction motor inverter.

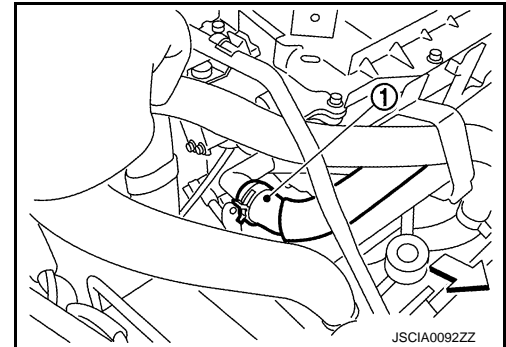


: Vehicle front

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

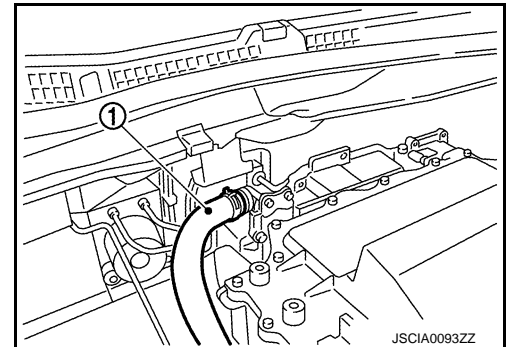
- Take care that coolant does not contact the high voltage harness connectors.
- To prevent performance degradation, if coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.

12. Disconnect water hose (1) at DC/DC-J/B OUT side.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Take care that coolant does not contact the high voltage harness connectors.
- To prevent performance degradation, if coolant contacts a high voltage harness connector, immediately dry the high voltage connector completely with an air blow gun.

13. Remove torx bolts (A), and then remove high voltage safety cover (1).

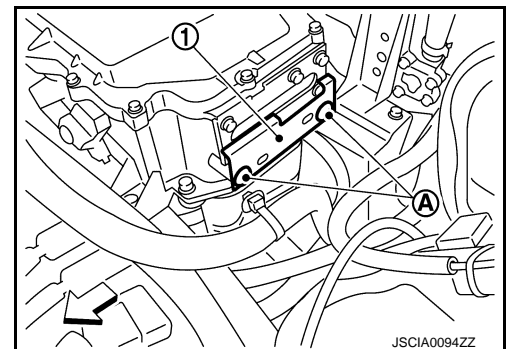


: Vehicle front

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

14. Remove 3-phase harness cover mounting bolts and remove 3-phase harness cover.

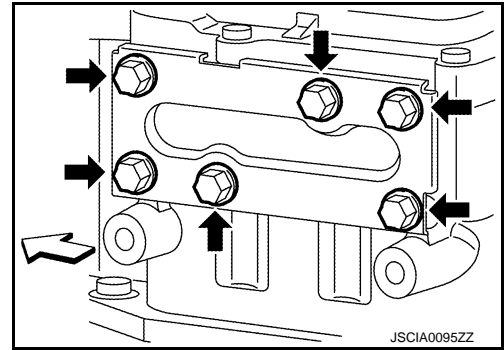


: Vehicle front

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



15. Remove 3-phase harness mounting bolts and remove 3-phase harness.

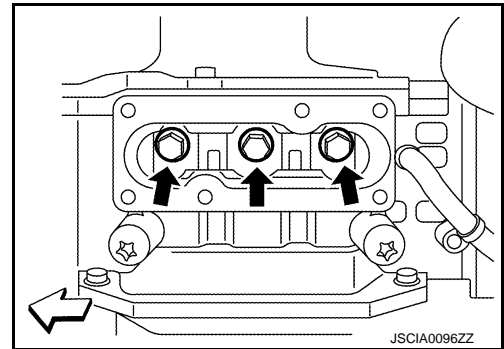


: Vehicle front

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- When removing 3-phase harness mounting bolts, take care not to drop them into traction motor inverter.
- Bolts cannot fall into the traction motor inverter until 3-phase harness is pulled downwards. Therefore if bolts look likely to fall, be sure to collect them with a magnet or other means before pulling 3-phase harness out downwards.
- If a bolt falls into traction motor inverter, do not invert traction motor inverter. (If inverted, bolt may contact PCB inside traction motor inverter, causing damage.)
- Incline so that 3-phase harness bolt insertion hole faces down in order to recover the fallen bolt.

16. Remove 3-phase harness grommet mounting bolts and pull 3-phase harness out downwards.

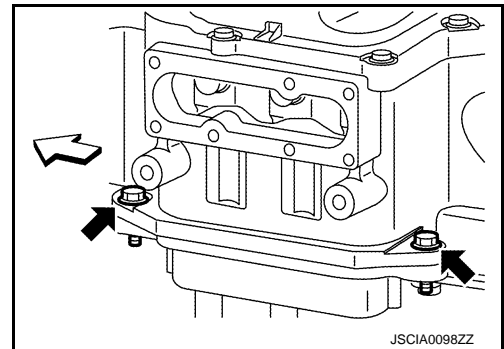


: Vehicle front

WARNING:



- To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.

TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

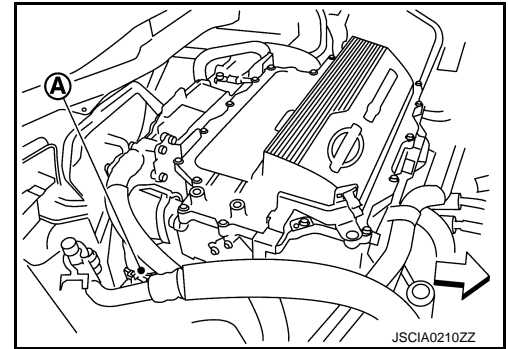
17. Remove high voltage connector (3 step type) that is connected to DC/DC-J/B.



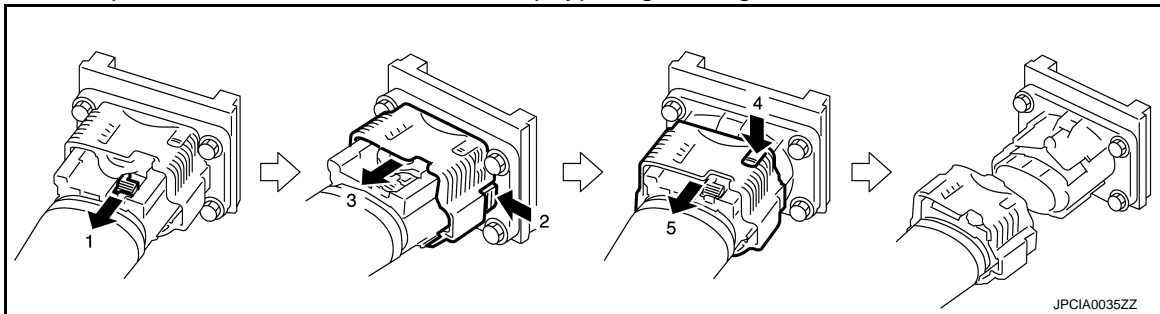
: Vehicle front

WARNING:

- To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- Protect the terminals of disconnected high voltage harness connector with insulation tape so that they are not exposed.
- Follow steps shown below to remove a 3-step type high voltage connector.



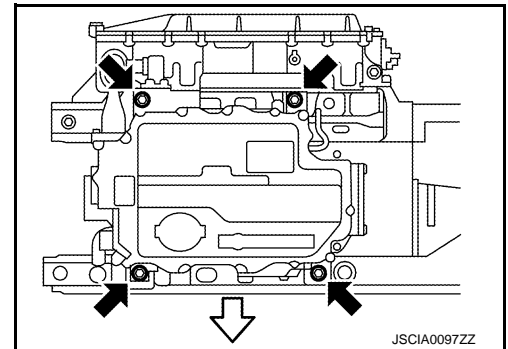
18. Remove traction motor inverter fastening bolts, then remove traction motor inverter.



: Vehicle front

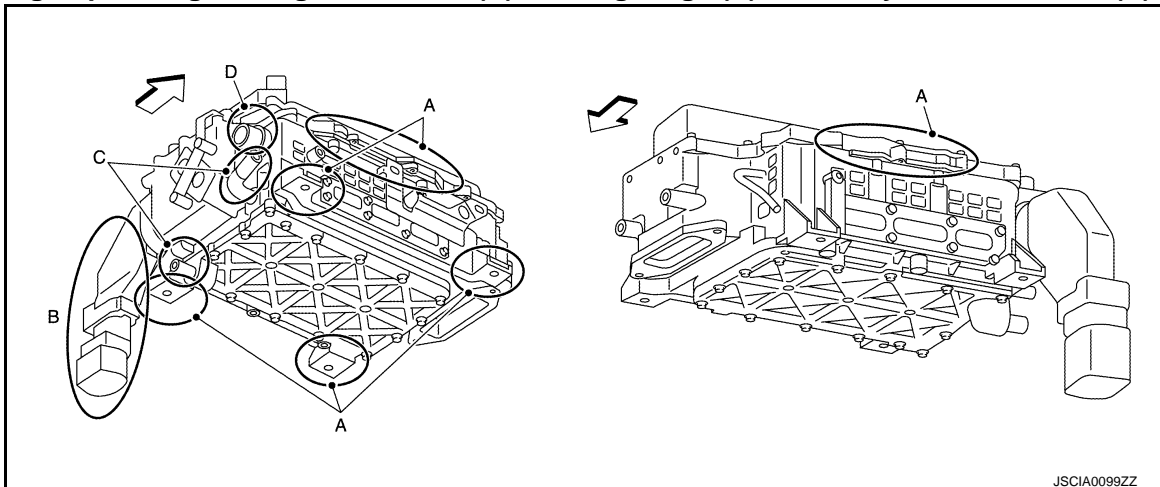
WARNING:

- To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- When removing and transporting traction motor inverter, grasp part (A) shown in figure.
- Do not grasp the high voltage connector (B), cooling bulge (C), or 12V system connector (D).



A

B



INSTALLATION

Pay attention to the following and install by following the procedure for removal in the reverse order.


WARNING:

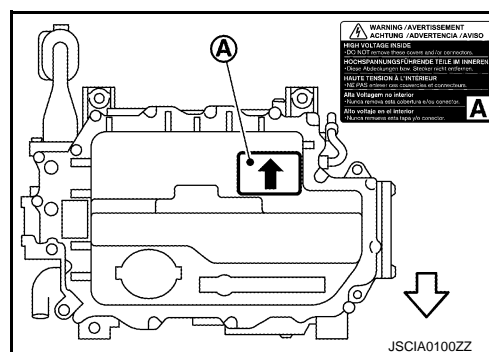


 To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

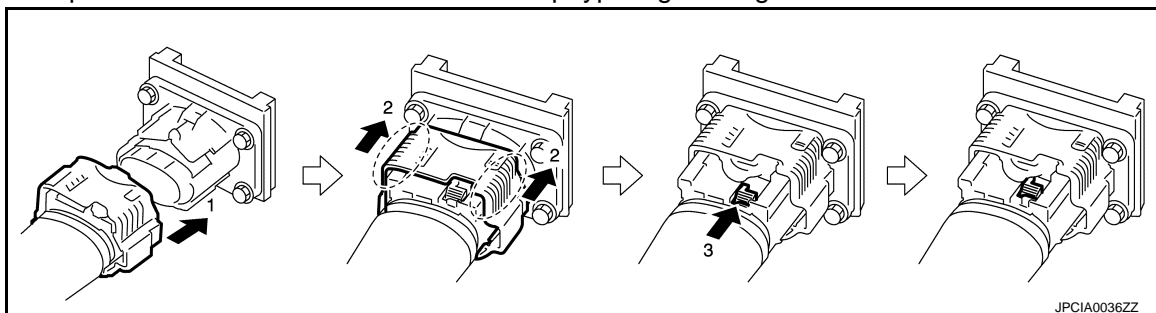
- Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.
 - Be sure to perform correct air bleeding after adding coolant. Refer to [HCO-11, "Draining and Refilling"](#).
 - If traction motor inverter was replaced, apply high voltage warning label at position (A), with top facing in the direction of arrow.
 - Before applying label, verify that there is no dust or dirt on surface of traction motor inverter.
- 



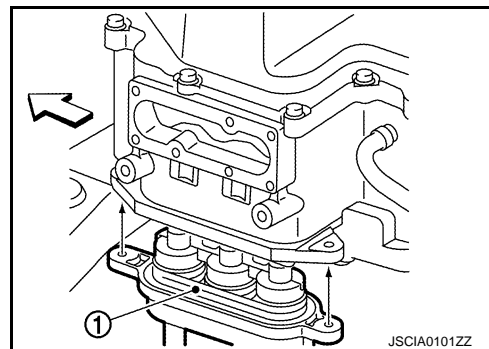
NOTE:

Place the ornament (NISSAN and Zero Emission) in place.

- Follow the procedure below and connect the 3-step type high voltage harness connector.



- When installing 3-phase harness, take care packing does not become displaced while inserting harness into inverter.



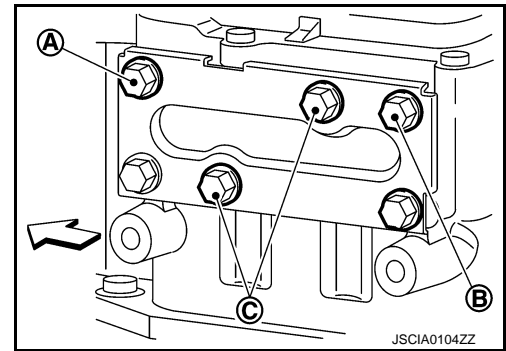
TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

- To tighten 3-phase harness cover bolt, temporarily tighten bolt (A) and (B) shown in the figure for positioning purpose before tightening two center bolts (C). After this, tighten four remaining bolts.



: Vehicle front

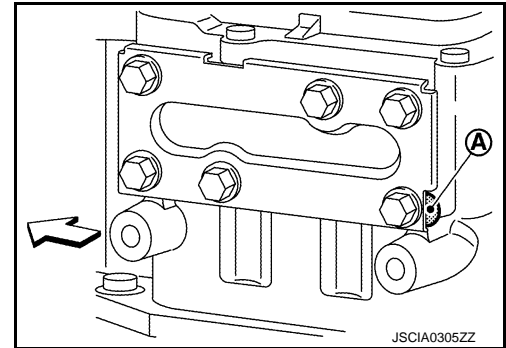


CAUTION:

- To install, align gasket tab (A) as shown in the figure.
- Gasket of the 3-phase harness cover is not reusable. Be sure to replace it with a new part.



: Vehicle front



- After all parts are installed, be sure to check equipotential. Refer to [TMS-122. "Inspection and Adjustment"](#).
- If traction motor inverter was replaced, perform resolver write. Refer to [TMS-44. "Work Procedure"](#).

Inspection and Adjustment

INFOID:000000006998458

INSPECTION AFTER INSTALLATION

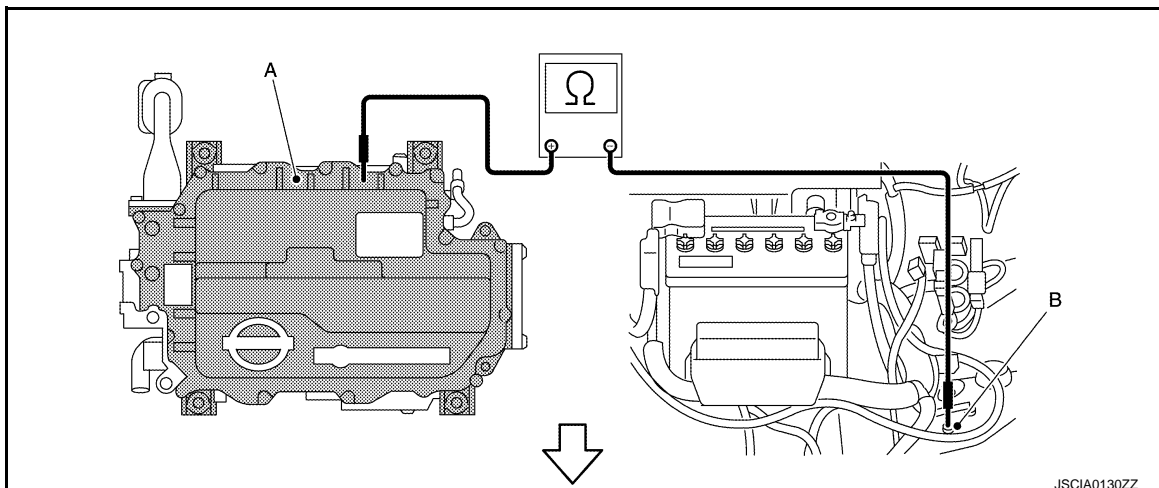
After installing traction motor inverter, measure resistance below.

- Between traction motor inverter (aluminum part) and DC/DC-J/B (aluminum part).
- Between traction motor inverter (aluminum part) (A) and body (ground bolt) (B).

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



Standard : Less than 0.1 Ω

TRACTION MOTOR INVERTER

< REMOVAL AND INSTALLATION >

If result deviates from standard values, check that no paint, oil, dirt, or other substance is adhering to bolts or conductive mounting parts. If any such substance is adhering, clean the surrounding area and remove the substance.

ADJUSTMENT AFTER INSTALLATION

It is necessary to perform writing of the traction motor resolver offset to the traction motor inverter after the traction motor inverter is replaced. Refer to [TMS-44, "Work Procedure"](#).

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TRACTION MOTOR

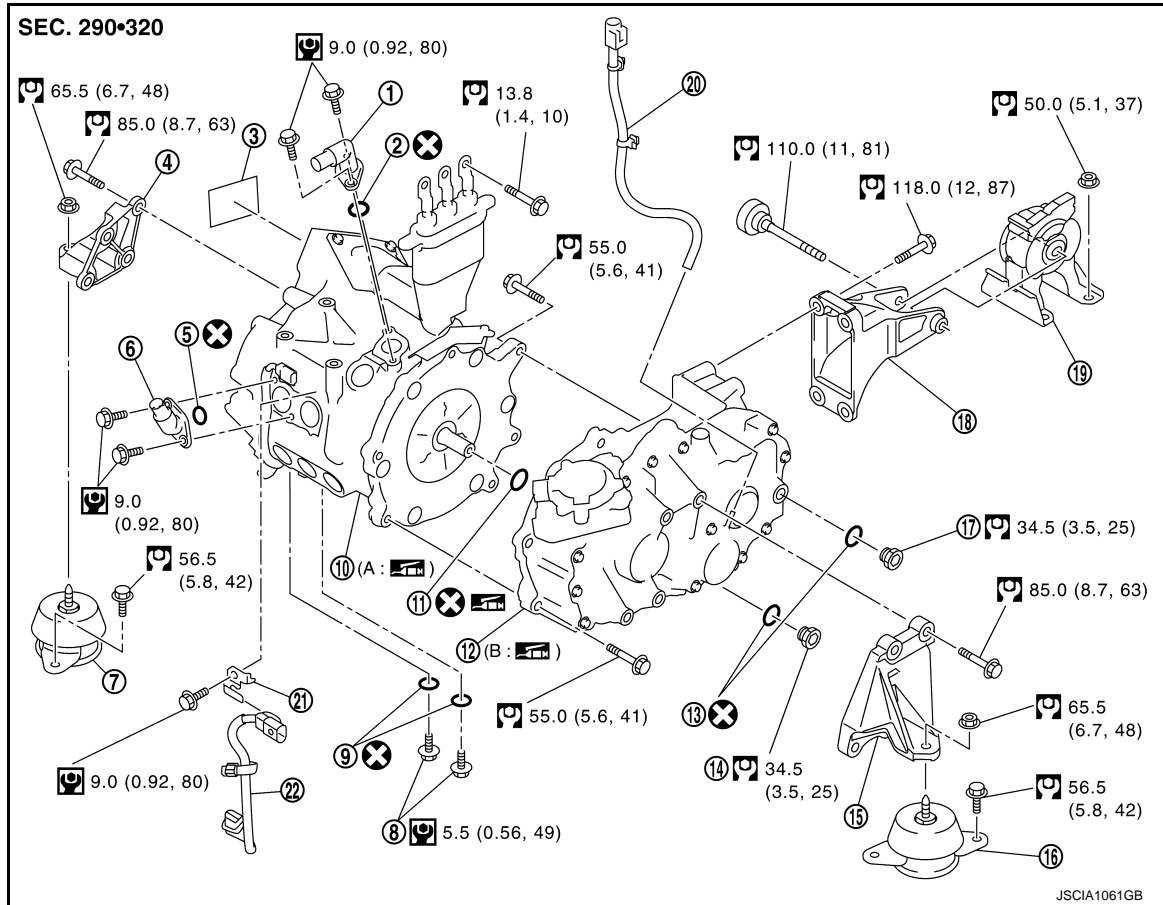
< UNIT REMOVAL AND INSTALLATION >

UNIT REMOVAL AND INSTALLATION

TRACTION MOTOR


Exploded View


INFOID:000000006998459





- | | | |
|-------------------------------------|-------------------|---------------------------------|
| 1. Water outlet | 2. O-ring | 3. High voltage warning label |
| 4. Motor mounting RH bracket | 5. O-ring | 6. Water inlet |
| 7. Motor mounting RH | 8. Drain bolt | 9. Gasket |
| 10. Traction motor | 11. O-ring | 12. Reduction gear |
| 13. Gasket | 14. Drain plug | 15. Motor mounting LH bracket |
| 16. Motor mounting LH | 17. Filler plug | 18. Motor mounting rear bracket |
| 19. Motor mounting rear | 20. Breather hose | 21. Harness bracket |
| 22. Traction motor resolver harness | | |

A. Shaft spline B. Inside of input shaft (inside of spline)

 : N-m (kg-m, in-lb)

 : N-m (kg-m, ft-lb)

 : Always replace after every disassembly.

 : Apply lithium-based grease including molybdenum disulphide.

Removal and Installation

INFOID:000000006998460

WARNING:

- Because hybrid vehicles and electric vehicles contain a high voltage battery, there is the risk of electric shock, electric leakage, or similar accidents if the high voltage component and vehicle are han-

TRACTION MOTOR

< UNIT REMOVAL AND INSTALLATION >

bled incorrectly. Be sure to follow the correct work procedures when performing inspection and maintenance.

- Be sure to remove the service plug in order to disconnect the high voltage circuits before performing inspection or maintenance of high voltage system harnesses and parts.
- To prevent the removed service plug from being connected by mistake during the procedure, always carry it in your pocket or put it in the tool box.
- Be sure to wear insulating protective equipment consisting of glove, shoes, face shield and glasses before beginning work on the high voltage system.
- Clearly identify the persons responsible for high voltage work and ensure that other persons do not touch the vehicle. When not working, cover high voltage parts with an insulating cover sheet or similar item to prevent other persons from contacting them.
- Refer to [TMS-5, "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 [GI-31, "How to Disconnect High Voltage"](#).

1. Check voltage in high voltage circuit. (Check that condenser are discharged.)
 - a. Lift up the vehicle and remove the li-ion battery under covers. Refer to [EVB-169, "Exploded View"](#) (TYPE 1), [EVB-395, "Exploded View"](#) (TYPE 2), [EVB-626, "Exploded View"](#) (TYPE 3), or [EVB-866, "Exploded View"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
 - b. Disconnect the high voltage connector from front side of Li-ion battery. Refer to [EVB-169, "Removal and Installation"](#) (TYPE 1), [EVB-395, "Removal and Installation"](#) (TYPE 2), [EVB-626, "Removal and Installation"](#) (TYPE 3), or [EVB-866, "Removal and Installation"](#) (TYPE 4). To identify vehicle type, refer to [EVB-14, "How to Check Vehicle Type"](#).
 - c. Measure voltage between high voltage harness terminals.

DANGER:



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

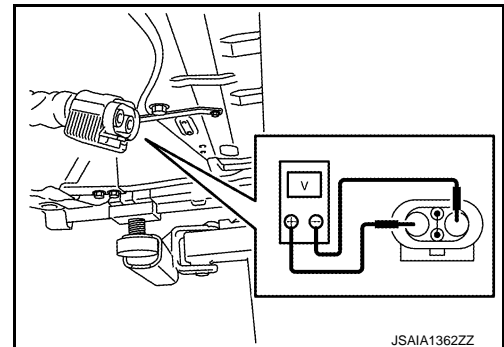


Standard

: 5 V or less

CAUTION:

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

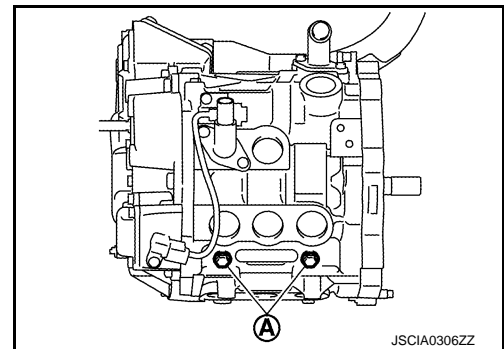


2. Drain coolant. Refer to [HCO-11, "Draining and Refilling"](#).
3. Remove drain bolt (A) of traction motor to drain coolant.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



4. Remove traction motor inverter. Refer to [TMS-116, "Removal and Installation"](#).
5. Drain reduction gear oil. Refer to [TM-15, "Draining and Refilling"](#).
6. Remove traction motor and reduction gear from vehicle together as suspension member assembly. Refer to [FSU-22, "Removal and Installation"](#).

TRACTION MOTOR

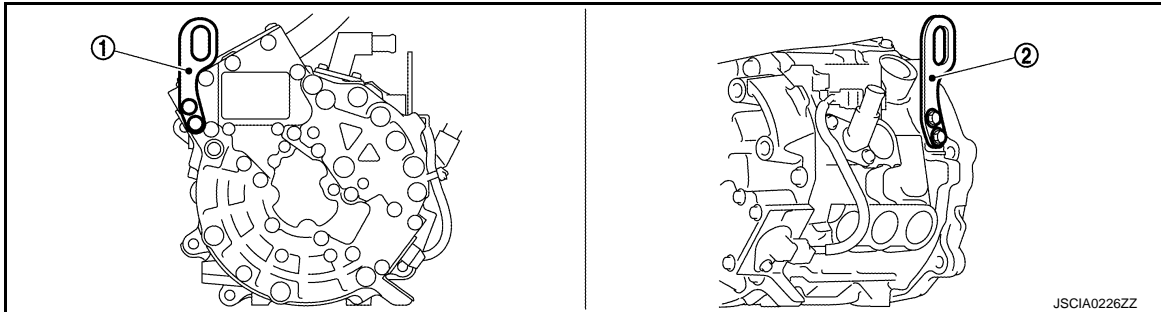
< UNIT REMOVAL AND INSTALLATION >

7. Remove reduction gear from suspension member. Refer to [TM-24, "Removal and Installation"](#).
8. Attach slinger to traction motor, and prepare to lift up with hoist.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



- 1 : Motor slinger (rear)
2 : Motor slinger (front)

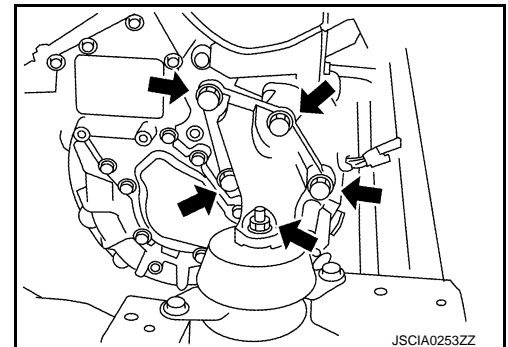
Tightening torque for mounting bolts  : 28.0 N-m (2.9 kg-m, 21ft-lb)

9. Remove right motor mounting bolt, then lift up traction motor with hoist and separate it from suspension member.

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



10. Remove traction motor resolver harness and harness bracket.

CAUTION:

Be careful not to damage harness bracket when remove the traction motor resolver harness from harness bracket.

INSTALLATION

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

WARNING:



To prevent electric shock hazards, be sure to put on insulating protective gear before beginning work on the high voltage system.



CAUTION:

- Be sure to reinstall high voltage harness clips in their original positions. If a clip is damaged, replace it with a new clip before installing.
- Be sure to perform correct air bleeding after adding coolant. Refer to [HCO-11, "Draining and Refilling"](#).
- If traction motor was replaced, perform resolver correction value learning. Refer to [TMS-44, "Work Procedure"](#).

2011 LEAF

TRACTION MOTOR

< UNIT REMOVAL AND INSTALLATION >



Standard : Less than 0.1 Ω

If result deviates from standard values, check that no paint, oil, dirt, or other substance is adhering to bolts or conductive mounting parts. If any such substance is adhering, clean the surrounding area and remove the substance.

ADJUSTMENT AFTER INSTALLATION

It is necessary to perform writing of the traction motor resolver offset to the traction motor inverter after the traction motor is replaced. Refer to [TMS-44, "Work Procedure"](#).